

1. Family 72572204 (WO20040325 A1)

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Title

[EN] CARBON DIOXIDE STORAGE CEMENT COMPOSITION USING CARBON DIOXIDE CAPTURED BY-PRODUCT, AND METHOD FOR PRODUCING SAME

Abstract

[EN] The present invention relates to a cement composition and a method for producing same, and specifically, to a carbon dioxide storage cement composition using a carbon dioxide captured by-product and a method for producing same, wherein: a carbon dioxide captured by-product is produced by capturing carbon dioxide by reacting an exhaust gas discharged from cement production equipment with an absorbent solution in which calcium hydroxide (Ca(OH)₂) and an alkaline admixture are mixed; and an additive is added to the carbon captured by-product and the resultant by-product is dried into a powdery form, and then mixed into cement to produce a carbon dioxide storage cement.

1st Main Claim

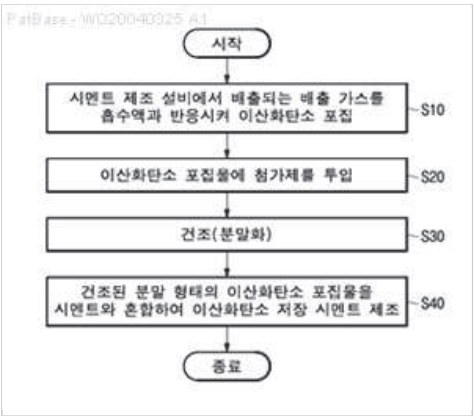
[MT] In the exhaust gas discharged from the cement manufacturing facility), calcium hydroxide (Caand alkali admixture to is mixed is supplied to the absorption liquid stored in the reaction column carbon dioxide collector for collecting carbon dioxide to produce a by-product of

the reaction column collection process is produced in the form of carbon dioxide precipitated sludge byproducts and additives in the additive injection process in the microwave dryer; and

using the microwaves in the microwave dryer additives is injected in the form of a powder by drying the carbon capture by-products; and

drying the discharged carbon dioxide drying process and portland cement 85 to 95 parts by weight by 5 to 15 parts by weight percent mixture in the cement manufacturing process for producing a carbon dioxide storage cement characterized in that it comprises a by-product of carbon dioxide collector with the carbon dioxide storage cement composition production method.

Assignees: DAEWOO ENG AND CONSTR CO LTD; DAEWOO ENGINEERING AND CONSTRUCTION CO LTD; NOVIL; DAEWOO E AND C CO LTD



2. Family 29792163 (CA2255287 AA)

[View in PatBase](#)

Title
[EN] CARBON DIOXIDE MITIGATION AND UTILIZATION PROCESS VIA CHEMICAL FIXATION TO VALUABLE COMMODITIES

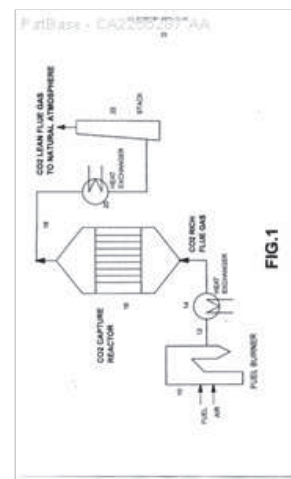
Abstract

[EN] A novel process of capturing and utilization of carbon dioxide from flue gases as a method of reducing the level of carbon dioxide emissions into the atmosphere is disclosed. The carbon dioxide is first chemically captured directly from the emission stream and then transformed into valuable commercial commodities. The capturing process comprises in passing the stream of flue gas through a reactor packed with a bed of capturing agent selected from the group consisting of calcium hydroxide, magnesium hydroxide, iron hydroxide and combinations thereof, at a temperature from about 200.degree. C to about 400.degree. C, a pressure of about 1 atmosphere to about 10 atmosphere and gas hourly space velocity from about 1000 h⁻¹ to about 10,000 h⁻¹. If desired, CO₂ from the flue gas stream can first be separated by a membrane separator and then reacted with capturing agent. The said calcium hydroxide and magnesium hydroxide as capturing agents are synthesized from the group of abundantly available materials consisting of chloride salts of calcium and magnesium of sea water, fluorite/fluorspar (CaF₂) mineral and apatite/rock phosphate (impure Ca₃(PO₄)₂) mineral. Iron hydroxide in ferrous form as capturing agent is synthesized from haematite ore of iron present in abundance in earth's crust. The process of transforming the chemically captured carbon dioxide to valuable products is carried out by mixing the said chemically captured CO₂ material with a suitable binding agent to form a plastic-like substance which is then compression molded in a pellet press or in an extruder to form mechanically strong, thermally stable and environmentally friendly articles of desired shapes and sizes having numerous potential domestic and engineering applications, enabling a permanent fixation of carbon dioxide.

1st Main Claim

[EN] 1. A novel process of capturing and utilization of CO₂ from flue gas streams as a measure to reduce CO₂ emissions in the atmosphere, which comprises of the following steps: (a) passing the flue gas through a reactor packed with a bed of CO₂ capturing agent of this invention; and (b) transforming the chemically captured CO₂ material "CHEM-CO₂" formed in step (a) into value-added shaped articles "CHEM-CO₂-P" by mixing it with a suitable binding material and molding the mix in a pelleting press or in an extruder. 19

Assignees: PANDEY RAJ N



3. Family 92675722 (WO23226473 A1)

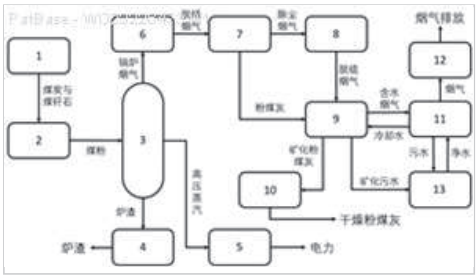
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Title

[EN] COOPERATIVE UTILIZATION SYSTEM FOR COAL GANGUE POWER GENERATION AND CO2 MINERALIZATION AND WORKING METHOD

Abstract

[EN] Disclosed in the present application are a cooperative utilization system for coal gangue power generation and CO2 mineralization and a working method thereof, said system comprising a coal bunker, a coal preparation unit, a boiler unit, a power generation unit, a denitration unit, a dust removal unit, a desulfurization unit, a mineralization unit, a fly ash drying unit, a cooling tower, a chimney and a waste water treatment unit. On the basis of an existing coal gangue and coal blending combustion power generation system, the coal preparation unit and the waste water treatment unit are modified, and the mineralization unit and the fly ash drying unit are added; and during the mineralization process of the mineralization unit, part of CO2 in the flue gas can be immobilized, such that emission reduction of CO2 is achieved. Meanwhile, CaO and MgO in the fly ash can be converted into CaCO3 and MgCO3, thereby extending the application field of the solid waste fly ash and increasing the utilization rate of the fly ash. The present application can achieve solid waste utilization of coal gangue and reduction of the CO2 emission amount. In addition, the content of CaO and MgO in the fly ash can be reduced, thereby increasing the application of the fly ash in the field of building material manufacturing.



1st Main Claim

[MT] A coal gangue power generation with CO₂A mineralization co-utilization system, characterized in that it comprises a coal silo (1), a coal preparation unit (2), a boiler unit (3), a slag collection unit (4), a power generation unit (5), a denitrification unit (6), A dust removing unit (7), a sulfur removing unit (8), a mineralization unit (9), a fly ash drying unit (10), a cooling tower (11), a chimney (12) and a wastewater treatment unit (13);

The outlet of the coal bin (1) is connected to the inlet of the coal preparation unit (2), the outlet of the coal preparation unit (2) is connected to the feed inlet of the boiler unit (3), the slag outlet of the boiler unit (3) is connected to the slag collection unit (4), and the steam outlet of the boiler unit (3) is connected to the power The flue gas outlet of the boiler unit (3) is connected to the inlet of the denitrification unit (6), the outlet of the denitrification unit (6) is connected to the inlet of the dust removal unit (7), and the flue gas outlet of the dust removal unit (7) is connected to the inlet of the sulfur removal unit The fly ash outlet of the dust removal unit (7) is connected to the fly ash inlet of the mineralization unit (9), The outlet of the de-sulfur unit (8) is connected to the flue gas inlet of the mineralization unit (9), the flue gas outlet of the mineralization unit (9) is connected to the inlet of the cooling tower (11), the fly ash outlet of the mineralization unit (9) is connected to the inlet of the fly ash drying unit (10) The wastewater outlet of the mineralization unit (9) is connected to the inlet of the wastewater treatment unit (13), the flue gas outlet of the cooling tower (11) is connected to the inlet of the chimney (12), the condensate outlet of the cooling tower (11) is connected to the make-up inlet of the mineralization unit (9) The wastewater outlet of the cooling tower (11) is connected to the inlet of the wastewater treatment unit (13), and the outlet of the wastewater treatment unit (13) is connected to the clean water inlet of the condensing tower (11).

Assignees: HUANENG CLEAN ENERGY RES INST; HUANENG DAQING THERMOELECTRICITY CO LTD

4. Family 55523638 (WO14005227 A1)

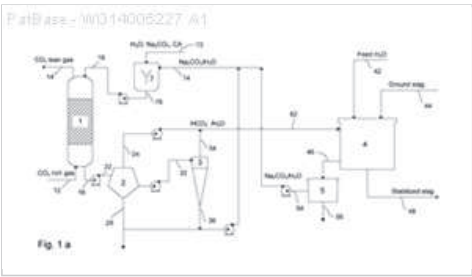
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Title
[EN] SLAG STABILIZATION WITH CAPTURED CARBON DIOXIDE

Abstract
[EN] Methods and processes for stabilizing a ground slag produced from a steelmaking operation. Optionally, a CO₂-containing gas may be contacted with a an aqueous absorption solution in presence of a biocatalyst, in a reactor, for enzymatically catalyzing a hydration reaction of dissolved CO₂ into bicarbonate ions and hydrogen ions to produce an ion loaded solution and a CO₂ lean gas. The ion loaded solution is then contacted with the ground slag to produce CaCO₃, MgCO₃, a stabilized slag depleted in CaO and MgO, and an alkaline liquor comprising carbonate ions CO₃²⁻. Alternatively, the ground slag may be contacted with water to leach CaO and MgO and produce a slurry containing Ca(OH)₂ and Mg(OH)₂, which is contacted with the ion loaded solution to produce CaCO₃ and MgCO₃ and the stabilized slag depleted in CaO and MgO.

1st Main Claim
[EN] 1. An enzymatically enhanced method for stabilizing a ground slag produced from a steelmaking operation, the method comprising contacting the ground slag with an ion loaded solution comprising bicarbonate and hydrogen ions produced from enzymatically enhanced absorption of CO₂.

Assignees: CO2 SOLUTIONS INC



5. Family 104518811 (WO24191274 A1)

[View in PatBase](#)

Title

[EN] METHOD FOR IMPROVING STRENGTH OF CONCRETE BY ADDING, TO CEMENT, BASIC ALKALI MIXTURE SOLUTION USED FOR CARBON DIOXIDE CAPTURE

Abstract

[EN] The present invention relates to a method for improving the strength of concrete by recycling a basic alkali mixture solution used for carbon dioxide capture and adding same to cement. According to one embodiment, the method comprises the steps of: (a) making a basic alkali mixture solution of specific components come in contact with carbon dioxide in the air in order to capture carbon; (b) forming a carbon dioxide reaction product containing sodium carbonate (Na_2CO_3) or sodium bicarbonate (NaHCO_3) by the reaction of the basic alkali mixture solution having come in contact with carbon dioxide; (c) injecting, in a preset ratio, the carbon dioxide reaction product into a cement powder for concrete placement; (d) mixing, for a preset time, the cement powder into which the carbon dioxide reaction product has been injected, thereby forming concrete paste; and (e) pouring the formed concrete paste.

1st Main Claim

[MT] (A) contacting a basic alkaline mixture of the specific components with carbon dioxide in the air for capturing carbon dioxide;

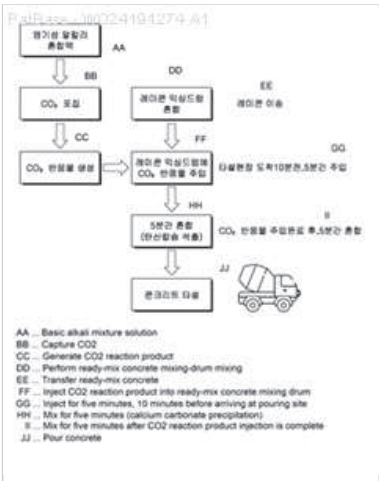
(B) the basic alkaline mixed liquid contacted with the carbon dioxide is reacted to sodium carbonate (Na_2CO_3) Sodium hydrogen carbonate (NaHCO_3) or sodium hydrogencarbonate (NaHCO_3);

(C) injecting the carbon dioxide reactant at a predetermined ratio into the cement powder for concrete batching;

(D) forming a concrete batter by mixing the cement powder injected with the carbon dioxide reactant for a predetermined time; and

A method of improving concrete strength by adding a basic alkali mixture used for carbon dioxide capture, comprising the steps of: (e) setting the formed concrete batter to cement.

Assignees: LOWCARBON CO LTD



6. Family 103306979 (KR20240096997 A)

[View in PatBase](#)

Title

[EN] LIGHT WEIGHT FOAMED CONCRETE COMPOSITION USING CALCIUM CARBONATE BY CARBON DIOXIDE CAPTURE OF CIRCULATING FLUIDIZED BED COMBUSTION BOILER BY PRODUCTED DESULFURIZATION GYPSUM AND LIGHT WEIGHT FOAMED CONCRETE USING THE SAME

Abstract

[MT] The present invention relates to lightweight cellular concrete compositions using carbon dioxide-encapsulated calcium carbonate of circulating fluidized bed boiler desulfuric gypsum and to lightweight cellular concrete using the same. More specifically, the present invention relates to a method of preparing a mixture of 5 to 10 weight percent of a carbonate produced by collecting, carbonating carbon dioxide from circulating fluidized bed (CFBC) boilers to 65 weight percent , Provided are a lightweight cellular concrete composition using carbon dioxide-encapsulated carbonate of a circulating fluidized bed boiler desulfurization gypsum that exhibits fire resistance performance , improved air quality , and antimicrobial effect of lightweight cellular concrete , and a lightweight cellular concrete using the same .

1st Main Claim

[MT] 1. The desulfurization gypsum generated in a circulating fluidized bed (CFBC) boiler, 5-10 wt. % Of a carbonate produced by entrapping, carbonating carbon dioxide, 45-65 wt. % Of a cement, 20-40 wt. % Of a lime (Cao) 6-16 wt. % Of a lime powder and 2-5 wt. % Of a foaming agent and water, after autoclaving the granulated concrete, improving the carbon dioxide flow by-product by-product by-product of the granulated concrete, reducing the granulated product by-product by-product by-product, by-product, by-product, by-product of the sulfur by-product, by-product, by-product of the sulfur by-product, by-product

Assignees: SYC CO LTD

7. Family 24116168 (US2004131531 AA)

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Title (EP1379469 B1)

[EN] PROCESS FOR MINERAL CARBONATION WITH CARBON DIOXIDE

Abstract (EP1379469 B1)

[EN] A process for mineral carbonation with carbon dioxide wherein carbon dioxide is reacted with a bivalent alkaline earth metal silicate, selected from the group of ortho-, di-, ring, and chain silicates, which silicate is immersed in an aqueous electrolyte solution. The invention further relates to the use of the mixture of carbonate and silica formed in such a process in construction materials and to the use of the carbonate formed by such a process for the production of calcium oxide.

1st Main Claim (EP1379469 B1)

[EN] 1. A process for mineral carbonation with carbon dioxide wherein carbon dioxide is reacted with a bivalent alkaline earth metal silicate, selected from the group of ortho-, di-, ring, and chain silicates, which silicate is immersed in an aqueous electrolyte solution, wherein the concentration of electrolyte in the electrolyte solution is at least 0.01 moles per litre.

Assignees: SHELL INT RESEARCH; SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B V; OOSTERBEEK HEIKO; SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ BV; GEERLINGS JACOBUS JOHANNES COR; MESTERS CAROLUS MATTHIAS ANNA

8. Family 87295266 (WO21194411 A1)

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Title

[EN] MINERALIZED CARBON DIOXIDE

(73) Patentee:	SE202000142 Aercement AB, Mädevigatan 1, 113 61 Stockholm SE
(72) Inventor:	Erik Larsson, Stockholm SE
(74) Agent:	AWA Sweden AB, Box 45086, 104 30, STOCKHOLM SE
(54) Title:	Mineralized carbon dioxide
(56) Cited documents:	US 2013167756 A1
(57) Abstract:	

Abstract

[EN] A method comprising mixing cement and water with a rotating mixer screw creating a cement paste; mixing a surfactant and high-pressure air creating a foam; and mixing the foam with the cement paste together with liquid carbon dioxide being at below freezing temperatures.

1st Main Claim

[EN] 1. A method comprising - mixing cement and water with a rotating mixer screw creating a cement paste; - mixing a surfactant and high-pressure air creating a foam; and - mixing the foam with the cement paste together with liquid carbon dioxide being at below freezing temperatures.

Assignees: AERCEMENT AB

9. Family 30568213 (US2004089203 AA)

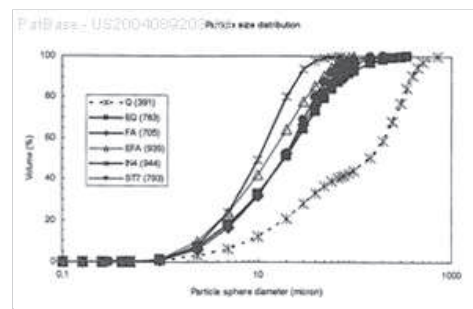
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Title (EP1558543 B1)

[EN] PROCESS FOR PRODUCING BLENDED CEMENTS WITH REDUCED CARBON DIOXIDE EMISSIONS

Abstract

[EN] A process for producing blended cement, where the cement contains Portland Cement mixed thoroughly with a microfiller and possibly a water reducing agent to a dry cement mixture and fine supplementary cementitious materials selected from the materials blast furnace slag, fly ash, quartz, silica, amorphous silicon dioxide, limestone and recycled concrete. The invention is characterized in, that said supplementary materials in a first step are being subjected to a grinding in a dry state to a specific surface of at least 1000 cm²/g (Blaine), in that in a second step the supplementary grinded materials are being subjected to a grinding together with at is least 20 percent by weight of the total grinding mass of a highly reactive cement mixture in a dry state to achieve a specific surface of at least 3000 cm²/g (Blaine), which highly reactive cement mixture contains cement and at least one of the components a SiO₂ containing microfiller and a polymer in the form of a powdery water-reducing agent which mixture have been previously been treated in a grinder with vibrating grinding media in which the cement particles are subjected to a large number of impact impulses giving the cement particles an increase in surface energy and chemical reactivity.



1st Main Claim (EP1558543 B1)

[EN] 1. A process for producing blended cement, where the cement contains Portland Cement mixed thoroughly with a microfiller and possibly a water reducing agent forming dry cement mixture and where the cement mixture also contains fine supplementary cementitious materials selected from the materials blast furnace slag, fly ash, quartz, silica, amorphous silicon dioxide, limestone and recycled concrete **characterised in, that** said supplementary materials in a first step are being subjected to a grinding in a dry state to a specific surface of at least 1000 cm²/g (Blaine), **in that** in a second step the supplementary grinded materials are being subjected to a grinding together with at least 20 percent by weight of the total grinding mass of a highly reactive cement mixture in a dry state to achieve a specific surface of at least 3000 cm²/g (Blaine), which highly reactive cement mixture contains cement and at least one of the components selected from the group consisting of a SiO₂ containing microfiller and a polymer in the form of a powdery water-reducing agent which mixture have been previously been treated in a grinder with vibrating grinding media in which the cement particles are subjected to a large number of impact impulses giving the cement particles an increase in surface energy and chemical reactivity such that a cement paste cube having the size of 20 mm and compacted thoroughly under vibration and cured at +20 degrees centigrade under sealed conditions has a one-day compressive strength equal to at least 60 MPa.

Assignees: PROCEDO ENTPR ETABLISSEMENT; PROCEDO ENTERPRISES ETABLISSEMENT; PROCEDO ENTERPRISES ETS; PROCEDO ENTPR ETS; RONIN VLADIMIR; PROCEDO ENTERPRISES ETABLISSE; PROSEDO EHINTERPRAJZES EHTABLIS

10. Family 52797738 (EP2589671 A1)

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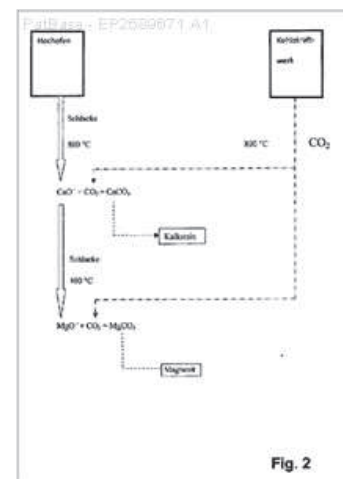
Title (EP2589671 B1)

[EN] METHOD AND APPARATUS FOR INTEGRATING AND USING ENVIRONMENTALLY HARMFUL CARBON DIOXIDE

Abstract

[EN] The method comprises supplying environmentally harmful carbon dioxide in a compressed form, after the termination of a respective blast furnace tap, for direct utilization of heat energy of regions at which waste slag is generated, where the waste slag comprises a thermal energy in the temperature range of 400-800[deg] C, and bringing element oxides contained in the waste slag in contact with the waste slag generating regions, where carbon dioxide is transmitted to calcium oxide components present in the waste slags for its integration thus producing limestone. The method comprises supplying environmentally harmful carbon dioxide in a compressed form, after the termination of a respective blast furnace tap, for direct utilization of heat energy of regions at which waste slag is generated, where the waste slag comprises a thermal energy in the temperature range of 400-800[deg] C, bringing element oxides contained in the waste slag in contact with the waste slag generating regions, where carbon dioxide is transmitted to calcium oxide components present in the waste slags for its integration thus producing limestone and to magnesium oxide components present in the waste slags for its integration thus producing magnesite, and segregating products produced by known separation processes during the cooling process of the waste slag, where

the temperature of the waste slag falls below a predetermined minimum temperature of 800[deg] C. The carbon dioxide-concentration is controlled as long as the heat present in the waste slag is sufficient for the implementation of the respective integration method and the sufficient amount of the element oxides is present. The carbon dioxide is supplied by an energy-generating power plant, which produces energy by burning fossil fuels or by conversion of biomass, and/or supplied by a cement plant. An independent claim is included for a device for integrating environmentally harmful carbon dioxide from technical processes of blast furnaces of a metallurgical-, steel- or casting industry using element oxides.



1st Main Claim (EP2589671 B1)

[EN] 1. Process for the incorporation of environmentally-harmful carbon dioxide with the inclusion of elemental oxides from the technical processes of blast furnaces in the metallurgical, steel or foundry industry, **characterised in that**, the environmentally-harmful carbon dioxide to be incorporated is supplied after the respective termination of the blast furnace tapping for the direct use of thermal energy to the areas of the origin of the blast furnace slag in compressed form and the CO₂ - concentration controlled as long as the amount of heat available in the blast furnace slag for the implementation of the respective incorporation method is sufficient and the sufficient level of elemental oxides is available, in which the blast furnace slag shows a heat energy in the temperature range 400 degrees centigrade to 1000 degrees centigrade, in particular in the temperature range of 800 degrees centigrade to 1000 degrees centigrade, and in these local areas with elemental oxides contained in the blast furnace slag and / or whose ionised states are reactively bonded.

Assignees: BEYER WOLFGANG; WERFEL FRANK

11. Family 104083747 (KR20240127127 A)

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Title

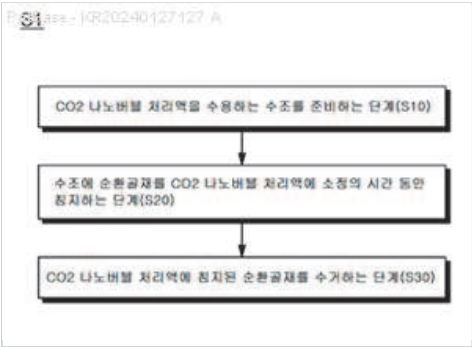
[EN] CO2 CARBONATION METHOD OF CEMENT PASTE INCLUDED RECYCLED AGGREGATE USING CARBON DIOXIDE NANO BUBBLE

Abstract

[MT] The present invention relates to a method of carbonating cement paste contained in circulating aggregates with CO2 nanobubbles , comprising the steps of : preparing a water bath for receiving said CO2 nanobubble treatment liquid ; immersing the circulating aggregates in said water bath into said CO2 nanobubble treatment liquid for a predetermined time ; and collecting the circulating aggregates immersed in said CO2 nanobubble treatment liquid .

1st Main Claim

[MT] 1. CO₂ A cement paste carbonation method contained in a circulating aggregate using nanobubbles , wherein CO is provided₂ Preparing a water bath containing a nanobubble treatment liquid ; and mixing the circulating aggregates with the CO to the water bath₂ Immersing the nanobubble treatment liquid for a predetermined period of time in the nanobubble treatment liquid ; and the CO₂ Collecting circulating aggregates immersed in the nanobubble treatment liquid₂ A cement paste carbonation method contained in circulating aggregate using nanobubbles .



Assignees: KOREA NATIONAL UNIV OF TRANSPORTATION IND ACADEMIC COOPERATION FOUNDATION

12. Family 82267349 (US2022212992 AA)

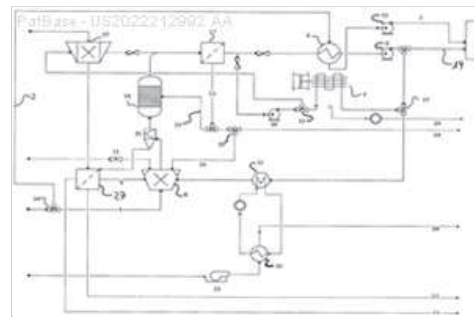
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Title (EP3744700 B1)

[EN] IMPROVED PROCESS AND DEVICE FOR CARBONATING CONCRETE WASTE AND/OR SEQUESTERING CO₂

Abstract

[EN] A method for manufacturing supplementary cementitious material and sequestering CO₂ by carbonating concrete fines has the following steps: grinding the concrete fines obtained from crushed concrete demolition waste in a mill at a temperature from 1 to 10 degrees centigrade above the water dew point in a carbonating atmosphere provided by a gas containing from 10 to 99 Vol.-% CO₂, circulating the ground and partially carbonated concrete fines in a fluidized bed reactor in contact with the carbonating atmosphere, and withdrawing decarbonated gas and carbonated concrete fines.



1st Main Claim (EP3744700 B1)

[EN] 1. Method for manufacturing supplementary cementitious material and sequestering CO₂ by carbonating concrete fines comprising the steps:

- - grinding the concrete fines obtained from crushed concrete demolition waste in a mill at a temperature from 1 to 10 degrees centigrade above the water dew point in a carbonating atmosphere provided by a gas containing from 10 to 99 Vol.-% CO₂,
- - circulating the ground and partially carbonated concrete fines in a fluidized bed reactor connected to the mill as carbonation zone in contact with the carbonating atmosphere, and
- - withdrawing decarbonated gas and carbonated concrete fines with recirculation of some of the gas and concrete fines to the reactor and/or mill, wherein at least 80 wt.-% percent of the concrete fines are carbonated.

Assignees: HEIDELBERGCEMENT AG; HCONNECT 2 GMBH

13. Family 100929089 (KR20240011468 A)

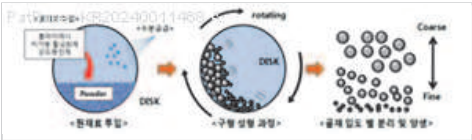
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Title
[EN] TETRAPOT COMPOSITION USING CARBON DIOXIDE COLLECTOR MATERIAL

Abstract
[EN] The present invention relates to a tetrapot composition using carbon dioxide collector materials, comprising water, cement, and artificial aggregate, wherein the artificial aggregate is molded to a certain particle size from a mixture of bottom ash, fly ash, slag, carbon dioxide capture, water, and additives.

1st Main Claim
[MT] 1. Water, cement, artificial aggregate comprising: Bottom ash, fly ash, A tetrapoport composition using a carbon dioxide-trapping material , characterized in that a slag , a carbon dioxide-trapping material , water , and an additive are formed into a uniform particle size .

Assignees: CHEMICAL CORP KG



14. Family 101531532 (KR20240027201 A)

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Title

[EN] TETRAPOD MANUFACTURING METHOD USING CARBON DIOXIDE CAPTURE

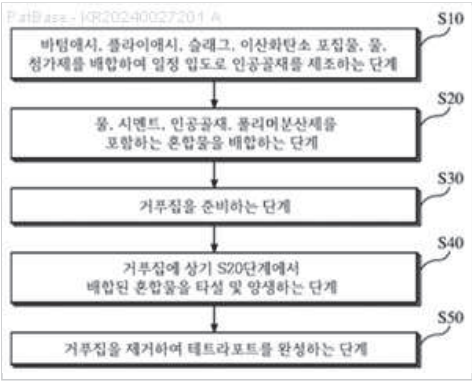
Abstract

[EN] The present invention relates to a method for manufacturing a tetrapod using a carbon dioxide capture material, characterized by including a step (S10) of manufacturing an artificial aggregate having a predetermined particle size by mixing bottom ash, fly ash, slag, carbon dioxide capture material, water, and an additive; a step (S20) of mixing a mixture containing water, cement, artificial aggregate, and a polymer dispersant; a step (S30) of preparing a formwork; a step (S40) of pouring and curing the mixture mixed in step S20 into the formwork; and a step (S50) of removing the formwork to complete the tetrapod.

1st Main Claim

[MT] 1. Bottom ash, fly ash, slag, carbon dioxide capture, water, Blending additives to form an artificial aggregate at a constant degree of granularity S10; blending S20 the mixture comprising water, cement, artificial aggregate, and polymer dispersant; preparing a formwork S30; compression and curing S40 the blended mixture in the S20 step in the formwork ; removing the formwork to complete a tetrapode.

Assignees: CHEMICAL CORP KG

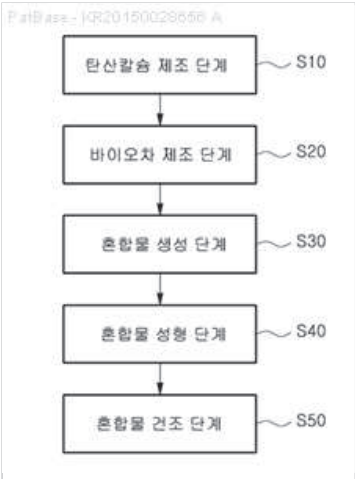


15. Family 58697170 (KR20150028656 A)

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Title
[EN] METHOD FOR MANUFACTURING LIGHTWEIGHT AGGREGATE CONTAINING CARBON DIOXIDE AND LIGHTWEIGHT AGGREGATE MANUFACTURED THEREBY

Abstract
[EN] The present invention relates to a method for manufacturing carbon dioxide-containing lightweight aggregates. According to the present invention, carbon dioxide can be effectively consumed for carbon dioxide reduction and the lightweight aggregates used in building construction or the like can be manufactured in quantity. The method includes a calcium carbonate production step in which calcium ions are extracted by acidizing calcium ion-containing inorganic wastes, calcium hydroxide is formed by adjusting the pH of the extracted calcium ions, a calcium carbonate aqueous solution is produced through a reaction between the calcium hydroxide and the carbon dioxide, and powered calcium carbonate is produced by performing solid-liquid separation on the calcium carbonate aqueous solution; a biochar production step in which biochar is produced by putting biomass in a pyrolysis tank accommodating carbon dioxide in an oxygen-free state and performing pyrolysis at a high temperature; a mixture generation step in which a mixture is generated by mixing the powdered calcium carbonate with the biochar at a predetermined ratio; a mixture molding step in which the mixture is put into a molding machine and is formed into a granular shape with an organic binder added; and a mixture drying step in which the molded mixture is dried for aggregate manufacturing.



1st Main Claim
[MT] 1. The inorganic wastes containing calcium ions to the acid treatment and extraction of calcium ions, by adjusting the pH of the extracted calcium ion to form a calcium hydroxide, the calcium hydroxide and calcium carbonate by reacting carbon dioxide to create a solution, the aqueous solution of calcium carbonate solid-liquid separation of the calcium carbonate in powder form and calcium carbonate production step for producing a through; And bio-manufacturing step for manufacturing a car bio car carbon dioxide into oxygen-free state yet biomass pyrolysis section is received by the thermal decomposition at a high temperature; And a generation step of generating a mixture by mixing a mixture of calcium carbonate and the bio-difference between the powder form at a certain rate; And shaping the mixture into the mixture in the molding machine by the addition of an organic binder for forming a granular form; Drying the molded mixture to the dry mixture to prepare the aggregate; One containing carbon dioxide, characterized in that it comprises a lightweight aggregate manufacturing method.

Assignees: 4EN INC

16. Family 98792304 (US2023271134 AA)

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Title (EP4482805 A1)

[EN] CARBON DIOXIDE-CAPTURING CEMENT COMPOSITIONS AND RELATED METHODS

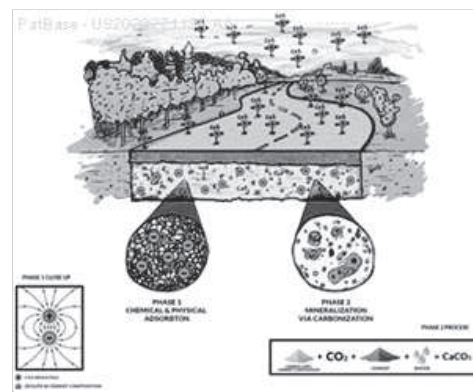
Abstract (EP4482805 A1)

[EN] Cement compositions that can capture carbon dioxide and related methods are generally described. These cement compositions can supplement and/or be added to concrete-forming materials to form concrete that can sequester carbon dioxide directly within the concrete.

1st Main Claim (EP4482805 A1)

[EN] 1. A concrete admixture, comprising: a first plurality of particles comprising a pozzolanic material; and a second plurality of particles comprising a metal oxide, wherein the concrete admixture is capable of enhancing the absorption of carbon dioxide of a cement composition or a concrete composition.

Assignees: CARBON LIMIT CO



17. Family 105674947 (US2024409461 AA)

[View in PatBase](#)

Title (EP4474365 A1)

[EN] CONCRETE COMPOSITION AND CONCRETE COATING MATERIAL CONTAINING BACTERIA HAVING CARBON DIOXIDE ADSORPTION MECHANISM, AND SHOTCRETE CONSTRUCTION METHOD USING THE SAME

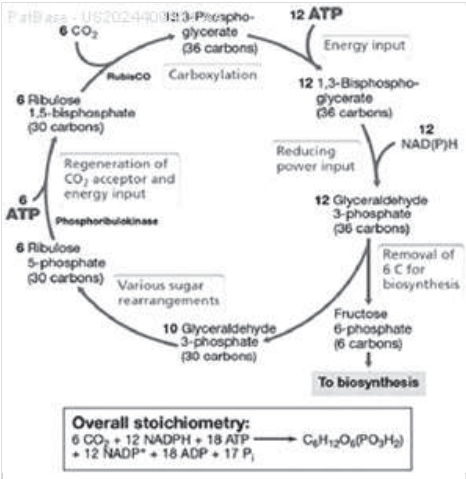
Abstract (EP4474365 A1)

[EN] A concrete composition and concrete coating material contain bacteria having a carbon dioxide adsorption mechanism in order to improve the durability of concrete structures and adsorb carbon dioxide in the air regardless of light and dark conditions. A shotcrete construction method uses the same. The concrete composition contains a cement-based inorganic binder and an aggregate mixture. The cement-based inorganic binder includes at least one of type 1 ordinary Portland cement, blast furnace slag, and fly ash. The aggregate mixture includes a normal aggregate, and a porous material impregnated with alkalophilic bacteria having a carbon dioxide adsorption mechanism and forming a glycocalyx. The concrete coating material contains the cement-based inorganic binder, the aggregate mixture, and a fiber material. The fiber material may include at least one of polyethylene and nylon.

1st Main Claim (EP4474365 A1)

[EN] 1. A concrete composition comprising:

- a cement-based inorganic binder including at least one of type 1 ordinary Portland cement, blast furnace slag, and fly ash; and
- an aggregate mixture including a normal aggregate and a porous material impregnated with alkalophilic bacteria having a carbon dioxide adsorption mechanism and forming a glycocalyx.



Assignees: KYONGGI UNIV IND AND ACADEMIA COOPERATION FOUNDATION; UNIV KYONGGI IND AND ACAD COOP FOUND; KYONGGI UNIV IND AND ACADEMIA COOP; KEPI KOREA ENDEMIC PLANTS INST INC; INDUSTRIAL ACADEMIC COOPERATION GROUP KYEONGGI UNIV

18. Family 101389931 (CN117585928 A)

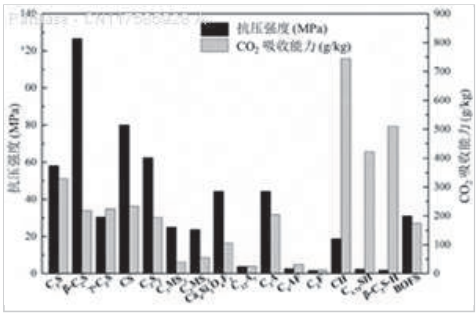
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Title

[EN] QUANTITATIVE REGULATION AND CONTROL METHOD FOR COMPRESSIVE STRENGTH AND CO2 ABSORPTIVITY OF CARBONATED STEEL SLAG PRODUCT

Abstract

[EN] The invention provides a quantitative regulation and control method for compressive strength and CO₂ absorptivity of a carbonated steel slag product, and belongs to the technical field of steel slag resource utilization. Calcium and siliceous raw materials with a certain molar ratio are doped into hot-melt steel slag, and one or more of carbonated active minerals beta-C₂S, gamma-C₂S, C₃S₂, CS and CaO are synthesized by utilizing waste heat of the hot-melt steel slag. And grinding the water-quenched and cooled steel slag, pressing into a blank body, and carbonating to prepare a carbonated steel slag product. The low-calcium silicate minerals are synthesized through the solid-phase reaction, the steel slag carbonation efficiency is improved, meanwhile, steel slag waste heat is fully utilized, heat recycling is achieved, and energy-saving and carbon-reducing development of the building material industry is facilitated. The strength growth rate and CO₂ absorption rate of the carbonated steel slag are quantitatively regulated and controlled by adjusting the component proportion of the calcium raw material and the siliceous raw material in the steel slag, the strength and carbon sequestration rate of a carbonated steel slag building material product are optimized, the steel slag consumption is increased, meanwhile, the CO₂ stabilization amount is increased, and the resource and environment pressure is fully relieved.



1st Main Claim

[MT] 1. A carbonated steel slag product compressive strength and CO₂The method for quantitative regulation of absorption rate, characterized in that the said method, using the calcium rich industrial raw material and the silicon rich industrial raw material, produces calcium silicate minerals by using the residual temperature of the hot melt steel slag, when there is excess calcium material, produces free calcium oxide, and after water quenching and cooling, produces steel slag rich in calcium silicate minerals, Quantitatively adjustable compressive strength and CO are obtained after carbonation₂Absorption volume of steel slag products with good volume stability.

Assignees: DALIAN UNIV OF TECHNOLOGY; UNIV DALIAN TECH

19. Family 97959961 (US2024360762 AA)

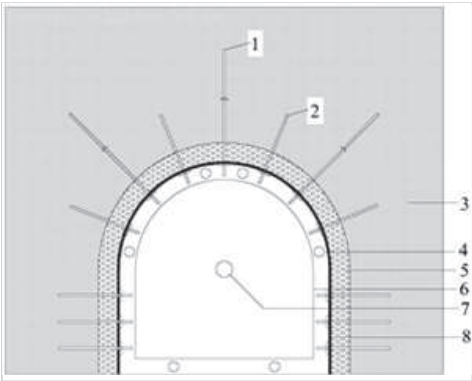
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Title

[EN] METHOD FOR BACKFILLING AND RECONSTRUCTING CARBON STORAGE SPACE IN ABANDONED MAIN ROADWAY AND STORING CO₂

Abstract

[EN] Disclosed is a method for backfilling and reconstructing a carbon storage space in an abandoned main roadway and storing CO₂. A surrounding rock of the main roadway is surveyed through geophysical exploration technology, and an anchor bolts (anchor cables) are used to reinforce and support an area which has unstable confining pressure bearing. According to a width and a height of the roadway section of the main roadway, a support formwork is forged in advance, and after the support formwork is placed in the main roadway, backfilling slurry is injected to the periphery of the support formwork. Meanwhile, supercritical carbon dioxide is injected into the backfilling slurry and the roadway, respectively.



1st Main Claim

[EN] 1. A method for backfilling and reconstructing a carbon storage space in an abandoned main roadway and storing CO₂, comprising following steps of:

step 1, surveying a surrounding rock of the main roadway, and analyzing a lithology of the surrounding rock, a density of the surrounding rock and fractures and cavities inside the main roadway;

step 2, reinforcing and supporting a damaged portion, which has unstable confining pressure bearing characteristics, of the surrounding rock by anchor bolts or anchor cables, so as to ensure a stable operation of the main roadway;

step 3, customizing a support formwork according to a width and a height of a roadway section of the main roadway, wherein the support formwork is spaced apart a distance of 50 cm to 80 cm from a top, two sides and a floor of the main roadway;

step 4, constructing a first backfilling wall at a first end of the main roadway, wherein a thickness of the first backfilling wall is of 50 cm to 60 cm to ensure that the first end of the roadway is completely sealed without air leakage;

step 5, placing the support formwork made in step 3 inside the main roadway, splicing the support formwork according to a shape of the main roadway, attaching the support formwork closely to the first backfilling wall, and temporarily fixing the spliced support formwork by the anchor bolts and the anchor cables;

step 6, injecting backfilling slurry into a gap between the support formwork and the main roadway through a backfilling pipeline to form a backfilling thickness of 50 cm to 80 cm around the main roadway; injecting supercritical carbon dioxide into the backfilling slurry between the support formwork and the main roadway, and enabling the supercritical carbon dioxide to fully react with the backfilling slurry for 3 h to 5 h to solidify the backfilling slurry to reach a support strength of 1 MPa to 2 MPa, and then stopping injecting the supercritical carbon dioxide;

step 7, dismantling the support formwork and constructing a second backfilling wall at an interval of 30 m to 40 m from the first backfilling wall, after the backfilling slurry fully reacts with the supercritical carbon dioxide and solidifies;

step 8, injecting the supercritical carbon dioxide into an enclosed space between the first backfilling wall and the second backfilling wall through a gas injection hole reserved on the second backfilling wall, and stopping injecting the supercritical carbon dioxide when an injection pressure of the supercritical carbon dioxide is from 1 MPa to 1.5 MPa and a CO₂ concentration in the enclosed space between the first backfilling wall and second backfilling wall reaches 5,000 ppm and more, and then sealing the reserved gas injection hole reserved on the second backfilling wall;

step 9, constructing the support formwork on a side which is opposite to the first backfilling wall, of the second backfilling wall, continuing to form an other enclosed space by constructing the support formwork, repeating step 5 to step 8, injecting the backfilling slurry and the supercritical carbon dioxide to the other enclosed space outside of the support formwork, and injecting the supercritical carbon dioxide into an enclosed space between the second backfilling wall and a third backfilling wall; and

step 10, when the carbon storage space of the main roadway is backfilled and sealed to the second end of the main roadway, constructing a final backfilling wall at the second end of the roadway to enclose the roadway space, injecting the supercritical oxide dioxide into the carbon storage space, and sealing the carbon storage space.

Assignees: TAIYUAN UNIV OF TECHNOLOGY; UNIV TAIYUAN TECHNOLOGY

20. Family 54707413 (KR101305546 B1)

[View in PatBase](#)

Title

[EN] METHOD OF MANUFACTURING PORTLAND CEMENT FOR CARBON DIOXIDE REDUCTION INCLUDING CALCINED DOLOMITE TAKE ADVANTAGE OF HYDRATION PROPERTIES

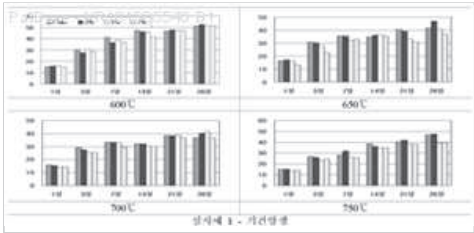
Abstract

[EN] PURPOSE: A manufacturing method of carbon dioxide reduction type Portland cement and carbon dioxide reduction type Portland cement composition are provided to maintain initial strength of concrete while effectively reducing carbon dioxide by adding light burned dolomite to the Portland cement. CONSTITUTION: Carbon dioxide reduction type Portland cement composition comprises 100 parts by weight of water, 150-250 parts by weight of Portland cement, 10-80 parts by weight of plaster mixture, and 10-80 parts by weight of light burning dolomite. The light burning dolomite is manufactured by incinerating the dolomite raw ore at 600-1000 deg. Celsius. The light burning dolomite comprises 40-70 wt percent of calcium oxide, 20-40 wt percent of activated magnesia, 10-20 wt percent of one or a mixture selected from silicon dioxide, dialuminum trioxide, iron oxide, and sulfur trioxide. The plaster mixture includes calcium sulfate, chemical gypsum and natural gypsum in a weight ratio of 1:1-2:1-2. The carbon dioxide reduction type concrete composition includes carbon dioxide reduction type cement composition and filler composition. The filler composition comprises 20-40 wt percent of metakaolin, 40-60 wt percent of silicate glass, 10-15 wt percent of silica and 10-15 wt percent of natural fiber. [Reference numerals] (A1,B1,C1,D1) 1 day; (A2,B2,C2,D2) 3 days; (A3,B3,C3,D3) 7 days; (A4,B4,C4,D4) 14 days; (A5,B5,C5,D5) 21 days; (A6,B6,C6,D6) 28 days; (EE) Example1-air drying curing

1st Main Claim

[MT] 1. 100 parts by weight of water 150 to 250 parts by weight Portland cement;; gypsum mixture 10 to 80 parts by weight; dolomite ore calcined at 600 to 1000 °C to prepare a 40 to 70% by weight, calcium oxide 20 to 40% by weight active magnesia and silicon oxide, aluminum trioxide, iron sesquioxide, sulfur trioxide is selected from any one or a mixture of 10 to 20% by weight curing, comprising an; and 10 to 80 parts by weight of dolomite, 20 to 40 percent by weight metakaolin, 40 to 60% by weight of water glass, the silica 10 to 15% by weight and 5 to 10% by weight consisting of a natural fiber filler composition; comprising 20 to 30 parts by weight, the carbon dioxide reduction type concrete composition: General gypsum plaster mixture is natural gypsum desulfurization gypsum from 1: 1 to 2: Each will mixed in a weight ratio 1: 1 to 2 carbon dioxide reduction type concrete composition.

Assignees: HANIL CEMENT CO LTD



21. Family 67553994 (KR20170127766 A)

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Title

[EN] CO REPAIR REINFORCEMENT MIXED COMPOSITION OF HIGH-DUCTILITY AND HIGH DURABLE USING CARBON DIOXIDE CAPTURE AND CALCIUM CARBONATE AND REPAIR REINFORCEMENT METHOD USING THE SAME

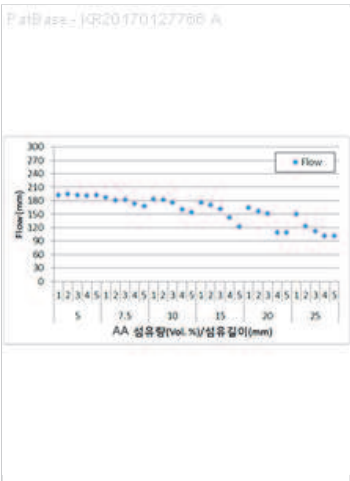
Abstract

[EN] The present invention relates to a high ductile and high durable mixed composition for repair and reinforcement using carbon dioxide capturing calcium carbonate, comprising: a mortar composition comprising cement, blast furnace slag, silica, a polymer, plaster, carbon monoxide (CO) capturing calcium carbonate, an inflating agent, silica fume, a water reducing agent and basalt fibers; a surface hardening composition comprising sodium silicate, potassium silicate, lithium silicate, an anionic surfactant and a nonionic surfactant; and a mineral fiber.

1st Main Claim

[MT] 1. Cement, blast furnace slag, silica sand, calcium carbonate, gypsum, CO-house, expanding agent, water-reducing agent, silica fume (fume silica) as well, the chopped fiber is characterized in that it comprises a maintenance and reinforcing mortar composition; sodium silicate, potassium silicate, lithium silicate, an anionic surfactant, a nonionic surfactant composition including a surface reinforcing agent, characterized in that it comprises a; and utilizing the carbon collector calcium carbonate maintenance and reinforced high toughness and high durability mixed composition.

Assignees: NECT CO LTD; DAEWOO ENG AND CONSTRUCTION CO LTD; DAEWOO ENG AND CONSTR CO LTD



22. Family 93546674 (KR102447945 B1)

[View in PatBase](#)

Title

[EN] A METHOD OF MANUFACTURING CONCRETE FOR ROAD PAVEMENT USING CARBON DIOXIDE COLLECTORS AND CONCRETE FOR ROAD PAVEMENT MANUFACTURED THEREBY

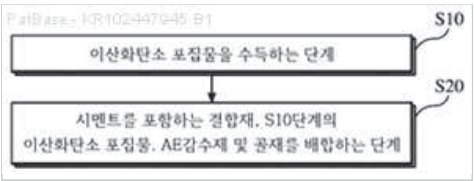
Abstract

[EN] The present invention relates to a method for manufacturing concrete for road pavement using captured carbon dioxide, which comprises the steps of: (S10) obtaining captured carbon dioxide; and (S20) blending a cement-containing binder, the captured carbon dioxide obtained in step (S10), and an AE water reducing agent.

1st Main Claim

[MT] 1. A method for producing a carbon dioxide trap comprising the steps of (S10); obtaining a carbon dioxide trap and (S20); combining the carbon dioxide trap, AE the sensitizer and the aggregate of step, S10 of a binder comprising cement, The step (S10) of obtaining a carbon dioxide collected product comprises the steps of:, calcining a clinker raw material (S11); pulverizing the clinker to produce cement (S12); collecting kiln dust generated during the pulverization process (S13); And a step of reacting the exhaust gas generated in the step S11 with the kiln dust collected in the step S13 to obtain a carbon dioxide collected product (S14); wherein the kiln dust collected in the step S13 is subjected to a filtering device, A chemical vapor deposition device comprising: a housing having a cylindrical shape and having an inclined gradient such that a diameter of the housing becomes narrower toward a center of a lower surface thereof, an inflow line through which kiln dust slurry is introduced is formed on one side thereof, a return flow is formed on the introduced kiln dust slurry, and a discharge line through which foreign matter is discharged is formed on a lower end thereof, A discharge pipe penetrating an upper surface of the housing and discharging the kiln dust slurry on which foreign matter has been applied upward, and a filtration port attached to a lower end of the discharge pipe, wherein the inflow line is configured in a tangential direction of the housing so that the kiln dust slurry introduced into the inflow line returns within the housing to induce rotational movement (hydrocyclon) and vortex (vortex), Wherein the filtration port includes: a mounting ring mounted to a lower end of the discharge pipe inside the housing; a filter portion that is formed to narrow in diameter in an end direction, has a flow hole formed at an end thereof, and has a gap formed to filter foreign matter from an upward kiln dust slurry; and a floating ring made of a floating material mounted to the flow hole.

Assignees: SEUM CONSTRUCTION



23. Family 97020885 (CN116023055 A)

[View in PatBase](#)

Title

[EN] METHOD FOR IMPROVING VOLUME STABILITY OF STEEL SLAG AND PREPARING CARBON-SEALED LIGHTWEIGHT AGGREGATE BY USING CO₂ UNDER AMMONIA MEDIATION

Abstract

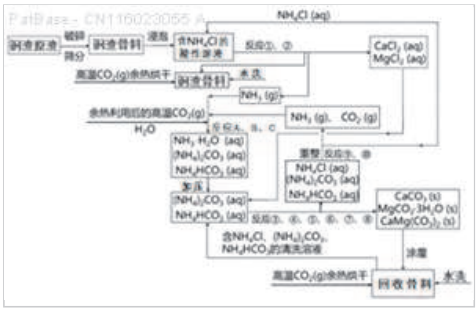
[EN] The invention relates to a method for improving the volume stability of steel slag and preparing carbon-sealed lightweight aggregate by using CO₂ under ammonia mediation. The method comprises the following steps: crushing and screening, dissolving acidic ammonium chloride, preparing ammonium carbonate and ammonium bicarbonate, depositing alkaline ammonium carbonate, performing a reforming process, and effectively solidifying f-CaO and f-MgO in the steel slag aggregate. Firstly, ammonium chloride forms an acidic solution in water, the acidic solution reacts with f-CaO and f-MgO hydrolysates Ca (OH)₂ and Mg (OH)₂ in the steel slag to generate soluble calcium salt and soluble magnesium salt, meanwhile, ammonia gas is generated, ammonia gas is captured, and the ammonia gas and carbon dioxide are jointly introduced into water to generate an alkaline ammonium carbonate solution. And finally, ammonium carbonate is in contact with soluble calcium salt and soluble magnesium salt, carbonate precipitates are dissolved out on the surface of the steel slag, and different types of carbon sequestration lightweight aggregates with good volume stability are finally formed in a water washing or in-situ coating or direct coating mode.

1st Main Claim

[MT] 1. A method of using CO under ammonia mediation, Method for improving slag volume stability and preparing carbon sequestration lightweight aggregate characterized by comprising the steps of:

- Step 1, Crushing and sieving: After crushing raw slag of different types to different fineness and sieving to obtain aggregate slag;
- Step 2, dissolution of acidic chlorinate ammonium: The slag aggregate obtained in Step 1 is immersed in an acidic solution containing chlorinate ammonium and reacted at 40-80 degrees centigrade for 1-3h, the hydrolysis product Ca (OH) of chlorinate ammonium with f-CaO and f-MgO in the slag₂, Mg (OH)₂The reaction produces soluble calcium salts and soluble magnesium salts, while producing ammonia gas;
- Step 3, preparation of ammonium carbonate, ammonium bicarbonate: The ammonia gas obtained in Step 2 is trapped to form ammonia water, and it is passed into an aqueous ammonia solution together with a high temperature carbon dioxide flue gas to produce an alkaline solution of ammonium carbonate, ammonium bicarbonate by adjusting the temperature and pressure reaction;
- Step 4, Alkaline Ammonium Carbonate Deposition: The soluble calcium salt, soluble magnesium salt obtained in Step 3 is reacted with ammonium carbonate to produce a poorly soluble carbonate precipitate which is applied in situ to the surface of slag aggregate to obtain carbon sequestration slag aggregate, and/or a recovered carbonate precipitate which is applied to the surface of recovered aggregate, The coated aggregate is obtained; the steel slag aggregate is washed with water, Obtaining a slag-based lightweight aggregate;
- Step 5, reforming process: The reaction solution obtained in step 4, by adjusting the temperature and pressure into the reforming process, adjust the acid alkalinity of the reaction solution, let the reaction of the slightly alkaline solution by warming down pressure to achieve ammonium carbonate and ammonium bicarbonate decomposition.

Assignees: JIANGSU NIGAO SCIENCE AND TECH CO LTD; CHANGZHOU ARCHITECTUAL RES INST GROUP CO LTD



[View in PatBase](#)

[EN] CARBON DIOXIDE SEQUESTRATION IN FOAMED CONTROLLED LOW STRENGTH MATERIALS

[EN] A process for sequestering carbon dioxide from the flue gas emitted from a combustion chamber is disclosed. In the process, a foam including a foaming agent and the flue gas is formed, and the foam is added to a mixture including a cementitious material (e.g., fly ash) and water to form a foamed mixture. Thereafter, the foamed mixture is allowed to set, preferably to a controlled low-strength material having a compressive strength of 1200 psi or less. The carbon dioxide in the flue gas and waste heat reacts with hydration products in the controlled low-strength material to increase strength. In this process, the carbon dioxide is sequestered. The CLSM can be crushed or pelletized to form a lightweight aggregate with properties similar to the naturally occurring mineral, pumice.

[EN] 1. A process for preparing a controlled low-strength material having a compressive strength of 1200 psi or less, the process comprising: preparing a mixture including water and a cementitious material; recovering flue gas from a combustion chamber; forming a foam including a foaming agent and the flue gas; mixing the foam into the mixture to form a foamed mixture; and thereafter allowing the foamed mixture to set to form the controlled low-strength material.

[illegible]

25. Family 101024671 (US2024034675 AA)

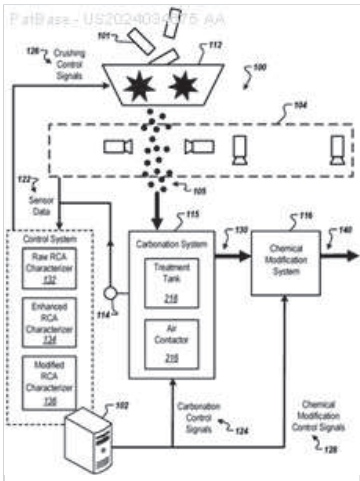
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Title
[EN] CARBONATION OF RECYCLED CONCRETE

Abstract
[EN] Methods, systems, and apparatus, including computer programs encoded on computer storage media, for processing recycled concrete aggregate (RCA). A method includes obtaining an aqueous carbonate solution by exposing an aqueous alkaline solution to a carbon dioxide laden fluid; performing a treatment process on a first portion of RCA particles using a first set of parameters, the treatment process including exposing the first portion of RCA particles to the aqueous carbonate solution; after performing the treatment process, obtaining measurements of the first portion of RCA particles; determining, using the measurements of the first portion of RCA particles, a second set of parameters; and performing the treatment process on a second portion of RCA particles using the second set of parameters. Exposing the first portion of RCA particles to the aqueous carbonate solution includes soaking the first portion of RCA particles in the aqueous carbonate solution.

1st Main Claim
[EN] 1. A method of treating recycled concrete aggregate (RCA), the method comprising:
obtaining an aqueous carbonate solution by exposing an aqueous alkaline solution to a carbon dioxide laden fluid;
performing a treatment process on a first portion of RCA particles using a first set of parameters, the treatment process including exposing the first portion of RCA particles to the aqueous carbonate solution;
after performing the treatment process, obtaining measurements of the first portion of RCA particles;
determining, using the measurements of the first portion of RCA particles, a second set of parameters; and
performing the treatment process on a second portion of RCA particles using the second set of parameters.

Assignees: X DEV LLC



26. Family 83214892 (US2022274876 AA)

[View in PatBase](#)

Title

[EN] METHODS OF MAKING SUSTAINABLE DUCTILE CAST CEMENTITIOUS STRUCTURE FOR CARBON DIOXIDE SEQUESTRATION

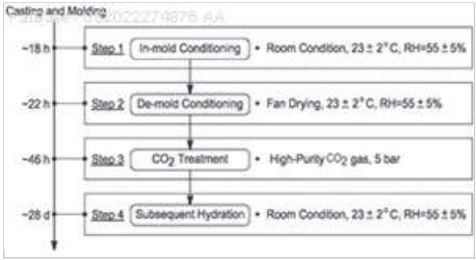
Abstract

[EN] Methods of preparing a cementitious structure for carbon dioxide (CO₂) sequestration are provided. The cementitious structure may be a cast in a mold. First, a cementitious composite material comprising binder and water is conditioned, for example, in a mold by exposing the cementitious composite material to greater than or equal to about 50 percent to less than or equal to about 80 percent relative humidity for greater than or equal to about 3 hours to less than or equal to about 24 hours. The cementitious composite material is then dried to remove greater than or equal to about 10 percent by weight of initial water in the cementitious composite material. The cementitious structure formed is capable of a carbon dioxide uptake level of greater than or equal to about 6 percent by weight binder. The cementitious structure has a tensile strain capacity of greater than or equal to about 1 percent and a uniaxial tensile strength of greater than or equal to about 1 MPa. The method may also include carbonating the cementitious structure, following by an optional further hydration process.

1st Main Claim

[EN] 1. A method of preparing a cast cementitious structure for carbon dioxide sequestration, the method comprising: conditioning a cementitious composite material comprising a binder and water in a mold by exposing the cementitious composite material to greater than or equal to about 50 percent relative humidity to less than or equal to about 80 percent relative humidity for a duration of greater than or equal to about 3 hours to less than or equal to about 24 hours; and removing the cementitious composite material from the mold and drying the cementitious composite material to remove greater than or equal to about 10 percent by weight of initial water in the cementitious composite material to form the cast cementitious structure capable of a carbon dioxide (CO₂) uptake level of greater than or equal to about 6 percent by weight of the binder, wherein the cast cementitious structure has a tensile strain capacity of greater than or equal to about 1 percent and a uniaxial tensile strength of greater than or equal to about 1 MPa.

Assignees: UNIV MICHIGAN REGENTS



27. Family 91246122 (US2023406768 AA)

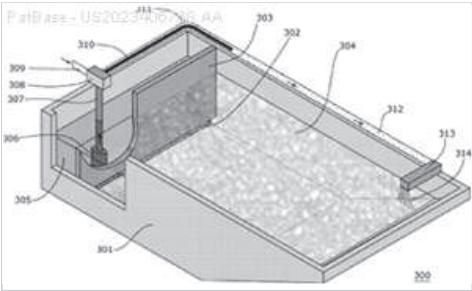
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Title (EP4237385 A1)

[EN] CARBONATION OF CONCRETE PRODUCTS

Abstract (EP4237385 A1)

[EN] Provided herein are methods and compositions for carbonation of recycled concrete aggregates (RCA) to produce carbonated RCA. In addition, uses of the carbonated RCA, such as in building materials, and building materials containing RCA, are included. Carbonation of RCA may be used alone or may be used in combination with other carbonation processes associated with concrete manufacture, such as carbonation of wet concrete mixes and/or carbonation of concrete wash water.



1st Main Claim (EP4237385 A1)

[EN] 1. A method for carbonating recycled concrete aggregate (RCA) comprising exposing the RCA to carbonated water.

Assignees: EINARSDOTTIR SOLEY; FORGERON DEAN PAUL; HANMORE ALEX; CARBONCURE TECH INC

28. Family 97469208 (US2025171371 AA)

[View in PatBase](#)

Title

[EN] METHOD OF PREPARING HIGH-PERFORMANCE GREEN BUILDING MATERIAL BASED ON COMBUSTION FLUE GAS CARBON DIOXIDE MINERALIZATION

Abstract

[EN] A method of preparing a high-performance green building material based on combustion flue gas carbon dioxide mineralization, including: calculating a raw material ratio; taking each industrial solid waste material to obtain a solid powder; pouring the solid powder, dihydrate gypsum and gel material into a granulator, mixing uniformly, and then taking a part of the mixture, and then stirring the remaining mixture with deionized water sprayed until spherical kernels are formed, uniformly adding the previously-taken part of mixture to prepare an aggregate; performing hydration reaction on the aggregate; drying the hydrated aggregate to prepare spherical ceramic granules; placing the ceramic granules into a reaction kettle and introducing a combustion flue gas containing CO₂ for mineralization reaction, and taking out reacted ceramic granules and putting into drying oven for drying to prepare a cold-bonded lightweight aggregate; supplementing water to the lightweight aggregate to perform hydration reaction and obtain a finished product.

1st Main Claim

[EN] 1. A method of preparing a high-performance green building material based on combustion flue gas carbon dioxide mineralization, comprising:
calculating a raw material ratio: screening industrial solid waste materials and calculating a ratio of the industrial solid waste materials, comprising: based on an association of components contained in the industrial solid waste materials with CO₂ reactivity, preliminarily selecting a ratio interval of components with CO₂ high reactivity, setting a plurality of component ratios in the ratio interval, calculating a corresponding CO₂ upper limit required for theoretical mineralization, and selecting an optimal component ratio;
pre-treatment: based on the optimal component ratio, taking each industrial solid waste material, grinding, screening, and drying to obtain a solid waste powder, wherein the industrial solid waste materials comprise one or more of a fly ash, a coal gangue, a steel slag, and an iron tailing;
granulation: pouring the solid waste powder, dihydrate gypsum, and a gel material into a granulator, mixing uniformly at a first rotation speed, and then taking a part of a mixture, and then at a second rotation speed, stirring a remaining mixture with a proper amount of deionized water sprayed until spherical kernels are formed, and then uniformly adding the part of the mixture and finally screening out balls with a diameter of 5 to 16 mm as an aggregate, wherein the first rotation speed is lower than the second rotation speed; a ratio of the solid waste powder to the gel material is (4.5 to 30):6; the gel material is a cement;
pre-curing: placing the aggregate in a drying oven with a constant temperature and humidity to perform a first hydration reaction;
drying: placing a hydrated aggregate into a baking oven to dry and remove water in pores and then taking samples from the baking oven and cooling down to room temperature to prepare moulded ceramic granules and then storing in a sealing way;
carbon dioxide mineralization curing: placing the moulded ceramic granules into a reaction kettle, introducing a combustion flue gas containing CO₂ for mineralization reaction under a given condition of temperature, humidity and pressure, taking out the reacted ceramic granules and putting into the drying oven for drying to prepare a cold-bonded lightweight aggregate;
assisted hardening curing: supplementing water to the cold-bonded lightweight aggregate to perform a second hydration reaction and obtain a finished product.

Assignees: SOUTHEAST UNIV; UNIV SOUTHEAST



29. Family 85224969 (US2021284585 AA)

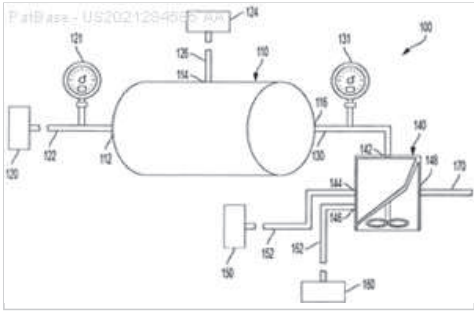
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Title (EP4065535 A1)

[EN] METHODS OF HOLISTICALLY DIFFUSING CARBON DIOXIDE WITHIN A CONCRETE MIXTURE

Abstract (EP4065535 A1)

[EN] A method of diffusing CO₂ within a concrete mixture that includes mixing a non-recycled aggregate material with a CO₂ gas in a pretreatment chamber of a concrete preparation system to form a CO₂ adsorbed aggregate material, transferring the CO₂ adsorbed aggregate material from the pretreatment chamber into a cement mixing chamber of the concrete preparation system, and mixing the CO₂ adsorbed aggregate material with cement and water to form the concrete mixture, where mixing the CO₂ adsorbed aggregate material with cement and water releases CO₂ from the CO₂ adsorbed aggregate material and diffuses CO₂ into the concrete mixture to form a carbonated concrete mixture.

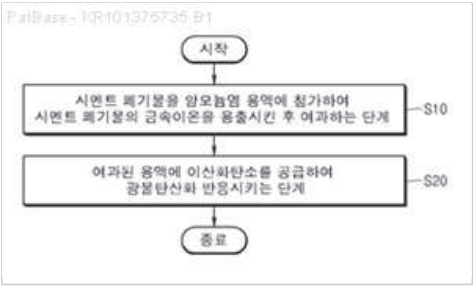


30. Family 56022749 (KR101375735 B1)

[View in PatBase](#)

Title
[EN] METHOD FOR MINERAL CARBONATION OF WASTE CEMENT USING AMMONIUM SALT

Abstract
[EN] The present invention relates to a method for mineral carbonation of waste cement using ammonium salt, and more specifically, to a method for mineral carbonation of waste cement using ammonium salt, wherein the method includes a step of eluting metal ions from waste cement by adding the waste cement to an ammonium salt solution and filtering and a step of performing mineral carbonation by supplying carbon dioxide to the filtered solution. [Reference numerals] (AA) Start; (BB) End; (S10) Step of filtering after eluting metal ions from waste cement by adding the waste cement to an ammonium salt solution; (S20) Step of performing mineral carbonation by supplying carbon dioxide to the filtered solution



1st Main Claim
[MT] 1.K2O, Fe2O3, SiO2, TiO2, Al2O3,P2O5, MgO, CAO,and NAO, and filter body to 100 mesh particle size is uniform, and the specific surface area is increased in the form of a powder in the cement waste ammonium salt solution was added to the cement waste of Ca, Mg, Si are then eluted metal ions, K; and supplying the carbon dioxide said filtered solution in mineral carbonation reaction PH 9-10 (CaCO3),calcite (CaCO3)may render waterloo (zeolite) portand calcium silicatecomprises a step of obtaining a (CA3SiO5) ammonium salts of mineral carbonation method using cement waste.

Assignees: KOREA INST GEOSCIENCE AND MINERA; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES

31. Family 85764157 (WO21127728 A1)

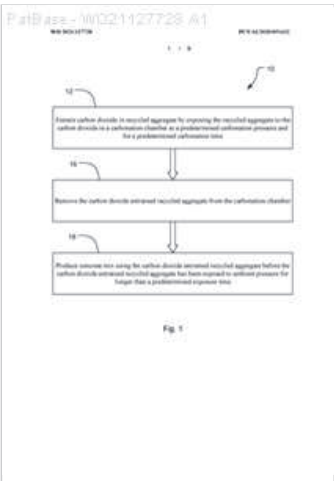
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Title
[EN] ENTRAINMENT OF CARBON DIOXIDE IN CONCRETE AGGREGATE

Abstract
[EN] Disclosed herein is a method (10) of producing a concrete mix and of obtaining a carbon dioxide entrained recycled aggregate for use in a concrete mix. Carbon dioxide is entrained (12) in recycled aggregate by exposing the recycled aggregate to the carbon dioxide in a carbonation chamber (14) at a predetermined carbonation pressure and for a predetermined carbonation time. Following this, the carbon dioxide entrained recycled aggregate is removed (16) from the carbonation chamber (14) to produce (18) the concrete mix.

1st Main Claim
[EN] 1. A method of obtaining carbon dioxide entrained recycled aggregate for use in a concrete mix, the method comprising: entraining carbon dioxide in recycled aggregate by exposing the recycled aggregate to the carbon dioxide in a carbonation chamber at a predetermined carbonation pressure and for a predetermined carbonation time; maintaining the carbon dioxide entrained recycled aggregate under pressure after the carbonation time and prior to its use in the concrete mix.

Assignees: WESTERN SYDNEY UNIV



32. Family 81666752 (US2022194852 AA)

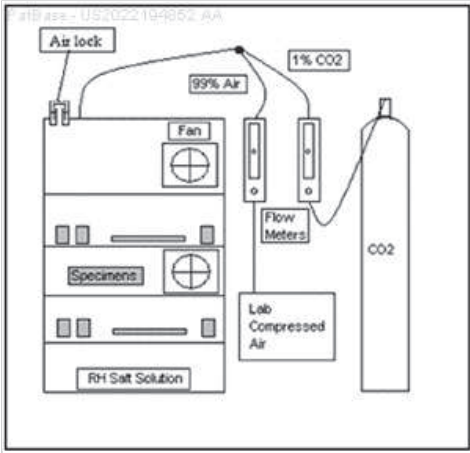
[View in PatBase](#)

Title (EP3959185 A1)
[EN] CARBONATION OF CONCRETE AGGREGATES

Abstract (EP3959185 A1)
[EN] Provided herein are methods and compositions for carbonation of recycled concrete aggregates (RCA) to produce carbonated RCA. In addition, uses of the carbonated RCA, such as in building materials, and building materials containing RCA, are included. Carbonation of RCA may be used alone or may be used in combination with other carbonation processes associated with concrete manufacture, such as carbonation of wet concrete mixes and/or carbonation of concrete wash water.

1st Main Claim (EP3959185 A1)
[EN] 1. A wet concrete mix comprising hydraulic cement, water, and aggregate, wherein a portion of the aggregate is carbonated recycled concrete aggregate (RCA), and wherein either the cement or the water, or both, is at least partially carbonated.

Assignees: THOMAS MICHAEL; MONKMAN GEORGE SEAN; HANMORE ALEX; CARBONCURE TECH INC; FORGERON DEAN



33. Family 102970948 (JP2024078376 A2)

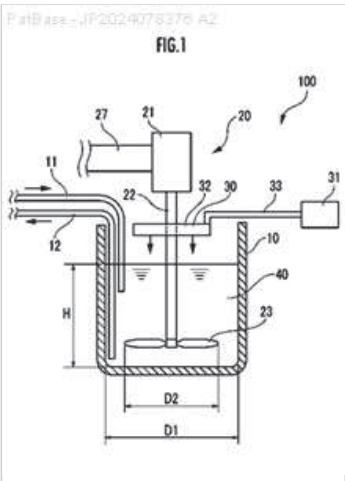
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Title
[EN] METHOD FOR FIXING CARBON DIOXIDE

Abstract
[EN] To provide a method for fixing CO₂ by incorporating CO₂ directly from air, and a method for fixing CO₂ by which a product generated when fixing CO₂ can be effectively utilized.SOLUTION: A method of the present invention for fixing CO₂ in air comprises a stirring step in which a Ca-containing substance and water are stirred in a reactor (10) to react with CO₂ in air to obtain a product containing CaCO₃, wherein the carbonation rate, which is a molar ratio of CO₂ to CaO contained in the product generated in the stirring step, is 25 percent or more, and the carbonation reaction rate, which is the rate of increase in the carbonation rate per hour, is 10 percent /h or less.SELECTED DRAWING: Figure 1

1st Main Claim
[MT] 1. CO in air₂Wherein the ca-containing material and water are stirred in a reaction vessel to produce CO in the air₂CaCO₃Wherein CO relative to CaO contained in the product produced in the stirring step₂And a rate of carbonylation reaction, which is a rate of increase per hour of the carbonylation rate, is 10 percent/h or less₂1).

Assignees: UNIV NIHON; TAIHEIYO CEMENT CORP; NIHON UNIV



34. Family 67652906 (US2017341988 AA)

[View in PatBase](#)

Title

[EN] SYSTEM AND METHOD FOR DISPOSING CARBON DIOXIDE

Abstract

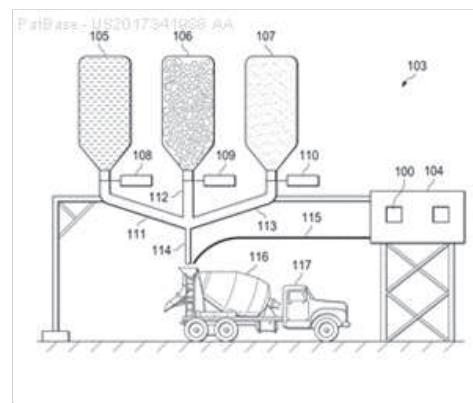
[EN] A system and method for disposing carbon dioxide is disclosed. The system includes a foam generator that generates a plurality of disposable foam vessels from a polymer based solution mixed with water and captured carbon dioxide from the atmosphere. The plurality of disposable foam vessels contains an amount of carbon dioxide. The plurality of disposable foam vessels is mixed in a cementitious material with a set of mixers. In a preferred embodiment, the set of mixers is a concrete mixing plant. During the curing process of the cementitious material the plurality of disposable foam vessels dissipates allowing for a timely release of CO₂ to chemically react with the surrounding cementitious material. This irreversible chemistry change permanently disposes of the carbon dioxide.

1st Main Claim

[EN] 1. A system for disposing carbon dioxide, comprising:

- a foam generator;
- a carbon dioxide source connected to the foam generator, supplying carbon dioxide to the foam generator;
- a water source connected to the foam generator, supplying water to the foam generator;
- a gas entrainment solution source connected to the foam generator, supplying a gas entrainment solution to the foam generator;
- and,
- a set of disposable foam vessels generated from the carbon dioxide, the water, and the gas entrainment solution.

Assignees: MACH IV L L C



35. Family 106909280 (US2025073671 AA)

[View in PatBase](#)

Title

[EN] CONTINUOUS PREPARATION METHOD OF COMPOSITE PARTICLES FOR CAPTURING CARBON DIOXIDE

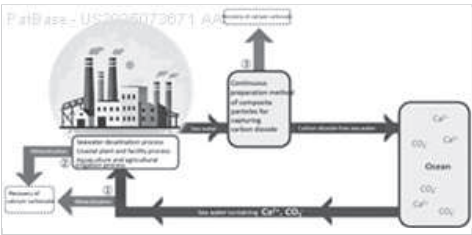
Abstract

[EN] Provided is a continuous preparation method of composite particles for capturing carbon dioxide which, in a process of using sea water as water, that is, a process of converting sea water into water, contribute to carbon neutrality by fixing carbon dioxide through mineralization of ions in sea water which is supply water or effluent water of the process.

1st Main Claim

[EN] 1. A continuous method for preparing composite particles for capturing carbon dioxide, the method comprising: a process of using seawater as the water source, wherein the method includes bringing the supply water or effluent from the process into contact with polyamidoamine particles.

Assignees: POSTECH RES AND BUSINESS DEVELOPMENT FOUNDATION; BLUECABORN CO LTD; POSTECH RES AND BUSINESS DEV FOUND; POSTECH ACADEMY IND FOUNDATION



36. Family 92821253 (CN114890704 A)

[View in PatBase](#)

Title

[EN] PREPARATION METHOD OF CARBON DIOXIDE CURED RECYCLED AGGREGATE

Abstract

[EN] The invention provides a preparation method of carbon dioxide cured recycled aggregate, which comprises the following steps: crushing and screening building solid waste to obtain uniform recycled aggregate particles; weighing quick lime and the fine powder admixture, and uniformly mixing to obtain a surface wrapping material; mixing the recycled aggregate particles with the surface coating material, putting the mixture into a ball forming mill, and uniformly spraying water to form balls, so as to obtain modified recycled aggregate particles; and carrying out pre-curing and carbon dioxide mineralization curing on the modified recycled aggregate particles. The porosity, the water absorption rate and the crushing index of the recycled aggregate are improved by coating the surface of the recycled aggregate with quicklime and a fine powder admixture and performing carbon dioxide curing treatment.

1st Main Claim

[MT] 1. A method of preparing carbon dioxide-cured regenerated aggregate, characterized by comprising the steps of (1) crushing and sieving building solid waste to obtain uniform particles of regenerated aggregate;

(2) Weighing the quicklime and fines blend to mix uniformly to obtain a surface coating material;

(3) Mixing the regenerated aggregate particles of step (1) with the surface wrapping material of step (2), placing them in a ball former, and uniformly spraying water into balls to obtain modified regenerated aggregate particles;

(4) The modified regenerated aggregate particles are pre-cured and carbon dioxide mineralization cured.

Assignees: SHENZHEN HENGJUN ENVIRONMENTAL PROTECTION TECH CO LTD

37. Family 93099680 (CN114956694 A)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE CURED RECYCLED AGGREGATE CONCRETE

Abstract

[EN] The invention provides carbon dioxide cured recycled aggregate concrete. The recycled aggregate concrete is prepared from the following components in parts by mass: 750 to 900 parts of modified recycled coarse aggregate, 700 to 850 parts of modified recycled fine aggregate, 40 to 60 parts of modified recycled micro powder, 350 to 450 parts of cement, 100 to 140 parts of mineral admixture, 10 to 20 parts of admixture and 100 to 140 parts of water. The compressive strength of the recycled aggregate concrete is improved by coating the surface of the recycled aggregate with the quick lime and the fine powder admixture and performing carbon dioxide curing treatment and through the synergistic cooperation of all the materials of the concrete.

1st Main Claim

[MT] 1. A CO2-curing regenerated aggregate concrete characterized in that the components and mass proportions of said regenerated aggregate concrete are 750-900 parts of modified regenerated coarse aggregate, 700-850 parts of modified regenerated fine aggregate, 40-60 parts of modified regenerated fine aggregate, 350-450 parts of cement, 100-140 parts of mineral blend, 10-20 parts of additive and 100-140 parts of water.

Assignees: SHENZHEN HENGJUN ENVIRONMENTAL PROTECTION TECH CO LTD

38. Family 96918273 (US2024425412 AA)

[View in PatBase](#)

Title (EP4416119 A1)

[EN] COMPOSITIONS AND METHODS UTILIZING ALTERNATIVE SOURCES OF CARBON DIOXIDE FOR SEQUESTRATION

Abstract (EP4416119 A1)

[EN] Provided herein are systems and methods for use of carbon dioxide, such as carbon dioxide containing one or more contaminants, e.g., produced in processes where the carbon dioxide comes directly or indirectly from the atmosphere, in one or more systems to perform one or more processes that binds the carbon dioxide or one or more carbon dioxide reaction products with one or more reactants to produce one or more carbon dioxide sequestration products, for example, products that permanently sequester the carbon dioxide.

1st Main Claim (EP4416119 A1)

[EN] 1. A method of carbon removal comprising (i) either (a) providing carbon dioxide derived from a gas comprising methane and carbon dioxide generated by anaerobic digestion of organic material at a first site, wherein at least a portion of the carbon dioxide is separated from the methane to produce a carbon dioxide portion and a methane portion, or (b) providing carbon dioxide derived from a composition generated by direct air capture of carbon dioxide at a second site by separating at least a portion of carbon dioxide from the composition; and (ii) sequestering at least part of the carbon dioxide portion at a third site by chemically reacting it or a reaction product of it to form a carbon dioxide sequestration product or products.

Assignees: CARBONCURE TECH INC; LEIST CASEY JAMES

39. Family 73453324 (CN109437632 A)

[View in PatBase](#)

Title

[EN] PREPARATION METHOD OF CEMENT-BASED MATERIAL WITH CARBON DIOXIDE FIXING FUNCTION

Abstract

[EN] The invention discloses a preparation method of a cement-based material with a carbon dioxide fixing function. The preparation method comprises the following steps: mixing fly ash and a sodium hydroxide solution, raising the temperature to 80-90 degrees centigrade and heating for 7-9 hours to obtain alkali-activated fly ash; mixing the alkali-activated fly ash and 3-[2-(2-aminoethylamino)ethylamino]propyl-trimethoxysilane for 7-9 hours under a room temperature and dry grinding conditions to obtain modified fly ash; adding the obtained modified fly ash into the cement-based material to prepare functional concrete slurry; curing the functional concrete slurry for 7 days at a temperature of 20+/-2 degrees centigrade and a relative humidity of 95+/-5 percent and then de-molding to obtain functional concrete with the carbon dioxide fixing function. The preparation method disclosed by the invention has the benefits that the fly ash is modified by strong alkali to obtain the alkali-activated fly ash, an aggregate with the CO₂ fixing function is prepared by being bonded with a specific organic matter, and the cement-based material with the carbon dioxide fixing function is provided.

1st Main Claim

[MT] 1. having a carbon dioxide fixation function of cement-based material production method, characterized by comprising the steps of:

- 1) the fly ash and sodium hydroxide solution mixed, heated to 80-90 degrees centigrade heating 7-9h to obtain alkali activation of fly ash;
- 2) the resulting alkali activation of fly ash and 3-[2-(2-amino-ethylamino-) ethylamino] propyl-trimethoxysilane at room temperature 7-9h, dry milling mixing conditions to obtain a modified fly ash;
- 3) the resulting modified fly ash added to the cement-based material preparation to obtain functional concrete slurry;
- 4) the resulting concrete slurry at 20 plus or minus 2 degrees centigrade and 95 plus or minus 5 percent relative humidity for curing 7 days after the release of carbon dioxide to give a fixed function of the concrete.

Assignees: UNIV WUHAN TECH; WUHAN UNIV OF TECHNOLOGY

40. Family 67252917 (CN107265995 A)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE-CURED RECYCLED AGGREGATE CONCRETE AND MANUFACTURING METHOD THEREOF

Abstract

[EN] The invention discloses carbon dioxide-cured recycled aggregate concrete. The carbon dioxide-cured recycled aggregate concrete is prepared from the following raw materials in parts by weight: 100 to 120 parts of cement, 20 to 40 parts of aggregate, 1 to 10 parts of silicon powder, 2 to 8 parts of colorant, 2 to 8 parts of corrosion inhibitor, 1 to 5 parts of fly ash, 20 to 40 parts of gypsum, 30 to 50 parts of saw dust, 10 to 30 parts of diatomite powder and 3 to 7 parts of microspheres. The invention also provides a manufacturing method of the carbon dioxide-cured recycled aggregate concrete. The manufacturing method comprises the following steps: S1, weighing the cement, the aggregate and the silicon powder according to the weight parts, subsequently putting the raw materials into a reaction still, and continuously stirring a mixture at the temperature of 30 to 50 degrees centigrade for 20 to 40 minutes to obtain a mixture A; S2, weighing the colorant, the corrosion inhibitor, the fly ash, the gypsum, the saw dust, the diatomite powder and the microspheres according to the weight parts, and sufficiently mixing the raw materials. The manufacturing method disclosed by the invention is simple; by adding the raw materials such as the fly ash, the gypsum and the saw dust, the compressive strength of the concrete can be significantly improved, and the recycled concrete can be continuously used under the condition of keeping original performance and is suitable for being popularized.

1st Main Claim

[MT] 1. A recycled aggregate concrete curing carbon dioxide, characterized in that it comprises the following parts by weight of raw materials: Cement 100 to 120 parts, 20-40 parts of aggregate, silica fume 1-10 parts, colorants 2-8 parts, rust inhibitor 2-8 parts, 1-5 parts of fly ash, gypsum 20-40 parts, 30-50 parts of sawdust, diatomaceous earth powder 10-30 parts, beads 3-7 copies.

Assignees: HENAN HUANYU PRECHEMICAL EQUIPMENT CO LTD

41. Family 66670767 (CN107056113 A)

[View in PatBase](#)

Title

[EN] METHOD FOR PRETREATING SAWDUST WITH CARBON DIOXIDE

Abstract

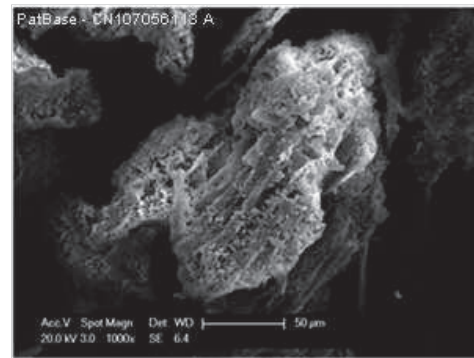
[EN] The invention discloses a method for pretreating sawdust with carbon dioxide. The method comprises the steps as follows: (1) alkali treatment: sawdust is placed in a container, soaked in an alkali solution, filtered out and washed; (2) calcium addition treatment: the sawdust subjected to alkali treatment is placed in the container, a calcium hydroxide or calcium salt solution is added, and the mixture is uniformly mixed; (3) carbonization treatment: the sawdust subjected to calcium addition treatment is placed in a closed carbonization box or reaction kettle for carbonization treatment until an added calcium source is completely carbonized. With the adoption of the method, the water absorption of the sawdust can be effectively reduced, the delaying effect of the sawdust on cement hydration can be retarded, and the performance of a sawdust cement-based composite can be improved.

1st Main Claim

[MT] 1. A pretreatment method using carbon dioxide sawdust, characterized in that the method comprises the following steps:

- (1) alkali treatment: The sawdust placed in a container, adding alkali solution immersion, filtered off, cleaning;
- (2) adding calcium treatment: The alkali treated sawdust after placed in a container, add calcium hydroxide or calcium salt solution and mixed;
- (3) carbonization treatment: The sawdust after adding calcium treatment placed in a sealed reactor carbonation tank or carbonization treatment, carbonization treatment to the added calcium source completely carbonized.

Assignees: UNIV SOUTHEAST; SOUTHEAST UNIV



42. Family 85406228 (CN112939538 A)

[View in PatBase](#)

Title

[EN] METHOD FOR PREPARING RECYCLED CONCRETE PRODUCT BY UTILIZING AND SEALING CARBON DIOXIDE

Abstract

[EN] The invention belongs to the technical field of recycled concrete preparation, and particularly relates to a method for preparing a recycled concrete product by utilizing and sealing carbon dioxide. The method comprises the steps of crushing and screening the building solid waste to obtain coarse aggregate, fine aggregate and regenerated micro powder; soaking the coarse aggregate, the fine aggregate and the regenerated micro powder in water, taking out, and performing mineralization strengthening in the presence of carbon dioxide; stirring and mixing the mineralization strengthened coarse aggregate, fine aggregate, regenerated micro powder, cement, a mineral admixture, an admixture, fibers and water to obtain freshly mixed regenerated concrete, pouring the freshly mixed regenerated concrete into a mold for molding, and performing mineralization maintenance in the presence of carbon dioxide after demolding to obtain a regenerated concrete product. According to the method, the performance of the building solid waste raw material and the recycled concrete product is improved, full utilization of the building solid waste is guaranteed, carbon dioxide storage and utilization of the concrete in the whole production process from the raw material to the product are achieved, and a way is provided for achieving the carbon neutralization target.



1st Main Claim

[MT] 1. A prepared using carbon dioxide sequestration and recycled concrete preparation, characterized in that it comprises the following steps:

- (1) the construction of solid waste crushing, screening, respectively, 0.15mm-4.75mm 4.75mm-25mm of coarse aggregate and fine aggregate grain size of less than 0.15mm renewable powder;
- (2) the coarse aggregate, fine aggregate, recycled powder soaked with water after the removal, in the presence of carbon dioxide mineralization strengthening;
- (3) will include mineralization after strengthening of coarse aggregate, fine aggregate, strengthening mineralization mineralization after strengthening regeneration powder, cement, mineral admixtures, admixtures, fiber and water were stirred and mixed to obtain new recycled concrete mix;
- (4) the new mix recycled concrete pouring into the mold forming, form removal after in the presence of carbon dioxide to obtain renewable mineralization curing concrete products.

Assignees: BEIJING BUILDING MATERIALS ACADEMY SCIENCES RES; UNIV CHINA PETROLEUM BEIJING; CHINA UNIV OF PETROLEUM BEIJING; BEIJING BUILDING MATERIALS ACADEMY OF SCIENCE RESEARCH; CHINA UNIV OF PETROLEUM

43. Family 34258040 (JP2007008749 A2)

[View in PatBase](#)

Title

[EN] CONCRETE COMPOSITION FOR FORMING CARBON DIOXIDE FIXING FORMED BODY, CARBON DIOXIDE FIXING FORMED BODY MADE OF THE COMPOSITION, AND METHOD OF MANUFACTURING THE FORMED BODY

Abstract

[EN] PROBLEM TO BE SOLVED: To provide a concrete composition for forming a carbon dioxide fixing formed body by which the formed body having a feature to effectively fix carbon dioxide in the air is formed without impairing original dynamic properties such as compressive strength or bending strength of concrete, the formed body made of the concrete composition and a method of manufacturing the same. SOLUTION: The concrete composition contains water, cement, admixtures, aggregate, an alkali decomposable resin fine particle or an organic fiber comprising an alkali decomposable resin and fine powder or an adsorbent capable of adsorbing carbon dioxide. The formed body having 0.05-10 volume percent void having 10-200 micro m diameter or cavity hole having the cross section of the same diameter on the surface part is obtained by hardening the concrete composition.

1st Main Claim

[MT] In the concrete composition containing an adsorbent capable of fine powder or water adsorption 1. , cement admixtures, aggregates, organic fibers made of a biodegradable resin, alkali or alkaline-decomposable resin fine particles, and carbon dioxide There, by curing the concrete composition wherein, at the surface, the molded body consisting provided percent - volume 0.05 percent volume of 10 holes cavity having a cross-section of the same diameter or a gap 10 micro m ~ 200 micro m in diameter is obtained Concrete composition molded body immobilized, characterized in that the carbon dioxide.

Assignees: TAKENAKA KOMUTEN CO

44. Family 91047675 (US2023348330 AA)

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Title (EP3984978 A1)

[EN] TRANSFORMATION OF LUMP SLAG INTO SUPPLEMENTARY CEMENTITIOUS MATERIAL BY CARBONATION

Abstract (EP3984978 A1)

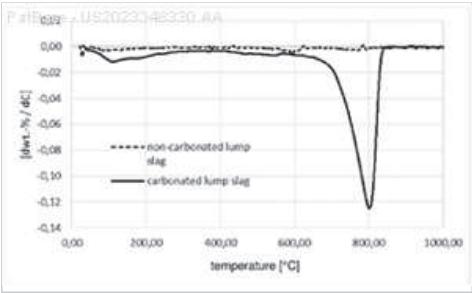
[EN] The present invention relates to a supplementary cementitious material, a method for producing the supplementary cementitious material, the use of the supplementary cementitious material, a binder comprising the supplementary cementitious material, a method for the preparation of the binder and use of the binder to make hydraulic building materials like concrete.

1st Main Claim (EP3984978 A1)

[EN] 1. A supplementary cementitious material comprising Si, Ca, Mg, Al, Fe, wherein the X-ray amorphous portion is at least 15 percent by weight based on the total weight of the supplementary cementitious material and wherein the sum of the amount of carbonated calcium and magnesium is at least 15 percent by weight based on the total weight of the supplementary cementitious material, obtained by carbonization of a precursor material having a basicity B_1 $B_1 = m \text{ CaO} / m \text{ SiO}_2$

PatBase

$$B_1 = \frac{m(\text{CaO})}{m(\text{SiO}_2)}$$



in the range from 0.60 to 1.25, determined from the amounts of the oxides measured by X-ray fluorescence (XRF).

Assignees: HEIDELBERGCEMENT AG; BEN HAH MOHSEN; BOLTE GERD; BULLERJAHN FRANK; DIENEMANN WOLFGANG; SKOCEK JAN; ZAJAC MACIEJ; HEIDELBERG MAT AG; HCONNECT 2 GMBH

45. Family 41454101 (US2008028995 AA)

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Title (EP1887064 B1)

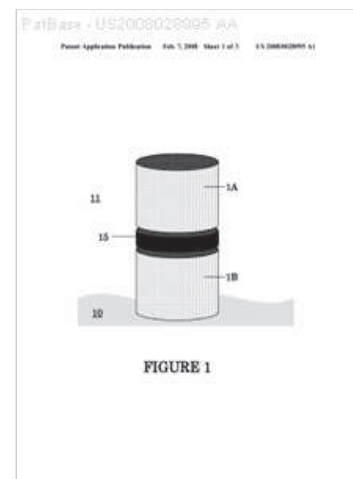
[EN] GEOPOLYMER COMPOSITION AND APPLICATION FOR CARBON DIOXIDE STORAGE

Abstract (EP1887064 B1)

[EN] The invention provides geopolymeric compositions intended for use in carbon dioxide injection or production wells or storage reservoirs and preferably in a supercritical carbon dioxide conditions. The geopolymeric composition is formed from a suspension comprising an aluminosilicate source, a metal silicate, an alkali activator, a retarder and/or an accelerator and a carrier fluid wherein the oxide molar ratio M_2O/SiO_2 is greater than 0.20 with M an alkali metal.

1st Main Claim (EP1887064 B1)

[EN] 1. Use of a pumpable suspension having a viscosity lesser than or equal to 300 cP, comprising an aluminosilicate source, a metal silicate, an alkali activator, a retarder and/or an accelerator to control the thickening and/or setting time of the suspension and a carrier fluid, the suspension having a oxide molar ratio M_2O/SiO_2 greater than 0.20 wherein M is an alkali metal, to form a geopolymeric composition resistant to carbon dioxide in supercritical conditions for at least 15 days when, after being cured for 3 days at 90 degrees centigrade, the set composition is put in a wet carbon dioxide supercritical vessel at 90 degrees centigrade under 28 MPa of fluid pressure composed of 90 percent by weight of carbon dioxide and 10 percent by weight of water.



Assignees: PRAD RES AND DEV NV; SCHLUMBERGER TECHNOLOGY BV; SCHLUMBERGER TECH BV; SCHLUMBERGER CA LTD; BARLET GOUEDARD VERONIQUE; PORCHERIE OLIVIER; ZUSATZ AYACHE BENEDICTE; SCHLUMBERGER HOLDINGS; SCHLUMBERGER SERVICES PETROL; SCHLUMBERGER TECHNOLOGY CORP

46. Family 98506661 (US2023278934 AA)

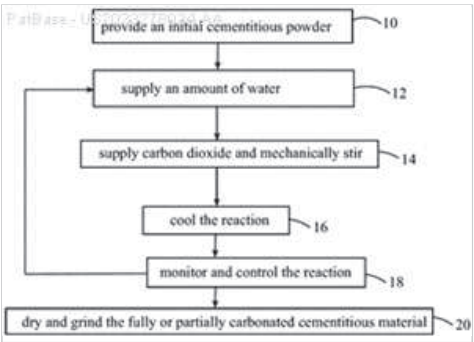
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Title
[EN] METHODS OF CARBONATING CEMENT POWDER

Abstract
[EN] A method of carbonating cement powder and use thereof. An amount of water is supplied to an initial cementitious powder to create a moistened cementitious powder. Carbon dioxide is supplied to the moistened cementitious powder, while mechanically stirring the moistened cementitious powder, to cause a reaction of the carbon dioxide with the moistened cementitious powder to produce a carbonated cementitious material. The carbonated cementitious material is dried and ground to produce a carbonated cementitious powder. The carbonated cementitious powder may be combined with ordinary cement and various ingredients or additives, such as retarders, accelerators and extenders for use in well cementing applications. Methods for cementing casing, liners and remedial operations such as plugging back, and squeeze cementing are also provided. Methods for producing a low alkaline cement suitable for high CO₂ gas wells are also provided. Methods to achieve a stable retarded cement used in higher temperatures are provided.

1st Main Claim
[EN] 1. A method of carbonating cement powder, the method comprising:
providing an initial cementitious powder;
supplying an amount of water to the initial cementitious powder to create a moistened cementitious powder;
supplying carbon dioxide to the moistened cementitious powder, while mechanically stirring the moistened cementitious powder, to cause a reaction of the carbon dioxide with the moistened cementitious powder to produce a fully or partially carbonated cementitious material; and
drying and grinding the fully or partially carbonated cementitious material to produce a fully or partially carbonated cementitious powder.

Assignees: MAGNUM CEMENTING SERVICES OPERATIONS LTD



47. Family 69373228 (CN107935507 A)

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Title

[EN] CONCRETE USING CARBON DIOXIDE FOR CURING RECYCLED AGGREGATE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention discloses concrete using carbon dioxide for curing recycled aggregate and a preparation method thereof. The concrete is prepared from the following raw materials: cement, recycled aggregate, mixing materials, mineral additives, water and carbon dioxide tail gas, wherein the cement is at least one of Portland cement, sulphate aluminum cement, white cement and colored cement; the carbon dioxide tail gas is from a thermal power plant, a cement plant or a waste incineration plant; the recycled aggregate comprises coarse aggregate and fine aggregate; the coarse aggregate comprises atleast one of recycled coarse aggregate, natural gravel, pebble and artificial lightweight aggregate; the fine aggregate comprises at least one of river sand, water washing marine sand, quartz sand and various man-made fine sand. The carbon dioxide is used for curing and treating the recycled aggregate for the first time; the mechanical performance and the endurance performance of the recycled aggregate are improved; on one hand, the utilization rate of the recycled aggregate in the structural concrete is greatly improved (greater than 50 percent); on the other hand, the emission of greenhouse gas is greatly reduced; the resources are fully utilized.

1st Main Claim

[MT] A use of recycled aggregate concrete curing carbon dioxide, characterized in that it comprises the following raw materials: Cement, recycled aggregate, admixtures, water and carbon dioxide exhaust, cement, mineral additives, including various types of silicate cement, sulfur aluminate cement plaster, white cement and at least one colored cement, carbon dioxide gas derived from thermal power plants, cement plants or incineration plant, recycled aggregate comprises coarse aggregate and fine aggregate, coarse aggregate, including natural gravel, pebbles and recycled coarse aggregate, artificial lightweight aggregate of at least one of fine aggregate, including sand, washed sea sand, quartz sand and various artificial sand, admixtures including at least one of kaolin powder, silicon powder, filling powder and fly ash, at least one of the weight ratio of water and cement, cement and additives the total amount of 0.3-0.6: 1 300-600kg/m³.

Assignees: SHENZHEN FUSITE BUILDING MAT CO LTD

48. Family 102160990 (KR102656599 B1)

[View in PatBase](#)

Title

[EN] IN-SITU MANUFACTURING METHOD OF FLOOR MORTAR USING IN-SITU CARBON DIOXIDE CARBONATION

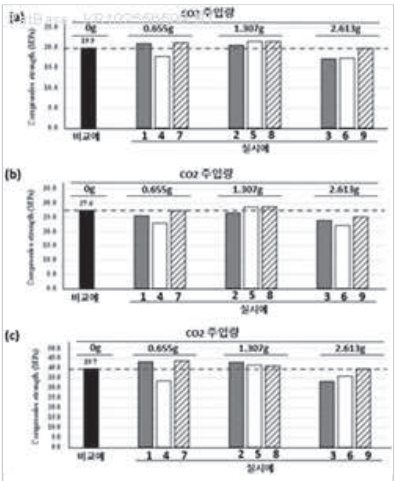
Abstract

[EN] A production method of a mortar mixture by using in-situ CO₂ carbonation according to the present invention can produce mortar having workability and compressive strength which are the same as or improved from conventional mortar even though the amount of cement having a large amount of carbon emission is reduced, and can produce mortar only by injecting CO₂ into a mortar composition under an optimal condition and mixing the same in a conventional mortar mixer, thereby being immediately applied to a field to be used. When the production method of a mortar mixture by using in-situ CO₂ carbonation according to the present invention is introduced as a mass-production process of mortar in a real field, the amount of cement (a binder) producing a large amount of greenhouse gases can be sufficiently reduced. Therefore, the production method of the present invention is expected to be used as Korean in-situ CO₂ carbonation technology that enables competitiveness of cement-based construction industry to be ensured by reducing greenhouse gases.

1st Main Claim

[MT] 1. Further adding 15 to 20 parts by weight of water, relative to 100 parts by weight of the binder, to a mixture comprising 70 to 75% by weight of aggregate, 20 to 22% by weight of binder, and 3 to 5% by weight of filler, followed by mixing with a mortar mixer to prepare a first mortar mixture₂Of 3.5 to 4.5 seconds at an injection rate of 10 L/min to allow 1 to 2 g CO in said first mortar mixture₂Preparing a infused second mortar mixture ; and further mixing the second mortar mixture into a mortar mixer in situ CO₂ In-situ CO comprising preparing a carbonated mortar mixture₂ A method for producing a mortar mixture for carbonated bottoms .

Assignees: HANIL CEMENT CO LTD



49. Family 86258817 (CN113185167 A)

[View in PatBase](#)

Title

[EN] DEVICE AND METHOD FOR QUICKLY CARBONIZING AND REGENERATING FINE AGGREGATE BY USING NANO CARBON DIOXIDE

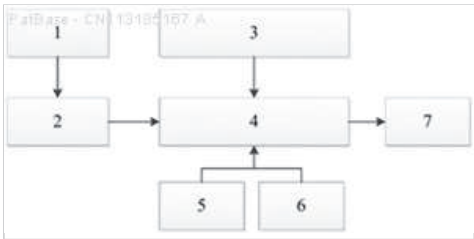
Abstract

[EN] The invention provides a device for quickly carbonizing and regenerating fine aggregate by using nano carbon dioxide, which is sequentially provided with a carbon dioxide processor, a nano carbon dioxide generator and a carbonization reaction mechanism along the input direction of carbon dioxide, and the carbonization reaction mechanism is sequentially provided with a regenerated fine aggregate conveyor, a carbonization reactor and a regenerated fine aggregate recoverer along the input direction of the regenerated fine aggregate. The invention further provides a method for quickly carbonizing and regenerating the fine aggregate by using the nano carbon dioxide. According to the device and the method for quickly carbonizing and regenerating the fine aggregate by using the nano carbon dioxide, provided by the invention, the circulating efficiency of materials is improved by increasing the carbonization reaction speed, and a large amount of cost can be saved; and meanwhile, the nano carbon dioxide device for carbonization can absorb carbon dioxide in the air to generate nano carbon dioxide which can react with the recycled fine aggregate quickly, so that the greenhouse effect is relieved, and the device has a wide application prospect.

1st Main Claim

[MT] 1. A nano-carbon dioxide quickly carbonized recycled fine aggregate, characterized in that along the direction sequentially provided carbon dioxide carbon dioxide input processor, nano carbon dioxide generator, carbonization reaction, the carbonation reaction mechanism mechanism along the input direction successively provided with a recycled fine aggregate weight of recycled fine aggregate transport, carbonization reactor, recycled fine aggregate recovery.

Assignees: UNIV TONGJI; TONGJI UNIV



50. Family 105575311 (CN119059764 A)

[View in PatBase](#)

Title

[EN] PLUGGING AGENT FOR CARBON DIOXIDE GAS-DRIVEN WELL AND PREPARATION METHOD OF PLUGGING AGENT

Abstract

[EN] The invention provides a plugging agent for a carbon dioxide gas-driven well and a preparation method of the plugging agent, and relates to the field of oil exploitation. The cement-based composite material comprises the following raw materials in parts by weight: 20-30 parts of oil well cement, 10-15 parts of nano calcium carbonate, 1-5 parts of modified silicon dioxide, 1-5 parts of a water reducing agent, 5-10 parts of modified montmorillonite and 1-5 parts of porous magnesium oxide particles. Uniformly mixing the nano calcium carbonate, the modified silicon dioxide, the water reducing agent, the modified montmorillonite and the porous magnesium oxide particles, adding the oil well cement, and uniformly mixing. The plugging agent is high in strength after being cured, good in sealing performance with a plugging part, and not easy to cause secondary leakage.

1st Main Claim

[MT] 1. An occluder for carbon dioxide gas driven wells, comprising, in parts by weight, the following raw materials:

Oil well cement 20-30 parts, nano calcium carbonate 10-15 parts, modified silica 1-5 parts, water reducing agent 1-5 parts, modified montmorillonite 5-10 parts, porous magnesium oxide particles 1-5 parts;

The modified silica is modified from polybenzene ethylene sulfonic acid and hydroxypropyltrimethoxysilane; the modified montmorillonite is modified from limestone and gelatin.

Assignees: KARAMAY HONGDU LLC

51. Family 100434226 (JP2023182440 A2)

[View in PatBase](#)

Title

[EN] CEMENT FOR REDUCING CARBON DIOXIDE EMISSION, CEMENT COMPOSITION, AND CEMENTITIOUS HARDENED BODY

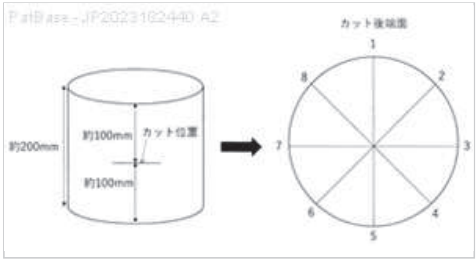
Abstract

[EN] To provide a cement or the like which emits less carbon dioxide in the cement production.SOLUTION: A carbon dioxide emission reduction cement according to the present invention comprises a calcined product comprising the following (a) to (c), and one or more mixtures selected from blast furnace slag fine powder, limestone fine powder, fly ash, fresh concrete sludge, and waste concrete fine powder. (a) 0-15 pts.mass of $3\text{CaO} \cdot \text{Al}_2\text{O}_3$ to 100 pts.mass of $2\text{CaO} \cdot \text{SiO}_2$, (b) 10-100 pts.mass in total of $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$ and $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$ to 100 pts.mass of $2\text{CaO} \cdot \text{SiO}_2$, (c) 0-210 pts.mass of $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$ to 100 pts.mass of $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$.SELECTED DRAWING: None

1st Main Claim

[MT] 1. A fired product comprising the following (a) and (c), and a blast furnace slag fine powder, a limestone fine powder, fly ash, A carbon dioxide emission-reducing cement comprising one or more mixed materials selected from ready-mixed concrete sludge, and waste concrete fine powder. (A) $2\text{CaO} \cdot \text{SiO}_2$ $3\text{CaO} \cdot \text{Al}_2\text{O}_3$ (B) $2\text{CaO} \cdot \text{SiO}_2$ $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$ And $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$ (C) $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{SiO}_2$ Based on 100 parts by mass, $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$

Assignees: TAIHEIYO CEMENT CORP



52. Family 108119559 (WO25110695 A1)

[View in PatBase](#)

Title

[EN] METHOD FOR MANUFACTURING CO₂-SEQUESTERING CONCRETE PAVING BLOCKS USING CARBON DIOXIDE-CAPTURED ALKALINE BASE MIXED SOLUTION

Abstract

[EN] According to an embodiment, the method for manufacturing concrete paving blocks using a carbon dioxide-captured alkaline base mixed solution of the present disclosure comprises the steps of: (a) contacting an alkaline base mixed solution of specific ingredients with atmospheric carbon dioxide to capture carbon dioxide; (b) reacting the carbon dioxide-contacted alkaline base mixed solution to form carbon dioxide-reacted products including sodium carbonate (Na₂CO₃), sodium bicarbonate (NaHCO₃), or potassium carbonate (K₂CO₃); (c) mixing cement powder with aggregate, water, and the carbon dioxide-reacted product obtained in step (b) at a predetermined ratio; (d) mixing the cement powder, aggregate, water, and carbon dioxide-reacted product for a set period to form a CO₂-sequestering concrete mixture; (e) injecting the CO₂-sequestering concrete mixture formed in step (d) into a mold and applying vibrations at a specific frequency range; and (f) removing the mold and curing the CO₂-sequestering concrete mixture pre-molded into a pave block under specific conditions, thereby completing the construction of hardened CO₂-sequestering concrete paving blocks.

1st Main Claim

[MT] (a) a step of contacting a basic alkaline mixture of specific components with carbon dioxide in the air for carbon dioxide capture;

(b) a step of reacting the basic alkaline mixture in contact with the carbon dioxide to form a carbon dioxide reactant including sodium carbonate (Na₂ CO₃), sodium bicarbonate (NaHCO₃), or potassium carbonate (K₂ CO₃);

(c) a step of mixing aggregate, water, and carbon dioxide reactant obtained in step (b) into cement powder at a preset ratio;

(d) a step of forming a CO₂ sequestering concrete paste by mixing a mixture of the cement powder, aggregate, water and carbon dioxide reactant for a preset period of time;

(e) a step of adding vibration of a certain frequency band after putting the CO₂ sequestering concrete dough formed in the above step (d) into a molding machine; and

(f) a step of removing the molding machine and curing the CO₂ sequestering concrete dough formed into a shape of a sidewalk block under certain conditions to complete the manufacture of a firmly hardened CO₂ sequestering concrete sidewalk block; a method for manufacturing a CO₂ sequestering concrete sidewalk block using a basic alkaline mixture solution that captures carbon dioxide.

Assignees: LOWCARBON CO LTD



53. Family 98629314 (CN116603834 A)

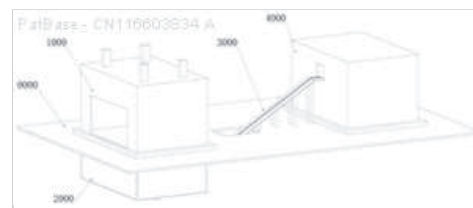
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Title

[EN] CONSTRUCTION WASTE POOL CAPABLE OF ABSORBING CARBON DIOXIDE AND USE METHOD OF CONSTRUCTION WASTE POOL

Abstract

[EN] The invention discloses a construction waste pool capable of absorbing carbon dioxide and a using method of the construction waste pool. The construction waste pool comprises a ground serving as an integral bearing, a main waste pool part installed at the front end of the upper surface of the ground and a storage pool part installed at the rear end of the upper surface of the ground. The processing strengthening pool part is mounted on the lower surface of the ground and at the bottom end of the main garbage pool part, and the transfer track part penetrates through the upper surface and the lower surface of the ground to connect the processing strengthening pool part with the storage pool part. According to the invention, by transforming the original construction waste pool and additionally arranging the strengthening bottom pool and the recycled aggregate storage pool, waste construction concrete and construction bricks in the construction waste are crushed and strengthened to form recyclable strengthened recycled aggregate, and the recycled aggregate is also used as the original construction waste pool, so that one pool has two purposes, the device space required by the recycled concrete is saved, and the cost is reduced. The recycling rate of the construction waste and the quality of the prepared recycled concrete are improved, and the reinforced recycled concrete aggregate which can be directly used is produced.



1st Main Claim

[MT] 1. A carbon dioxide-absorbing building waste basin, characterized in that Including a floor (0000) carried as a whole, a main refuse basin portion (1000) mounted at a front end of an upper surface of the floor (0000), a storage basin portion (4000) mounted at a rear end of an upper surface of the floor (0000);

Further comprising a process strengthening cell portion (2000) mounted on a lower surface of the floor (0000), a bottom end of the main refuse cell portion (1000), And a transfer track portion (3000) connecting the process enhancement cell portion (2000) and the reservoir portion (4000) through the upper and lower surfaces of the ground (0000);

Said main refuse chute portion (1000) is constituted by a refuse chute body (1001) having a bottom end provided with a refuse chute floor (1001b) and a middle opening provided in the middle of said refuse chute floor (1001b), And a floor (1201) of a fully closed floor and a floor (1202) with a screen opening (1202a), distributed above and below and covering the central opening, are provided in the floor (1001b) of the refuse chest, The top end of the refuse chest (1001) is provided with a primary crushing unit (1100) for crushing concrete waste material in the refuse chest (1001);

The process strengthening cell portion (2000) is constituted by a main body from top to bottom, successively from a hopper downloading plate (2001), a first pillar (2002), a base plate (2004), The base plate (2004) is provided with a lime-water strengthening unit (2300), a secondary crushing unit (2100), a carbon dioxide strengthening unit (2400), from left to right, and the base plate (2004) is also provided with a first transport track (2005), The secondary crushing unit (2100) is located below the feed opening (2001a) of the hopper feed plate (2001), The first transport track (2005) is provided with a transfer unit (2200) by means of an electric trolley, the transfer unit (2200) running the crushed concrete of the secondary crushing unit (2100) into a lime water strengthening unit (2300) for strengthening by lime water soaking, The transfer unit (2200) then runs the reinforced concrete into the carbon dioxide strengthening unit (2400) for strengthening by introducing carbon dioxide;

Said transfer rail portion (3000) constitutes a main body of an elevating rail mounting plate (3001), one end of which is mounted to the bottom of said process strengthening cell portion (2000) below the ground (0000), The other end of which is mounted on the ground (0000) in the middle of the rear baffle of said storage pool portion (4000), the lifting rail mounting plate (3001) being provided with a second transport rail (3002), The bottom end of the second transport track (3002) is spliced with said first transport track (2005), the transfer unit (2200) being moved into the second transport track (3002) by means of the first transport track (2005), when the concrete has been strengthened in the processing of the reinforced pool portion (2000), The reinforced concrete is finally moved to the tank section (4000) for storage.

Assignees: WUHAN CONSTRUCTION ENG CO LTD; WUHAN CONSTRUCTION ENGINEERING CO LTD

54. Family 44584217 (KR20100028709 A)

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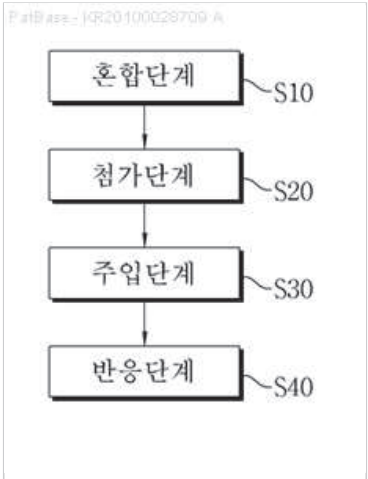
Title
[EN] METHOD FOR STABILIZING BURNED ASH USING CARBON DIOXIDE AND CONCRETE BLOCK MANUFACTURED BY ASH STABILIZED WITH THIS

Abstract
[EN] PURPOSE: A method for stabilizing burned ash using carbon dioxide and a concrete block manufactured into stabilized fly ash are provided to manufacture the concrete block composed of CCA system minerals by obtaining a CCA system clinker using chlorine component included in the burned ash. CONSTITUTION: A method for stabilizing burned ash using carbon dioxide comprises the following steps: a mixing step(S10) mixing fly ash of the burned ash and flooring materials; an addition step(S20) adding the water to the mixture; an injection step(S30) putting the mixture into a carbonation reactor and injecting carbon dioxide gas into the mixture; and a reaction step(S40) reacting the mixture in which the carbon dioxide is injected in the carbonation reactor. In the mixing step, the fly ash and the flooring materials are mixed with a ratio of 10:1, respectively.

1st Main Claim

[MT] 1. And the flooring material carrying a mixing step of mixing the fly ash (S10) and;
the mixing step (S10) is added water was added to the mixture subjected to step (S20)
(S20) via the step of adding to the mixture containing the carbon dioxide gas and put in the carbonation reactor for injecting the injection step (S30);
the carbon dioxide is injected into the injection step (S30), through at least one gasification reactor reacting the reaction mixture of step (S40); characterized in that consists of carrying material using carbon dioxide stabilization methods.

Assignees: KIM HEE JEONG; HYUN CHUN SIK



55. Family 82500024 (US2022152554 AA)

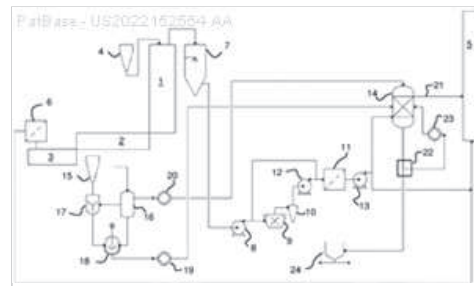
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Title (EP3750619 B1)

[EN] METHOD FOR SCRUBBING EXHAUST GAS FROM CO₂ AND/OR SO_x

Abstract

[EN] A method of exhaust gas scrubbing includes providing recycled concrete fines as a waste material rich in carbonatable Ca and/or Mg phases and with d_{90} less than or equal to 1000 micro m and a Rosin-Rammler slope n from 0.6 to 1.4, injecting the waste material into an exhaust gas stream containing CO₂ and/or SO_x for reaction with CO₂ and/or SO_x at a relative humidity of 50 to 100 Vol.-% percent and a temperature from 40 to 130 degrees centigrade in an amount of dry waste material ranging from 5 to 30 kg/m³, withdrawing a partly carbonated and/or sulphurized waste material and purified exhaust gas, and recycling a part of the partly carbonated and sulphurized waste material while the remainder is discharged, as well as use of a waste material slurry for exhaust gas cleaning of CO₂ and/or SO_x.



1st Main Claim (EP3750619 B1)

[EN] 1. Method for scrubbing an exhaust gas from CO₂ and SO_x with x from 1 to 3, comprising the steps:

- - providing recycled concrete fines with d_{90} less than or equal to 1000 micrometres and a Rosin-Rammler slope n from 0.6 to 1.4 in dry form or as a slurry,
- - injecting the recycled concrete fines into the exhaust gas for reaction with CO₂ and SO_x to provide in the exhaust gas stream an amount of dry recycled concrete fines ranging from 5 to 30 kg/m³, and adjusting a relative humidity from 50 to 100 percent and a temperature from 40 to 130 degrees centigrade,
- - withdrawing partly carbonated and/or sulphurized recycled concrete fines and cleaned exhaust gas
- - recycling a part of the partly carbonated and sulphurized recycled concrete fines while the remainder is discharged.

Assignees: HEIDELBERGCEMENT AG; HCONNECT 2 GMBH

56. Family 95110088 (CN218089372 U)

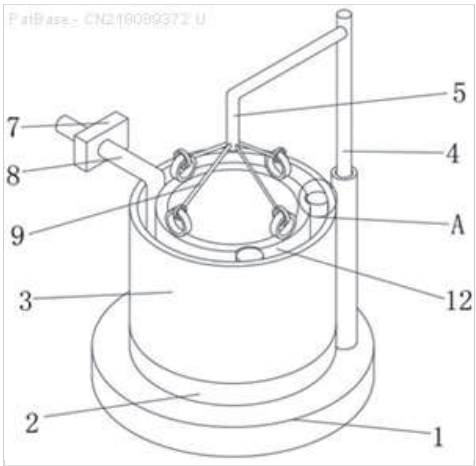
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Title

[EN] CARBON DIOXIDE REINFORCED RECYCLED CONCRETE AGGREGATE DEVICE

Abstract

[EN] The utility model discloses a carbon dioxide reinforced recycled concrete aggregate device, and relates to the technical field of concrete processing equipment, the carbon dioxide reinforced recycled concrete aggregate device comprises a lifting platform, the surface of the lifting platform is connected with a stirring platform, and the surface of the stirring platform is connected with a reaction chamber; the output end of the stirring table is rotationally connected with the interior of the reaction chamber, a grid cage is placed in the reaction chamber, a stirring mechanism is arranged in the reaction chamber, and by arranging the stirring mechanism, when the device operates, a stirring rod can be driven to stir aggregate, so that the aggregate can fully react with carbon dioxide, and the carbon dioxide can be fully stirred. Therefore, the situation that the aggregate strengthening effect is reduced due to the fact that the aggregate cannot fully react with carbon dioxide due to relative accumulation of the aggregate is avoided as much as possible, the aggregate strengthening uniformity is improved, and the aggregate strengthening effect is improved.



1st Main Claim

[MT] 1. A carbon dioxide-reinforced regenerative concrete aggregate apparatus comprising a lifting table (1), characterized in that the surface of the lifting table (1) is attached to a stirring table (2), the surface of the stirring table (2) is attached to a reaction chamber (3), The output of the stirring table (2) is rotationally connected to the interior of a reaction chamber (3), The inside of the reaction chamber (3) is placed a grid cage (12), the top of which is connected a pull cord (9), the end of which is remote from the grid cage (12) being connected to the output end of the lift table (1), and the inside of the reaction chamber (3) being provided with a stirring mechanism.

Assignees: LANGFANG RONGSHENG CONCRETE CO LTD

57. Family 88909120 (US2023101697 AA)

[View in PatBase](#)

Title

[EN] CO₂ SOLIDIFIED FIBER CEMENT BOARD AND ITS PREPARATION METHOD

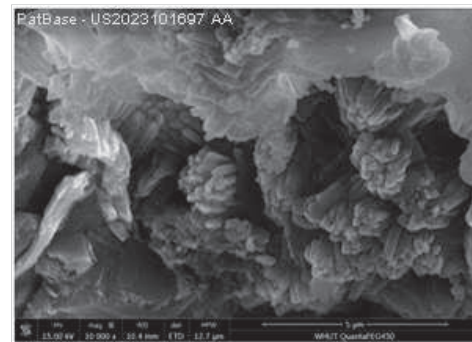
Abstract

[EN] Disclosed is a CO₂ solidified fiber cement board and its preparation method. The matrix composition of the fiber cement board prepared in this disclosure is calcium carbonate, which has high compactness, and the crystal form of calcium carbonate is adjusted by adding shell powder to improve the toughness of the matrix, so that the fiber cement board has excellent mechanics and durability performance. In addition, the preparation process does not require high temperature maintenance, and has the characteristics of normal temperature preparation, which creates conditions for the introduction of organic synthetic fibers, so that the organic synthetic fibers can further improve the brittleness of cement fiberboard. While reducing energy consumption, the preparation process can also effectively solve the problem that excessive pressure is easily generated in the fiberboard under high temperature conditions in the existing high-temperature and high-pressure curing process.

1st Main Claim

[EN] **1.** A preparation method for CO₂ solidified fiber cement board, comprising the following steps; dispersing cellulose fibers and organic synthetic fibers in water to obtain a fiber suspension; mixing a gelling component and an additive to obtain a mixed material; the gelling component comprises one or more of calcium silicate mineral powder, calcium silicate mineral phase-rich steel slag powder, and calcium silicate mineral phase-rich magnesium slag powder; the additive comprises silica fume, limestone powder, shell powder and pigment; mixing the fiber suspension, the mixed material, and water to obtain a slurry, and the slurry is sequentially dewatered, grouted, and statically maintained to obtain a slab, and the slab is cured in a CO₂ atmosphere to obtain the fiber cement board.

Assignees: UNIV WUHAN TECH; WUHAN UNIV OF TECHNOLOGY



58. Family 106575743 (KR20250021173 A)

[View in PatBase](#)

Title

[EN] CONCRETE PERMEABLE BLOCK HAVING CARBON DIOXIDE ADSORBABILITY AND MANUFACTURING METHOD THEREOF

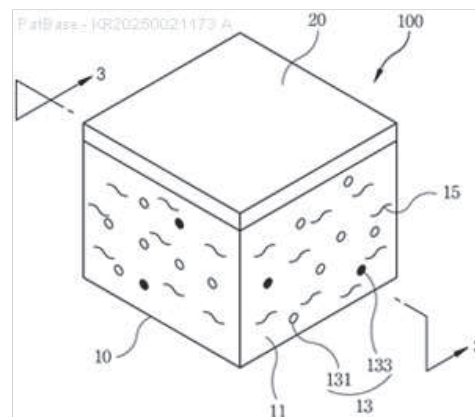
Abstract

[MT] The present invention relates to a concrete perblock having carbon dioxide adsorbability and a method for producing the same , and provides a concrete perblock capable of adsorbing carbon dioxide in air regardless of light-conditioning conditions and providing good water permeability and durability at the time of a long-term use material , and a method for producing the same . A concrete water permeable block having carbon dioxide adsorbability includes : a base layer containing cement , an aggregate mix , and reinforcing fibers , and having a plurality of water permeable holes formed therein ; and a surface layer formed on one surface of the base layer , wherein the aggregate mix includes a general aggregate and a porous material impregnated with bacteria having a carbon dioxide adsorption mechanism .

1st Main Claim

[MT] A concrete water permeable block , comprising : a base layer containing cement , an aggregate mixture , and reinforcing fibers , the base layer having a plurality of water permeable holes formed therein ; and a surface layer formed on one surface of the base layer ; wherein the aggregate mixture comprises general aggregate and porous material impregnated with bacteria having a carbon dioxide adsorption mechanism .

Assignees: KYONGGI UNIV IND AND ACADEMIA COOPERATION FOUNDATION; UNIV KYONGGI IND AND ACAD COOP FOUND; INDUSTRIAL ACADEMIC COOPERATION GROUP KYEONGGI UNIV



59. Family 95790622 (US2024375314 AA)

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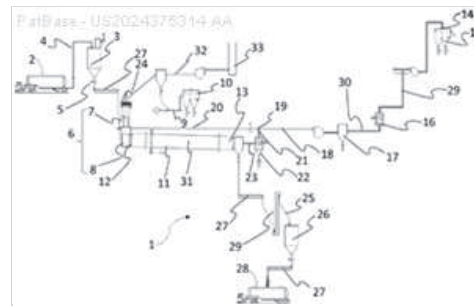
Title (EP4380906 A1)

[EN] ACCELERATED CARBONATION PROCESS AND IMPLEMENTATION THEREOF IN A PROCESS FOR UPCYCLING CONCRETE WASTE AND INDUSTRIAL WASTE GASES

Abstract (EP4380906 A1)

[EN] The invention relates to an accelerated carbonation process which comprises the following steps: a) providing recycled concrete aggregates with a particle size less than or equal to a value V1 of between 1 mm and 6 mm, in other words a 0/V1 sand; b) carrying out a separation step on the 0/V1 sand by defining a particle size cut-off with a value V2 of between 0.1 mm and 0.2 mm in such a way as to obtain: - a first fraction with a particle size less than V2, and - a second fraction with a particle size between V2 and V1; and c) subjecting the second fraction to an accelerated carbonation step in a dynamic carbonator (11) in order to obtain carbonated recycled concrete aggregates. The invention also relates to a process for upcycling concrete waste and industrial waste gases, in particular waste gases from cement works, using the accelerated carbonation process.

Assignees: VICAT; FIVES FCB

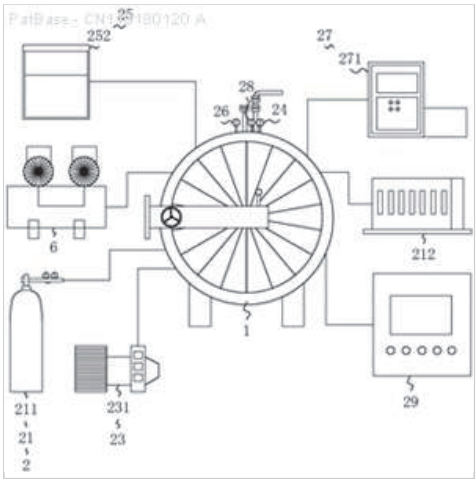


60. Family 103114527 (CN118180120 A)

[View in PatBase](#)

Title
[EN] BULK SOLID WASTE CARBONIZATION METHOD BASED ON GRADED STORAGE AND UTILIZATION OF CARBON DIOXIDE

Abstract
[EN] The invention relates to a bulk solid waste carbonization method based on graded storage and utilization of carbon dioxide, which comprises the following steps: S1, establishing a solid waste carbonization chain; s2, solid waste powder is put into the tray fixing unit to be subjected to primary carbonization treatment, carbonization parameters of the carbonization parameter grading regulation and control unit are set, and carbonized powder is obtained; s3, the carbonized powder or the carbonized powder and water are put into the stirring carbonization unit to be subjected to secondary carbonization treatment, carbonization parameters of the carbonization parameter grading regulation and control unit are set, and carbonized slurry is obtained; and S4, the carbonized slurry is put into the stirring granulation unit to be subjected to three-stage carbonization treatment, carbonization parameters of the carbonization parameter grading regulation and control unit are set, and carbonized particles are obtained. Through graded regulation and control of carbonization parameters such as CO₂ concentration, air pressure, temperature, humidity and carbonization time, multifunctional carbonization treatment of the solid waste is realized while the reaction of the solid waste and CO₂ is accelerated, and the method has the advantage of improving the storage and utilization rate of the solid waste CO₂.



1st Main Claim
[MT] 1. A bulk solid waste carbonization method based on carbon dioxide staged storage utilization, characterized by the steps of:

S1 establishes a solid waste carbonization chain comprising a plurality of carbonization kettles, a carbonization parameter classification control unit provided on the carbonization kettles, and a tray fixing unit, a stirred carbonization unit and a stirred granulation unit arranged in the bodies of the carbonization kettles, respectively, The carbonization parameters of the carbonization parameter classification control unit include CO₂Concentration, barometric pressure, temperature, humidity, and carbonization time;

S2 putting solid waste powder into the tray fixing unit to perform a primary carbonization process, and setting carbonization parameters of the carbonization parameter grading control unit to obtain carbonized powder;

S3 introducing the carbonized powder, or the carbonized powder and water, into the stirred carbonization unit for a secondary carbonization process, and setting the carbonization parameters of the carbonization parameter classification control unit to obtain a carbonized slurry;

S4 the carbonized slurry is put into the agitated granulation unit for a three-stage carbonization process, and the carbonization parameters of the carbonization parameter classification control unit are set to obtain carbonized particles.

Assignees: ZHEJIANG UNIV OF TECHNOLOGY; UNIV ZHEJIANG TECHNOLOGY

61. Family 102853711 (CN118084380 A)

[View in PatBase](#)

Title

[EN] BUILDING REGENERATED FINE AGGREGATE CURING CARBON DIOXIDE AND AGGREGATE SYNERGISTIC STRENGTHENING METHOD

Abstract

[EN] The invention discloses a building regenerated fine aggregate solidification carbon dioxide and aggregate synergistic reinforcement method. The method comprises the following steps: S1, crushing, screening, grading and particle shaping are performed on to-be-treated aggregates; s2, soaking the shaped aggregate in an aggregate pre-soaking solution; s3, performing carbon sequestration reinforcement on the soaked aggregate, and spraying an aggregate modification liquid on the surface of the aggregate before carbon sequestration reinforcement is finished; the aggregate presoaking liquid is composed of presoaking liquid effective components and water, and the mass concentration of the aggregate presoaking liquid is 6 percent -11 percent; the effective components of the presoaking liquid comprise the following components in parts by mass: 4-7 parts of sodium silicate, 2-3 parts of lithium silicate, 0.1-0.3 part of sodium formate and 0.1 part of an ether compound. The recycled fine aggregate concrete has the advantages that the recycled fine aggregate can meet the index requirements that the water demand ratio of recycled mortar is smaller than 1.35, the strength ratio of the recycled mortar is larger than 0.90, the apparent density is larger than 2450 kg/m³, the stacking density is larger than 1350 kg/m³, and the void ratio is smaller than 46 percent.

1st Main Claim

[MT] 1. A method of building regeneration of fine aggregate solidification of carbon dioxide and aggregate synergistic strengthening, comprising a carbon consolidation step, characterized in that it further comprises the step of soaking the aggregate with an aggregate prepreg, said aggregate prepreg consisting of a prepreg active ingredient and water, prior to the carbon consolidation step, The mass concentration of aggregate prepreg solution is 6 to 11%; the active ingredients of the prepreg solution include the following parts by mass: Sodium silicate 4 to 7 parts, lithium silicate 2 to 3 parts, sodium formate 0.1 to 0.3 parts, ether compound 0.1 parts.

Assignees: SICHUAN INST OF BUILDING RES; SICHUAN INST BUILDING RES

62. Family 105900362 (KR20240176858 A)

[View in PatBase](#)

Title

[EN] CONCRETE BLOCK CONTAINING BACTERIA WITH CARBON DIOXIDE ADSORPTION MECHANISM

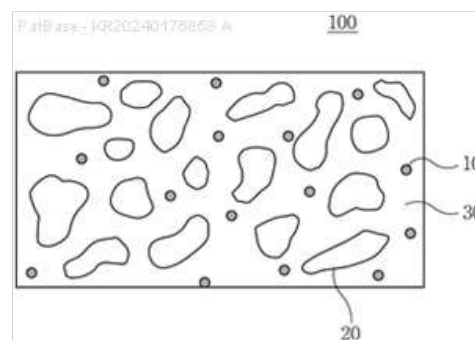
Abstract

[MT] The invention relates to a concrete block comprising bacteria having a carbon dioxide adsorption mechanism, and to provide a concrete block which has improved durability and adsorbs carbon dioxide in the atmosphere regardless of bright and dark conditions. A composition for a concrete block according to the present invention includes: an inorganic binder containing cement; and an aggregate mixture including a general aggregate and a porous material impregnated with alkalophilic bacteria having a carbon dioxide adsorption mechanism and forming glycocalyx.

1st Main Claim

[MT] 1. A concrete block comprising: An inorganic binder comprising cement; and an aggregate mixture comprising common aggregate and porous material impregnated with alkalophilic bacteria having a carbon dioxide adsorption mechanism and forming glycocalyx.

Assignees: KYONGGI UNIV IND AND ACADEMIA COOPERATION FOUNDATION; UNIV KYONGGI IND AND ACAD COOP FOUND; INDUSTRIAL ACADEMIC COOPERATION GROUP KYEONGGI UNIV



63. Family 91802288 (CN216687933 U)

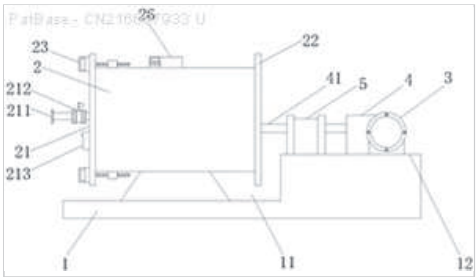
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Title

[EN] DEVICE FOR CURING RECYCLED AGGREGATE CONCRETE BY USING CARBON DIOXIDE

Abstract

[EN] The utility model relates to the technical field of recycled aggregate, in particular to a carbon dioxide device for curing recycled aggregate concrete, which comprises a workbench, a carbonization box, a motor, a gearbox and a bearing seat are mounted at the top of the workbench, and a movable box cover is arranged on one end face of the carbonization box. A movable box cover is fixedly installed on the end face, away from the movable box cover, of the carbonization box, meanwhile, the movable box cover and the carbonization box are fixedly connected through a limiting mechanism, and a heating assembly is fixedly installed on the inner wall of the carbonization box. According to the present invention, the recycled aggregate has characteristics of porosity reducing, water absorption rate reducing, strength improving, effective overcoming of the defects of large porosity, large water absorption rate, small bulk density, high crushing index, high surface inerting degree and high micro-powder content of the existing recycled aggregate, easy practical engineering application, automatic gas closing function, high efficiency and convenience.



1st Main Claim

[MT] 1. Device for carbon dioxide for regenerative aggregate concrete maintenance comprising a worktop (1), characterized in that a carbonization box (2), an electric motor (3), a gearbox (4) and a bearing seat (5) are mounted on top of the worktop (1), a mobile lid (21) being provided at one end face of the carbonization box (2), And a fixed lid (22) is fixedly mounted on an end face of the carbonization box (2) remote from the movable lid (21), while the movable lid (21) and the carbonization box (2) are fixedly connected by a limiting mechanism (23), and a heating assembly (24) is fixedly mounted on an inner wall of the carbonization box (2), And a stirrer (25) is installed inside the carbonization box (2), while a control electric box (26) is installed on top of the carbonization box (2), a carbon dioxide intake pipe (211) is installed throughout the side of the movable box cover (21) remote from the carbonization box (2), and a solenoid valve (212) is sleeved on the carbon dioxide intake pipe (211), Meanwhile, a digital controller (213) is fixedly installed at the bottom of the carbon dioxide intake pipe (211), and a carbon dioxide sensor (214) and a temperature humidity sensor (215) are fixedly installed at the side of the mobile tank cover (21) close to the carbonization tank (2).

Assignees: JIANGSU YUHUI RESIDENTIAL IND LTD CO

64. Family 77298943 (CN110683780 A)

[View in PatBase](#)

Title

[EN] MODIFIED COAL ASH FOR CURING AND SEALING CARBON DIOXIDE AND PREPARATION METHOD OF MODIFIED COAL ASH

Abstract

[EN] The invention discloses modified coal ash for curing and sealing carbon dioxide. The modified coal ash comprises coal ash, 2-amino terephthalic acid and water, wherein the mole ratio of aluminum and iron elements to 2-amino terephthalic acid to water in the coal ash is 1:(0.15-0.60):153. The invention further discloses a preparation method of the modified coal ash. The preparation method comprises the following steps: 1) screening the coal ash, mixing the coal ash with the aluminum and iron elements, the 2-amino terephthalic acid and the water in a mole ratio of 1:(0.15-0.60):153, and performing ball milling for 25-30 minutes; 2) putting the mixture into a sealed hydrothermal kettle, and performing a reaction for 3-4 hours at 130-140 DEG C; 3) after the reaction is completed, performing cooling to the room temperature, and washing the product obtained through the reaction by using deionized water for multiple times; and 4) drying the reaction product in a drying oven. By adopting the modified coal ash disclosed by the invention, aluminum oxide and ferric oxide which account for about 30 percent of the coal ash component can also participate in carbon dioxide absorption, the curing and sealing performance of the coal ash upon the carbon dioxide can be greatly improved, the preparation method is simple in operation, and the processing cost is low.

1st Main Claim

[MT] 1. A method for curing a carbon dioxide sequestration of modified fly ash, characterized by comprising: 2-amino-terephthalic acid, and water, the fly ash, the fly ash contained in the aluminum and iron, 2-amino-terephthalic acid and water in a molar ratio of 1:0.15-0.60:153.

Assignees: UNIV ZHEJIANG; ZHEJIANG UNIV

65. Family 104922800 (KR102719848 B1)

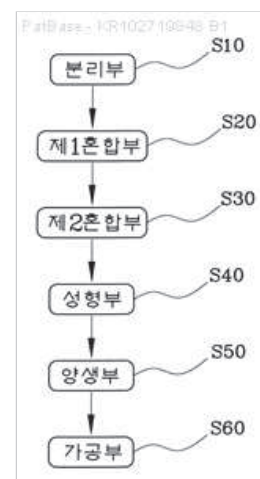
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Title

[EN] RECYCLING SYSTEM THAT CAPTURES AND PROCESSES CARBON DIOXIDE SEPARATED FROM BIOGAS

Abstract

[MT] The present invention relates to a method for producing carbon dioxide , nitrogen , oxygen , hydrogen sulfide , ammonia , and methane generated from food waste , sewage sludge , and the like , An environmentally friendly , non-saving industrial , construction , and sulfur Trioxide by effectively removing any sulfides such as hydrogen sulfide , sulfur dioxide , sulfur Trioxide from other various biogas such as siloxanes and the like , and collecting and non-saving carbon dioxide separated from the biogas so as to recycle any collected carbon dioxide and quicklime , and a specific waste means for recycling various materials for civil engineering , and the same , A sewage sludge , a sewage sludge , a sewage sludge , a sewage sludge , a sewage sludge , a biogas generated in two or more of a sewage sludge , a sewage sludge , A separation section (S10) for separating methane gas and carbon dioxide after removing ammonia, hydrogen sulfide which is a hazardous substance from siloxane, sulfur dioxide and sulfur Trioxide, and then separating methane gas and carbon dioxide, and a first reactor ((200)) for collecting only the separated carbon dioxide and then entering into a first reactor (10), Waste building materials or waste materials are mixed and mixed through a dehydrator (210) and then charged to the first reactor (200) to obtain a stirring reaction with the carbon dioxide and then a mixture via the first mixing part S20 and the first mixing part S20 are introduced into a second reactor (300), and then calcium carbonate, A second mixing section (S30) for mixing and mixing waste construction materials or waste materials through a dehydrator ((210)) and then charged to the second reactor ((300)) to produce an stirring reaction with the mixture , and a second mixing section (S30) for charging the mixture into a molding mold and then applying vibration for 5 to 30 minutes, A molded part (S40) for heating and pressing heat under conditions of temperature 85-90 degrees Celsius, a molded part (S50) for drying the compressed molded product at a temperature of 30-90 degrees Celsius, and a processing part (S60) for polishing the surface of the dried molded product and cutting to a certain specification (200) of silicon (300) 10-15 weight percentage, butanone 1-3 weight percentage, methyl isobutyl ketone 1-3 weight percentage, butyl acetate 10-15 weight percentage, propylene glycol methyl ether acetate 5-10 weight percentage, ethanol A recycling system for trapping carbon dioxide separated from biogas which has been applied with a coating agent which has been mixed in 1 to 5 weight percentage, acrylic polyol 10 to 15 weight percentage, polyester polyol 1 to 4 weight percentage, xylene 5 to 10 weight percentage, other additives 1 to 4 weight percentage."



1st Main Claim

[MT] 1. A biogas which is generated in any one or more of the following ingredients : food waste , sewage sludge , sewage sludge , sewage sludge , sewage sludge , A separation section (S10) for separating methane gas and carbon dioxide after removing ammonia, hydrogen sulfide which is a hazardous substance from siloxane, sulfur dioxide and sulfur Trioxide, and then separating methane gas and carbon dioxide, and a first reactor ((200)) for collecting only the separated carbon dioxide and then entering into a first reactor (10), Waste building materials or waste materials are mixed and mixed through a dehydrator (210) and then charged to the first reactor (200) to obtain a stirring reaction with the carbon dioxide and then a mixture via the first mixing part S20 and the first mixing part S20 are introduced into a second reactor (300), and then calcium carbonate, A second mixing section (S30) for mixing and mixing waste construction materials or waste materials through a dehydrator ((210)) and then charged to the second reactor ((300)) to produce an stirring reaction with the mixture , and a second mixing section (S30) for charging the mixture into a molding mold and then applying vibration for 5 to 30 minutes, A molding part (S40) for heating and pressing heat under a condition of a temperature of 85 to 90°C, a curing part (S50) for placing the compressed molding in a drying furnace and drying the same for 10 to 50 minutes at a temperature of 30 to 90°C, and a processing part (S60) for polishing and cutting the surface of the dried molding by certain specifications, and cutting silicon dioxide (Silicene dioxide (Silicen (200)-(300)₆H₅CH₃(A) 10-15 wt%, Butanone 1-3 wt%, methyl isobutyl ketone 1-3 wt%, butyl acetate 10-15 wt%, propylene glycol methyl ether acetate 5-10 wt%, ethanol ethyl acetate 5-1 wt%, benzene 1 A recycling system that collects carbon dioxide separated from biogas, comprising coated with a coating agent which has a mixture of 10 to 15% by weight of polyester polyol, 1 to 4% by weight of polyester polyol, 5 to 10% by weight of xylene, and 1 to 4% by weight of other additives.

Assignees: JEONG CHOONG EUI; KUKDONG ENVIRONMENT CHEMICAL TECH CO LTD

66. Family 93457490 (CN115093143 A)

[View in PatBase](#)

Title

[EN] METHOD FOR COLLECTING AND RECYCLING CARBON DIOXIDE IN FLUE GAS THROUGH COOPERATIVE TREATMENT OF FLY ASH AND LEACHATE AND RECYCLING PRODUCT

Abstract

[EN] The invention belongs to the field of environmental protection, and particularly relates to a method for cooperatively treating and recycling carbon dioxide in captured flue gas through fly ash and leachate and a recycling product. The method comprises the following steps: a) mixing fly ash, leachate, a heavy metal curing agent, an emulsifier and a water reducing agent to obtain slurry; in the step a), the heavy metal curing agent comprises bentonite, spodumene powder, magnesium oxide, clay and silica-alumina gel; b) capturing carbon dioxide in the flue gas by using the slurry to obtain carbon-rich slurry; and c) dehydrating the carbon-rich slurry to obtain the modified fly ash. According to the method provided by the invention, comprehensive treatment of various industrial wastes and pollutants is realized, the modified fly ash with a relatively good recycling value is obtained, and the method has good environmental benefits and economic benefits and is wide in market prospect.

1st Main Claim

[MT] 1. A method of fly ash and diafiltrate to synergistically treat and resource carbon dioxide in trapped flue gases, comprising the steps of:

a) Mixing fly ash, diafiltrate, heavy metal curing agent, emulsifier, and water reducer to obtain a slurry;

In step a), the ingredients of the heavy metal curing agent include bentonite, spodumene powder, magnesium oxide, clay and silica gel;

b) Capturing CO₂ in flue gas using the slurry to obtain a carbon-rich slurry;

c) Dewatering the carbon-rich slurry, resulting in a modified fly ash.

Assignees: SHANGHAI SUS ENVIRONMENT CO LTD

67. Family 102470415 (CN117964271 A)

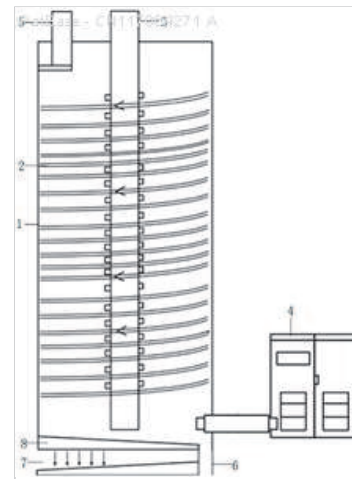
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Title

[EN] CARBON DIOXIDE CURED ARDEALITE-BASED CEMENTING MATERIAL AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention discloses a carbon dioxide cured ardealite-based cementing material and a preparation method thereof, the preparation method comprises the following steps: S1, obtaining an ardealite-based cementing material, and pretreating the ardealite-based cementing material to obtain recycled aggregate particles; s2, obtaining an expired dairy product, and heating the expired dairy product at 60-80 degrees centigrade for 1-2 hours; s3, adding the recycled aggregate particles into the expired dairy product, and mixing and stirring for 20-40 minutes under the condition of 100-140 degrees centigrade to obtain a mixture; and S4, cooling the mixture to room temperature, adding yeast, carrying out dripping spraying under negative pressure and ultrasonic conditions, and maintaining for 2 hours under the negative pressure and ultrasonic conditions to obtain the carbon dioxide-maintained phosphogypsum-based cementing material. According to the method, the solid waste cementing material can be efficiently cured in an energy-saving mode, the obtained cured cementing material has good mechanical performance, and technical support can be provided for recycling and reusing of the solid waste material.



1st Main Claim

[MT] 1. A process for preparing a carbon dioxide-maintained phosphorus gypsum-based gelling material, comprising the steps of: Providing a carbon dioxide-containing gypsum-based gelling material;

S1: Obtaining a phosphorus gypsum-based gelling material and pretreating the phosphorus gypsum-based gelling material to obtain regenerated aggregate particles;

S2: Obtaining an expired dairy product and heat treating said expired dairy product under 60-80 degrees centigrade conditions for 1-2 h;

S3: Adding the regenerated aggregate particles to the expired milk product and mixing under 100-140 degrees centigrade conditions for 20-40 minutes to obtain a mixture;

S4 : Cool the mixture to room temperature, add yeast, and drip under negative pressure and ultrasonic conditions, then maintain under negative pressure and ultrasonic conditions for 2h to obtain the carbon dioxide-preserved phosphorus gypsum-based gelling material.

Assignees: CHONGQING JIAOTONG UNIV; XIAMEN MARINE ENG CO LTD OF CCCC THIRD HARBOR ENG CO LTD; UNIV CHONGQING JIAOTONG; NO 6 ENG XIAMEN CO LTD OF CCCC THIRD HARBOR ENG CO LTD

68. Family 108238871 (CN120081632 A)

[View in PatBase](#)

Title

[MT] CARBON DIOXIDE ENRICHED REINFORCED RECYCLED AGGREGATE CONCRETE AND PREPARATION METHOD THEREOF

Abstract

[MT] [0001] The present invention belongs to the technical field of new materials for comprehensive recycling of solid waste, and discloses a carbon dioxide enriched and enhanced recycled aggregate concrete and a preparation method thereof. A carbon dioxide enriched and enhanced recycled aggregate concrete is mainly made of the following raw materials in parts by mass: 40 to 60 parts of carbon dioxide enriched recycled aggregate, 20 to 30 parts of fine aggregate, 15 to 20 parts of cement, 0.5 to 1 part of admixture, and 4.5 to 9 parts of water; the carbon dioxide enriched recycled aggregate is modified by blending with microwave induction material and compound solution, soaking in alcohol amine solution, and capturing CO_2 . The present invention enables the surface of the loose and porous recycled aggregate to fully enrich carbon dioxide through modification technology, so that the uncarbonized cementitious material inside the recycled aggregate fully reacts, thereby improving the overall carbonization reaction of the concrete, and finally improving the mechanical properties of the recycled aggregate concrete.

1st Main Claim

[MT] 1. A carbon dioxide enriched and reinforced recycled aggregate concrete, characterized in that it is mainly made of the following raw materials in parts by weight: 40 to 60 parts of carbon dioxide enriched recycled aggregate, 20 to 30 parts of fine aggregate, 15 to 20 parts of cement, 0.5 to 1 part of admixture, and 4.5 to 9 parts of water;

The carbon dioxide enriched recycled aggregate is prepared by mixing recycled aggregate with microwave induction material and compound solution, soaking in alcohol amine solution, and capturing CO_2 ; the compound solution is prepared by mixing organic siloxane and ethanol;

The admixture is at least one of a polycarboxylate water reducer and a lignin sulfonate water reducer.

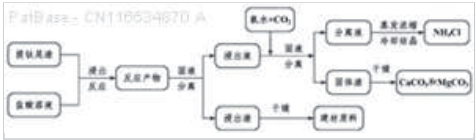
Assignees: HENAN UNIV OF SCIENCE AND TECHNOLOGY; ZHONGYUAN INST OF TECHNOLOGY

69. Family 98446170 (CN116534870 A)

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Title

[EN] METHOD FOR CO-PRODUCTION OF NH₄CL BY DECHLORINATION, COUPLING, MINERALIZATION AND STORAGE OF CO₂ FROM TITANIUM EXTRACTION TAILINGS AND APPLICATION OF METHOD



Abstract

[EN] The invention discloses a method for co-production of NH₄Cl by dechlorination, coupling, mineralization and storage of CO₂ from titanium extraction tailings and application of the method. The titanium extraction tailings and hydrochloric acid are mixed and stirred for a leaching reaction, and a first reactant is obtained; the first reactant is subjected to solid-liquid separation, a leaching solution and leaching residues are obtained, and the leaching residues can be used as building raw materials. After ammonia water is added into the leachate to adjust the leachate to a preset pH value, carbon dioxide is introduced for a mineralization reaction, and a second reactant is obtained; carrying out solid-liquid separation on the second reactant to obtain a separation solution containing NH₄Cl and solid residues (CaCO₃ and MgCO₃); and carrying out evaporation concentration and cooling crystallization treatment on the separation liquid to obtain an NH₄Cl product. According to the method, valuable elements in the titanium extraction tailings can be recycled, CO₂ emission can be reduced to a certain extent, meanwhile, by-products such as building raw materials, CaCO₃, MgCO₃ and NH₄Cl are co-produced, and the method has important significance in promoting green, low-carbon and sustainable development of the iron and steel industry.

1st Main Claim

[MT] 1. A titanium tailing dechlorination coupled mineralization sequestration of CO₂Co-production of NH₄Cl, characterized in that it comprises the following steps:

- Step 1. The leaching reaction is carried out by mixing the titanium tailing residue and hydrochloric acid with stirring to obtain a first reactant;
- Step two of solid-liquid separating said first reactant to obtain a leach liquor and leach slag;
- Step three: Adding ammonia water to the leach liquor to adjust to a predetermined pH, and then introducing carbon dioxide to carry out a mineralization reaction to obtain a second reactant;
- Step four subjecting the second reactant to solid-liquid separation to obtain a separation liquid and a solid slag;
- Step 5 The separation solution is concentrated by evaporation, and after cooling the crystallization process, NH is obtained₄Cl products.

Assignees: PANZHIHUA IRON AND STEEL RES INST PANGANG GROUP; PANZHIHUA IRON AND STEEL RESEARCH INST PANGANG GROUP

70. Family 95776079 (CN115650663 A)

[View in PatBase](#)

Title

[EN] PREPARATION METHOD OF ULTRA-HIGH PERFORMANCE CONCRETE WITH CARBON DIOXIDE AS INTERNAL CURING AGENT

Abstract

[EN] The invention provides a preparation method of ultra-high performance concrete with carbon dioxide as an internal curing agent. The method comprises the following steps: carrying out modification treatment on steel fibers by adopting a polyethyleneimine (PEI) solution with a certain concentration to obtain PEI coated steel fibers; the PEI coating steel fiber is placed in a carbonization box to capture CO₂, and the CO₂-captured PEI coating steel fiber is obtained; the preparation method comprises the following steps: adding dry materials (cement, silica fume, quartz powder and quartz sand) and a dry powder polycarboxylate superplasticizer into a stirrer, uniformly mixing, and then adding mixing water; when the mixture is in a wet state, adding the PEI coating steel fiber for capturing CO₂; and stopping stirring when the expansion degree of the freshly mixed concrete meets the requirement. After the fresh mixed concrete is subjected to pouring molding and static curing, the ultra-high performance concrete with the carbon dioxide as the internal curing agent is obtained through curing. The method has the effect of improving the mechanical property of the ultra-high performance concrete while capturing and storing CO₂, and has certain reference significance for relieving the greenhouse effect and improving the bearing capacity of an ultra-high performance concrete member.

1st Main Claim

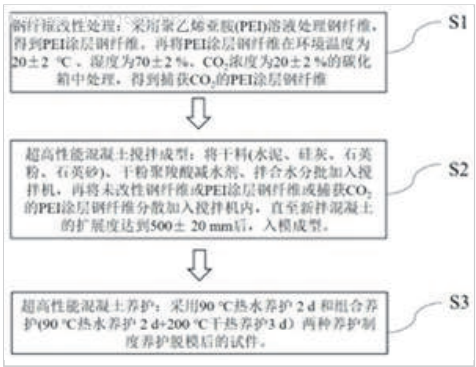
[MT] 1. A method of preparing ultra-high performance concrete with carbon dioxide as an internal care agent, comprising:

Modified treating steel fibers with a concentration of polyethyleneimine solution to obtain PEI-coated steel fibers;

The PEI coated steel fibers were placed in a carbonization box to capture CO₂, The captured CO is obtained₂Of PEI-coated steel fibers;

The dry material comprising cement, silica ash, quartz powder and quartz sand are added to a blender and mixed for homogeneity; the dry material comprising cement, silica fume, quartz powder and quartz sand are added to mix water; Adding the capture CO₂(A) when the expansion of the new mixed concrete reaches the required level;

Assignees: BEIJING JIAOTONG UNIV; UNIV BEIJING JIAOTONG



71. Family 97003691 (US2024335814 AA)

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Title (EP4403256 A1)

[EN] CO2 IMMOBILIZATION MATERIAL AND METHOD FOR PRODUCING CO2 IMMOBILIZATION PRODUCT

Abstract (EP4403256 A1)

[EN] There are provided a CO₂ immobilization material including one kind or two or more kinds of non-hydraulic compound selected from the group consisting of gamma-2CaO·SiO₂, 3CaO·2SiO₂, α-CaO·SiO₂, and calcium magnesium silicate, in which the CO₂ immobilization material contains Li, and a content percentage of the Li is 0.001 to 1.0 percent by mass in terms of oxide; and a method for producing a CO₂ immobilization product including subjecting the CO₂ immobilization material to a carbonation treatment at 75 degrees centigrade or lower and/or 50 percent RH or higher.

1st Main Claim (EP4403256 A1)

[EN] 1. A CO₂ immobilization material comprising one kind or two or more kinds of non-hydraulic compound selected from the group consisting of gamma-2CaO·SiO₂, 3CaO·2SiO₂, α-CaO·SiO₂, and calcium magnesium silicate, wherein the CO₂ immobilization material contains Li, and a content percentage of the Li is 0.001 to 1.0 percent by mass in terms of oxide.

Assignees: DENKA CO LTD



72. Family 96394999 (CN218665804 U)

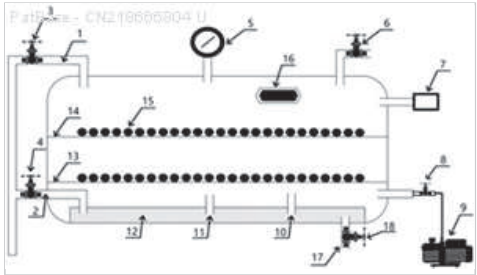
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Title

[EN] EQUIPMENT FOR DOUBLE MAINTENANCE OF STEEL SLAG AGGREGATE BY USING HIGH-TEMPERATURE CARBON DIOXIDE AND FLUE GAS

Abstract

[EN] The utility model relates to equipment for double maintenance of steel slag aggregate by using high-temperature carbon dioxide flue gas, which comprises an equipment body, a high-temperature carbon dioxide flue gas pipeline I and a high-temperature carbon dioxide flue gas pipeline II are communicated with the equipment body, and the steel slag aggregate to be treated is placed in the equipment body. A water treatment device is arranged at the bottom in the equipment body, the high-temperature carbon dioxide flue gas pipeline I is introduced into the equipment body from an upper cover of the equipment body, and the high-temperature carbon dioxide flue gas pipeline II is introduced into the water treatment device from the lower part of the equipment body; a steam outlet pipeline I and a steam outlet pipeline II which are opened upwards are arranged on the water treatment device. The steel slag aggregate is subjected to carbonization curing and steam curing in sequence in a manner of directly introducing high-temperature carbon dioxide flue gas and introducing the high-temperature carbon dioxide flue gas into water to generate steam, and the steel slag aggregate with good volume stability is obtained.



1st Main Claim

[MT] 1. An apparatus for double-retaining steel slag aggregates using high temperature carbon dioxide flue gas, characterized in that it comprises an apparatus body having a high temperature carbon dioxide flue gas conduit one (1) and a high temperature carbon dioxide flue gas conduit two (2), The apparatus body is provided with an aggregate (15) of slag to be treated, the bottom of the apparatus body being provided with a water treatment device (12),

Said high temperature carbon dioxide flue gas conduit one (1) from the upper cover of the plant body into the plant body and the high temperature carbon dioxide flue gas conduit two (2) from the lower part of the plant body into the water treatment device (12), The water treatment device (12) is provided with an upwardly opening steam outlet pipe one (10) and a steam outlet pipe two (11),

Said steel slag aggregate (15) is laid on stainless steel shelves one (13) and two (14), Stainless steel frame one (13) and stainless steel frame two (14) are located between the upper cover of the plant body and the steam outlet pipe one (10) and the steam outlet pipe two (11) of the water treatment unit (12).

Assignees: JIANGSU NIGAO SCIENCE AND TECH CO LTD; CHANGZHOU ARCHITECTUAL RES INST GROUP CO LTD

73. Family 101118000 (CN117510113 A)

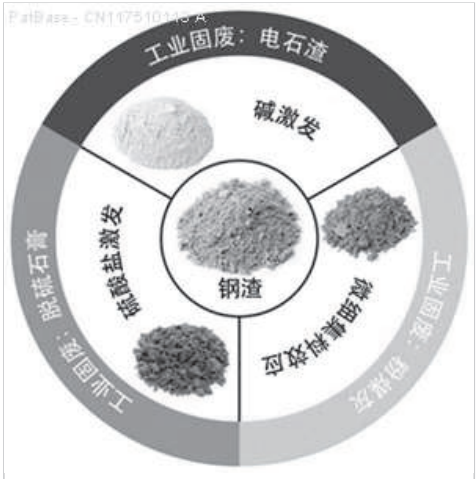
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Title

[EN] ALL-SOLID-WASTE ARTIFICIAL LIGHTWEIGHT AGGREGATE BASED ON CO2 MINERALIZATION UTILIZATION AND PREPARATION METHOD OF ALL-SOLID-WASTE ARTIFICIAL LIGHTWEIGHT AGGREGATE

Abstract

[EN] The invention discloses an all-solid waste artificial lightweight aggregate based on CO2 mineralization utilization and a preparation method thereof. The preparation method comprises the steps that dry materials such as steel slag powder, carbide slag, fly ash, desulfurized gypsum and slag powder are fully mixed and then put into a ball forming mill to obtain an artificial aggregate blank, and then the artificial aggregate blank is sequentially subjected to pre-curing, carbonization treatment and subsequent wet curing; according to the method, industrial solid waste of factories around a steel plant is added into a formula, mineralized active substances are supplemented while the activity of the steel slag is fully excited, and a multi-element solid waste synergistic excitation system is formed. In the preparation process, industrial flue gas is directly used, required equipment is simple, calcination is not needed, and various costs are reduced. According to the prepared artificial aggregate, the apparent carbon sequestration amount is 8-12 percent, the compressive strength is 3-10 Mpa, the water absorption rate is 7-15 percent, the apparent carbon sequestration amount is increased, the compressive strength is improved, and the water absorption performance is improved. The artificial aggregate prepared by the method is applicable to but not limited to road engineering, mine filling, thermal insulation materials and the like, and provides technical support for realizing large-scale resource utilization of mineralized products.



1st Main Claim

[MT] 1. A CO-based₂Fully solid waste artificial lightweight aggregate for mineralization and method for preparing same, comprising:

- (1) Magnetically sorting, grinding and sieving the steel slag of the converter to obtain the steel slag powder for use;
- (2) mixing the steel slag powder with other dry materials and putting it into a ball-forming machine, controlling the water-ash ratio of 0.15:1-0.4:1, to obtain an artificial bone mass;
- (3) pre-nursing the artificial bone mass for a time of 2 h to 24 h to obtain pre-nursing artificial bone embryos;
- (4) placing the pre-maintained artificial aggregate embryos into a carbonization apparatus for carbonization for 2 h to 48 h to obtain carbonized artificial aggregate embryos;
- (5) Carbide artificial aggregates for subsequent wet maintenance, that is, to obtain solid waste artificial lightweight aggregates.

Assignees: SICHUAN UNIV; UNIV SICHUAN

74. Family 84931733 (US2022396526 AA)

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Title (EP4054989 B1)

[EN] COMPOSITIONS COMPRISING A MECHANOCHEMICALLY CARBOXYLATED MINERAL FILLER AND A CEMENT AND/OR ASPHALT BINDER

Abstract

[EN] The present invention relates to compositions comprising a mechanochemically carboxylated mineral filler and a binder, wherein the binder is cement and/or asphalt and wherein the filler is obtainable by mechanochemically carboxylating a silicate mineral. The invention further relates to a method for preparing said compositions. The invention further relates to a method for preparing concrete from these compositions and to the concrete obtainable from said method for preparing concrete. The invention also relates to uses of the mechanochemically carboxylated mineral filler, for example as a filler in asphalt or cement.

1st Main Claim (EP4054989 B1)

[EN] 1. Composition comprising a mechanochemically carboxylated mineral filler and a binder; wherein the binder is selected from the group consisting of cement, asphalt and combinations thereof; and wherein the mechanochemically carboxylated mineral filler is obtainable by a method comprising the following steps:

- a) providing a solid feedstock comprising a silicate mineral, wherein the solid feedstock is a particulate material which has a BET surface area of more than 0.01 m²/g and a D50 within the range of 0.1-5000 micrometres;
 - b) providing an oxidizing gas comprising CO₂;
 - c) introducing said solid feedstock and said oxidizing gas into a mechanical agitation unit; and
 - d) subjecting the material of said solid feedstock and to a mechanical agitation operation in the presence of said oxidizing gas at an oxidizing gas pressure of more than 1 atm to obtain the mechanochemically carboxylated mineral filler;
- wherein the CO₂ content of the mechanochemically carboxylated mineral filler is more than 1 weight percent (by total weight of the mechanochemically carboxylated mineral filler) wherein the CO₂ content is determined as the mass loss above 120 degrees centigrade measured by TGA-MS employing a temperature trajectory wherein the temperature was increased from room temperature to 800 degrees centigrade at a rate of 10 degrees C/min and then decreased to room temperature at a rate of 15 degrees C/min.

Assignees: SINHA APOORV; CARBON UPCYCLING TECH INC; CARBON CYCLING TECH LLC

75. Family 96037056 (KR102505258 B1)

[View in PatBase](#)

Title

[EN] CONSTRUCTION MATERIAL MANUFACTURING METHOD BY CAPTURING CARBON DIOXIDE USING CALCIUM CARBONATE GENERATED FROM STEELMAKING SLAG

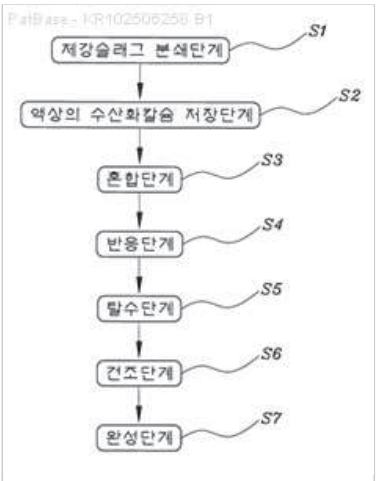
Abstract

[EN] The present invention relates to a construction material manufacturing method by capturing carbon dioxide using calcium carbonate generated from steelmaking slag, which is eco-friendly and cost-effective by recycling calcium carbonate generated using steelmaking slag. The construction material manufacturing method comprises: a steelmaking slag grinding step of grinding steelmaking slag in a high-temperature molten state; a reaction step of injecting water into calcium oxide contained in the ground steelmaking slag to extract calcium hydroxide, and generating calcium carbonate by reacting with carbon dioxide contained in the combustion gas generated during combustion in an industrial boiler; a dehydration step of dehydrating the generated calcium carbonate; a drying step of drying the dehydrated calcium carbonate; and a completion step of generating a construction material by mixing the dried calcium carbonate with an incombustible material and silica.

1st Main Claim

[MT] 1. A method for producing a ground steel slag , comprising : a reaction step of pulverizing steel slag in a hot melt state ; a step of adding water to calcium oxide contained in the pulverized steel slag to extract calcium hydroxide , and reacting with carbon dioxide contained in combustion gas generated in an industrial boiler to produce calcium carbonate ; A steel slag grinding step of injecting the steel slag into a rotary drum which rotates at 5 RPM and charging cooling water to pulverize the steel slag with 200 Mesh using steel spheres , and a step of introducing water to the pulverized steel slag to extract and store the calcium hydroxide produced by reaction of the calcium oxide contained at 40 % by weight of the steel slag and the water in the industrial combustion tank And mixing step ; a reaction step of sequentially conducting a primary to tertiary reaction baths so as to generate calcium carbonate by reacting the calcium hydroxide with carbon dioxide contained in the combustion gas in the mixing step ; a dehydration step of dehydrating a water content 84 to 86 % of calcium carbonate generated in the reaction step by using a centrifugal dehydrating machine ; and a pressure of 16 kg/cm² And drying in a dryer under conditions of a temperature of 203 °C. , wherein an additive is mixed with calcium carbonate from which carbon dioxide has been removed by mixing any one or all of magnesium oxide (MGO) or sodium hydroxide (NaOH) in said mixing step , and an additive is mixed with any one or all of a waste rubber chip , a waste tire chip or an EPDM collar chip , A method of manufacturing construction materials by capturing carbon dioxide using calcium carbonate produced from steel slag including any one or all of pulp .

Assignees: JEONG CHOONG EUI



76. Family 48983029 (KR101029912 B1)

[View in PatBase](#)

Title

[EN] MODIFIER FOR MANUFACTURING LOW OR MID TEMPERATURED ASPHALT CONCRETE AND ASPHALT CONCRETE WITH LOW CARBON DIOXIDE EMISSION USING THE MODIFIER

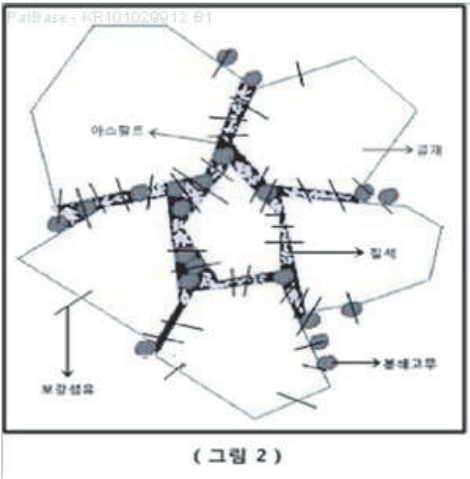
Abstract

[EN] PURPOSE: A modifier for low-mid temperature asphalt concrete and the low-mid temperature asphalt concrete using the same are provided to improve the mixing property and the hardening property of the asphalt concrete by using a superplasticizer, a particle adhesion preventive agent, and processing oil. CONSTITUTION: A base material containing crushed waste tire, heat expandable vermiculite, and cellulose fiber is prepared. Modifying fluid and a particle adhesion preventive agent are added to the base material. A mixing process is implemented under the temperature of 100 to 150 degrees Celsius in order to obtain a mixture. The mixture is cooled to temperature lower than 50 degrees Celsius. Processing oil, rosin, and ethylene vinyl acetate are added to the cooled mixture.

1st Main Claim

[MT] 1. First, the size of the mixer and 2mm~0.08mm indirect heating to 100 parts by weight of the pulverized waste tires, it is the thermal expansion portion with pores having a size of 3mm or less than 1.0 parts by weight of vermiculite 10, 10 to 200 parts by weight of cellulose fibers and, while mixing, the modified asphalt or EVA flow material component 1 to 30 parts by weight, resin (ROSIN), sulfur, PE, select one or more of WAX, EVA WAX, SBS and SIS, polyurethane, latex 30 parts by weight of EPDM, select at least one of 1 to 100 parts by weight in the mixer is heated so that the temperature of 100 degrees centigrade -150 degrees centigrade mixing, and wherein the pulverized waste tires, vermiculite, cellulose fiber, calcium carbonate, cement as a material preventing adhesion of particles, or hydrated lime 0.01 to selection of one or more of further added 1 to 30 parts by weight; and a first step of mixing the mixture according to the first step, the air-cooled or water-cooled as the secondary cooling is cooled to 50 °C mixer, 300 parts by weight of process oil, 5 to 5, rosin (rosin) or 10-100 parts by weight of less than 4mm 2 step to put a EVA; Characterized in that it is produced, including the added for the production of modified asphalt concrete for low temperature material

Assignees: HWANG IK HYUN



77. Family 84931729 (US2022396527 AA)

[View in PatBase](#)

Title (EP4054990 B1)

[EN] A MECHANICALLY CARBOXYLATED FLY ASH, METHODS OF ITS PRODUCTION AND USES THEREOF

Abstract

[EN] The present invention relates to a mechanically carboxylated fly ash which has a BET surface area of less than 50 m²/g and a CO₂ content of more than 1 weight percent. The invention further relates to methods of its production and uses thereof, for example as a filler. The invention further relates to compositions comprising the mechanically carboxylated fly ash and a further material selected from the group consisting of asphalt, cement, polymers and combinations thereof and methods of their production.

1st Main Claim (EP4054990 B1)

[EN] 1. A mechanochemically carboxylated fly ash which has a BET surface area of less than 50m²/g and a CO₂ content of more than 1 weight percent, wherein the CO₂ content is determined as the mass loss above 120 degrees centigrade measured by TGA-MS employing a temperature trajectory wherein the temperature was increased from room temperature to 800 degrees centigrade at a rate of 10 degrees C/min and then decreased to room temperature at a rate of 15 degrees C/min, and a D50 within the range of 0.5-50 micrometres.

Assignees: SINHA APOORV; CARBON UPCYCLING TECH INC; CARBON CYCLING TECH LLC

78. Family 107903172 (JP2025071904 A2)

[View in PatBase](#)

Title

[MT] CEMENT COMPOSITION, METHOD FOR PRODUCING CEMENT COMPOSITION, AND METHOD FOR ABSORBING AND FIXING CO₂

Abstract

[MT] [Problem] To provide a cement composition, its manufacturing method, and a CO₂ absorption and fixation method, which absorb and fix CO₂ while suppressing a decrease in compressive strength of concrete or mortar relative to the amount of CO₂ fixed. [Solution] The cement composition of the present invention is a cement composition containing cement, aggregate, clinker ash, and water, and the water content of the clinker ash is 21.2 percent or less. The cement composition manufacturing method of the present invention is a cement composition manufacturing method in which cement, aggregate, clinker ash, and water are mixed, and the water content of the clinker ash before mixing is 21.2 percent or less. The CO₂ absorption and fixation method of the present invention is a CO₂ absorption and fixation material used in the CO₂ absorption and fixation method is a cement composition in which cement, aggregate, clinker ash, and water are mixed, and the water content of the clinker ash before mixing is 21.2 percent or less. [Selected Figure] None

1st Main Claim

[MT] A cement composition comprising cement, aggregate, clinker ash, and water,
A cement composition, wherein the moisture content of the clinker ash is 21.2 percent or less.

Assignees: SUMITOMO OSAKA CEMENT CO LTD

79. Family 98681824 (CN116621487 A)

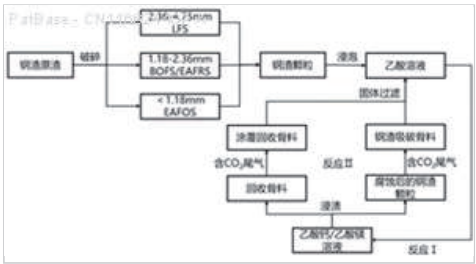
[View in PatBase](#)

Title

[EN] METHOD FOR ELIMINATING STABILITY OF STEEL SLAG AND PREPARING CARBON SEQUESTRATION RECYCLED AGGREGATE BY USING CO₂-CONTAINING TAIL GAS BASED ON ACETIC ACID CIRCULATION

Abstract

[EN] The invention relates to a method for eliminating stability of steel slag and preparing carbon sequestration recycled aggregate by using CO₂-containing tail gas based on acetic acid circulation. The method comprises the following steps: crushing and screening, corroding the steel slag by acetic acid, carbonizing and depositing a mixed solution of calcium acetate and magnesium acetate, and recycling an acetic acid solution. Differentiated treatment processes are adopted for different types of steel slag, acetic acid is used for corroding the steel slag to eliminate the volume stability of the steel slag, and the corrosive liquid and carbon dioxide tail gas are used for preparing the carbon sequestration recycling aggregate; different types of steel slag particles are effectively treated in a low-energy-consumption mode to obtain the steel slag particles with the stable size, carbon dioxide in industrial tail gas is utilized, the interface transition area of recycled aggregate is improved, and the whole production process has the advantages of being low in carbon, environmentally friendly, capable of being recycled and regenerated, high in reaction efficiency and the like.



1st Main Claim

[MT] 1. A recycle based on acetic acid containing CO₂A method of removing steel slag stability and preparing carbon sequestration recovered aggregate, characterized in that it comprises the steps of:

Step 1, Crushing and sieving: After crushing raw slag of different kinds to different particle sizes and sieving to obtain slag particles;

Step 2, Acetic Acid Corrosion of Steel Slag: The steel slag particles obtained in Step 1 are immersed in an acetic acid solution, and f-CaO and f-MgO in the steel slag particles are reacted with acetic acid to form calcium acetate and magnesium acetate and water for a reaction time of 1 to 3 hours, while obtaining porous steel slag particles after corrosion;

Step 3. Carbonization deposition of a mixture of calcium acetate and magnesium acetate:

Take out part of the calcium acetate and magnesium acetate mixture from step 2, soak the recovered aggregate from the demolition process in the solution, and then pass it into the CO containing solution₂Industrial tail gas, producing carbonate buildup at the recovery aggregate interface transition zone;

The remaining mixture is passed with CO₂Industrial tail gas, reacted with calcium acetate and magnesium acetate to produce carbonate buildup on the surface of slag particles;

Step 4, Recycling of acetic acid solution: Step 3 Calcium acetate and magnesium acetate solution with CO₂After the complete reaction product is carbonate precipitate and acetic acid, filtered out the solid particles after the reaction or modified slag particles and recovered aggregates, you can obtain acetic acid solution, recovered acetic acid solution used in step 2 corrosion of slag.

Assignees: CHANGZHOU ARCHITECTUAL RES INST GROUP CO LTD; JIANGSU NIGAO SCIENCE AND TECH CO LTD

80. Family 108075664 (WO25105021 A1)

[View in PatBase](#)

Title

[EN] MOLDED BODY FOR CARBON DIOXIDE FIXATION, METHOD FOR USING MOLDED BODY, CEMENT HARDENED BODY, AND METHOD FOR PRODUCING CEMENT HARDENED BODY

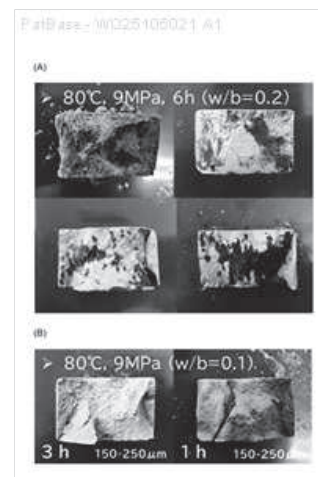
Abstract

[EN] This method for producing a cement hardened body includes: a molding step for molding a molded body from a molding feedstock containing water and a fine powder of cement hydrate; and a carbonation step for carbonating a calcium-containing component contained in the fine powder of cement hydrate in an atmosphere that contains carbon dioxide, has a partial pressure of carbon dioxide of 3.0 MPa or less, and has a temperature of 80 degrees centigrade or less. The molded body for carbon dioxide fixation contains water and a fine powder of cement hydrate, and the particle diameter of the fine powder of the cement hydrate is 500 micro m or less. The cement hardened body contains calcium carbonate, has a carbonation degree of 50 percent or more, and has a compressive strength of 17 N/mm² or more.

1st Main Claim

[MT] a forming step of forming a forming raw material containing fine powder of cement hydrate and water to obtain a formed body;
and a carbonation step of keeping the shaped body in an atmosphere containing carbon dioxide, the partial pressure of the carbon dioxide being 3.0 MPa or less and the temperature being 80 degrees centigrade or less, to carbonate the calcium-containing component contained in the fine powder of the cement hydrate.

Assignees: MITSUBISHI UBE CEMENT CORP



81. Family 91706283 (CN114538876 A)

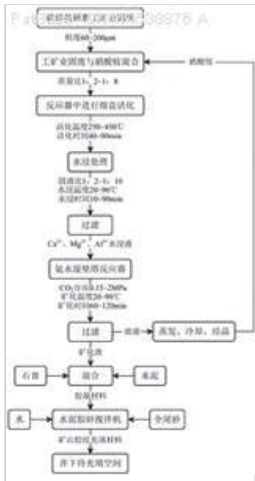
[View in PatBase](#)

Title
[EN] METHOD FOR PREPARING MINE CEMENTED FILLING MATERIAL BY USING LABOR/MINING INDUSTRY SOLID WASTE MINERALIZED CO2

Abstract
[EN] The invention provides a method for preparing a mine cemented filling material by mineralizing CO2 from labor/mining industry solid waste. The method comprises the following steps: grinding the labor/mining industry solid waste, and uniformly mixing the ground labor/mining industry solid waste with ammonium nitrate; placing the mixed raw material in a reactor for molten salt activation, collecting ammonia gas generated in the activation process, and converting Ca, Mg and Al in the activated raw material into corresponding metal nitrate; the metal nitrate activated mixture is subjected to water leaching treatment, and water leaching residues with the main component being SiO2 and water leaching liquid rich in Ca < 2 +>, Mg < 2 +> and Al < 3 +> are obtained through filtering; introducing the collected ammonia gas, the obtained water immersion liquid and CO2 prepared in advance into a reaction container to carry out carbonation reaction, and filtering to obtain filtrate containing ammonium nitrate and mineralized slag with main phases of CaCO3, MgCO3 and Al2 (CO3) 3; mixing the mineralized slag with cement and gypsum to prepare a cementing material; and mixing and stirring the cementing material, water and full tailings to prepare the cemented filling material. According to the method, CO2 mineralization sequestration and geological sequestration technologies are organically fused, and upgrading and transformation of metal mining under the dual-carbon strategy are achieved.

- 1st Main Claim**
[MT] 1. A method of preparing a mine cemented packing material with worker/mine solid waste mineralization CO2, characterized by comprising the steps of:
- S1. Mix the industrial/mineral solid waste milling homogeneously with ammonium nitrate;
 - S2. placing the mixed raw material in step S1 in a reactor for molten salt activation, collecting ammonia produced during activation, and converting the metals including Ca, Mg, Al in the raw material into corresponding metal nitrates after activation;
 - S3. subjecting the metal nitrate-activated mixture obtained in step S2 to a water dip treatment, and filtering to obtain a water dip slag having a main component of SiO2 and a water dip rich in Ca2+, Mg2+ and Al3+;
 - S4. The ammonia gas collected in step S2, the water immersion liquid obtained in step S3, and the preprepared CO2 are passed into a reaction vessel for carbonation reaction, namely mineralization of CO2, and filtered to obtain a filtrate containing ammonium nitrate and a mineralization slag having a main phase of CaCO3, MgCO3 and Al2 (CO3) 3;
 - S5. Mixing the mineralized slag obtained in step S4 with cement and gypsum to make a new cementitious material;
 - S6. Mix the cementitious material obtained in step S5 with water and full tail sands using a cement sand blender to make mine cementitious packing material for the downhole space to be filled.

Assignees: CHONGQING UNIV; UNIV CHONGQING



82. Family 95647404 (WO24144635 A1)

[View in PatBase](#)

Title

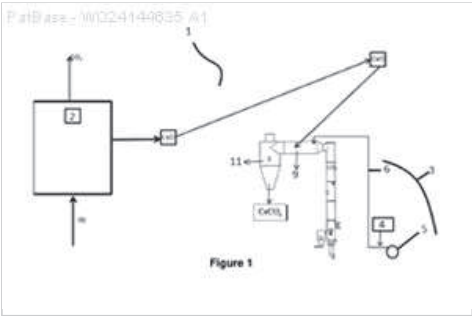
[EN] METHOD OF CONVERTING CARBON DIOXIDE (CO₂) IN FLUE GAS TO CALCIUM CARBONATE (CACO₃) USING CALCINED EGGSHELL

Abstract

[EN] The disclosure relates to a method and system (1) for capturing CO₂ by reacting CO₂ in the flue gas cooled to 600-700 degrees centigrade after leaving the solid, liquid and gas combustion chamber with calcined eggshell powders in a tangential vortex formed in a cylindrical column (9) and forming CaCO₃ as a result of the reaction.

1st Main Claim

[EN] 1. A system (1) for capturing CO₂ gas, which is the biggest cause of greenhouse gases in the flue gas resulting from the combustion of fossil fuels burned in thermal power plants and industrial boilers, and converting it into CaCO₃ characterized by comprising; At least one cylindrical column (9) that is cylindrical structure, to increase CO₂ capture efficiency, At least one cyclone area (11) to keep separate the CaCO₃ obtained as a result of the reactions in the cylindrical column (9) from the flue gas, At least one feeding system (3) to feed the calcined eggshell to the cylindrical column (9), At least one tangential feeding area (8), which allows the calcined powdered eggshell particles to enter the cylindrical column (9) to capture CO₂.



Assignees: SUELEYMAN DEMIREL UENIVERSITESI IDARI VE MALI ISLER DAIRE BASKANLIGI GENEL SEKRETERLIK

83. Family 72156784 (WO18216829 A1)

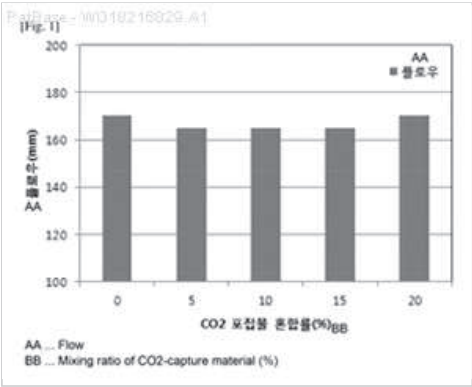
[View in PatBase](#)

Title
[EN] HIGHLY FLUID CONCRETE COMPOSITION WITH LESS POWDER, COMPRISING CARBON DIOXIDE-CAPTURE CALCIUM CARBONATE

Abstract
[EN] The present invention relates to a highly fluid concrete composition with less powder, comprising carbon dioxide-capture calcium carbonate, the composition comprising, with respect to 100 parts by weight of cement, 20 to 30 parts by weight of blast furnace slag, 5 to 10 parts by weight of CO-capture calcium carbonate, and 1 to 5 parts by weight of sodium hydroxide.

1st Main Claim
[MT] For cement 100 parts by weight of blast furnace slag from 20 to 30 parts by weight, 5 to 10 parts by weight calcium carbonate CO-house, 1 to 5 parts by weight of sodium hydroxide characterized in that it comprises a calcium carbonate containing the carbon collector (high fluidity concrete composition low.

Assignees: NOVIL; DAEWOO ENG AND CONSTR CO LTD



84. Family 107130570 (CN119638328 A)

[View in PatBase](#)

Title

[EN] FABRICATED CARBON SEQUESTRATION ECOLOGICAL FISH REEF BASED ON CO₂ MINERALIZED RECYCLED AGGREGATE AND PREPARATION METHOD OF FABRICATED CARBON SEQUESTRATION ECOLOGICAL FISH REEF

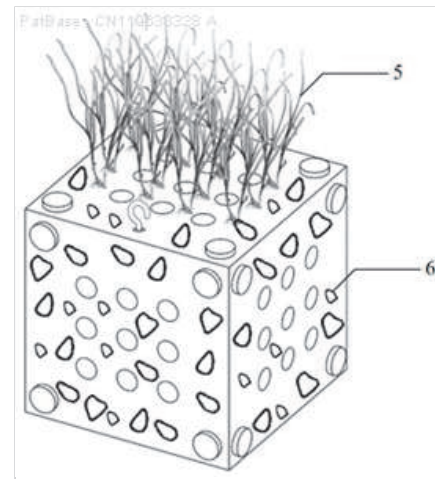
Abstract

[EN] The invention provides a fabricated carbon sequestration ecological fish reef based on CO₂ mineralized recycled aggregate and a preparation method of the fabricated carbon sequestration ecological fish reef, and belongs to the technical field of carbon sequestration technologies and the field of marine ecological restoration. The fabricated carbon sequestration ecological fish reef based on the CO₂ mineralized recycled aggregate is prepared from the following raw materials in parts by mass: 20 to 30 parts of CO₂ mineralized recycled aggregate, 15 to 20 parts of sea sand, 10 to 15 parts of cement, 1 to 2 parts of mineral admixture, 2 to 4 parts of shell powder, 0.15 to 0.6 part of additive and 3 to 6 parts of water, the CO₂ mineralized recycled aggregate is prepared from the following raw materials in parts by mass: 15 to 20 parts of CO₂ mineralized recycled coarse aggregate and 5 to 10 parts of CO₂ mineralized recycled fine aggregate. The fabricated carbon sequestration ecological fish reef based on the CO₂ mineralized recycled aggregate is integrally formed through a formwork pouring process, and has the advantages of modular assembly, good stability, convenience in construction and the like. According to the method, marine ecological restoration and biological inhabitation are facilitated, carbon sequestration and emission reduction can be achieved through the CO₂ mineralization technology, and high ecological and environmental protection values are achieved.

1st Main Claim

[MT] 1. An assembled carbon-fixing ecological fish reef based on CO₂ mineralized recycled aggregate, characterized in that, calculated by weight, it includes the following raw materials: 20 to 30 parts of CO₂ mineralized recycled aggregate, 15 to 20 parts of sea sand, 10 to 15 parts of cement, 1 to 2 parts of mineral admixtures, 2 to 4 parts of shell powder, 0.15 to 0.6 parts of additives and 3 to 6 parts of water; the CO₂ mineralized recycled aggregate includes the following raw materials, calculated by weight: 15 to 20 parts of CO₂ mineralized recycled coarse aggregate and 5 to 10 parts of CO₂ mineralized recycled fine aggregate.

Assignees: CCCC SECOND HARBOUR ENG CO LTD; CCCC SECOND HARBOR ENGINEERING CO LTD



85. Family 107440055 (CN119750941 A)

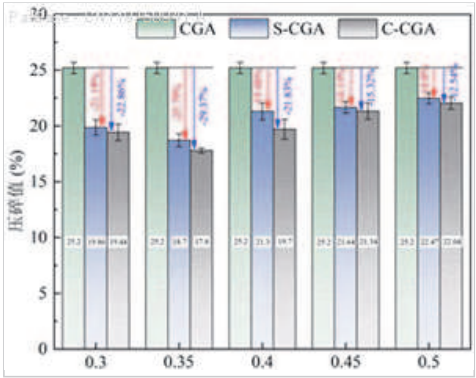
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Title

[EN] METHOD FOR MODIFYING COAL GANGUE AGGREGATE THROUGH COAL ASH-CEMENT WRAPPING IN COOPERATION WITH CO₂ CARBONIZATION AND MODIFIED COAL GANGUE AGGREGATE

Abstract

[EN] The invention belongs to the technical field of building materials, and particularly relates to a method for modifying coal gangue aggregate through coal ash-cement wrapping and CO₂ carbonization cooperation and the modified coal gangue aggregate. The method comprises the following steps: (1) crushing coal gangue to obtain coal gangue aggregate; (2) performing saturated surface drying treatment on the coal gangue aggregate to enable the coal gangue aggregate to reach a water absorption saturated state; (3) uniformly mixing the coal gangue aggregate obtained in the step (2) with fly ash-cement paste, then putting the mixture on a sieve, and naturally airing to obtain coal gangue aggregate wrapped by the fly ash-cement paste; and (4) placing the coal gangue aggregate wrapped by the fly ash-cement paste in a CO₂ carbonization curing chamber for carbonization curing. The coal gangue aggregate wrapped by the coal ash-cement paste is cured by adopting a CO₂ carbonization technology, so that the coal ash and coal gangue solid wastes are effectively utilized, the environmental pollution is reduced, and the resources are saved.



1st Main Claim

[MT] 1. A method for modifying coal gangue aggregate by fly ash-cement encapsulation and synergistic CO₂ carbonization, characterized by comprising the following steps:

- (1) crushing the coal gangue to obtain coal gangue aggregate;
- (2) performing a saturated surface drying treatment on the gangue aggregate so that the gangue aggregate reaches a water absorption saturation state;
- (3) mixing the gangue aggregate obtained by the treatment in step (2) with the fly ash-cement slurry evenly, and then placing it on a sieve and drying it naturally to obtain the gangue aggregate coated with the fly ash-cement slurry;
- (4) Placing the coal gangue aggregate wrapped by the fly ash-cement slurry in a CO₂ carbonization curing chamber for carbonization curing.

Assignees: YIMA COAL IND GROUP CO LTD; HENAN POLYTECHNIC UNIV; UNIV HENAN POLYTECHNIC

86. Family 96865565 (US2023120088 AA)

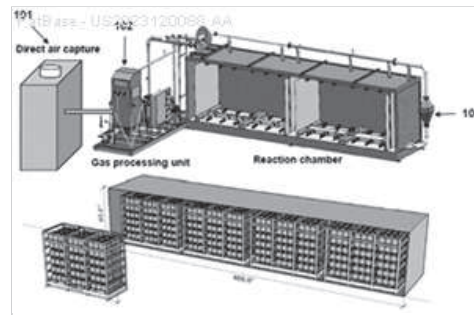
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Title

[EN] INTEGRATION OF DIRECT AIR CAPTURE SYSTEM INTO CO₂ MINERALIZATION PROCESS OF CONCRETES AND AGGREGATES

Abstract

[EN] A method of forming a concrete product includes directly capturing CO₂ from a gas source, the capturing comprising contacting the gas source with an absorption solution having a solvent and a solute, wherein the solvent and/or the solute are capable of reacting with CO₂ to form an anionic compound, adjusting the pH of the absorption solution electrochemically to less than about 7 to release the CO₂ as a concentrated vapor containing CO₂, collecting the concentrated vapor containing CO₂, regenerating the solvent and/or the solute, and optionally collecting the regenerated solvent and/or solute; flowing the concentrated vapor containing CO₂ through a gas processing unit to adjust at least one of a temperature, a relative humidity, or a flow rate of the concentrated vapor containing CO₂; and contacting the concentrated vapor containing CO₂ with a concrete component.



1st Main Claim

[EN] **1.** A method of forming a concrete product, the method comprising:
capturing CO₂ from a gas source, the capturing comprising:
contacting the gas source with an absorption solution having a solvent and a solute, wherein the solvent and/or the solute are capable of reacting with CO₂ to form an anionic compound;
adjusting the pH of the absorption solution electrochemically to less than about 7 to release the CO₂ as a concentrated vapor containing CO₂;
collecting the concentrated vapor containing CO₂;
regenerating the solvent and/or the solute; and
flowing the concentrated vapor containing CO₂ through a gas processing unit to adjust at least one of a temperature, a relative humidity, or a flow rate of the concentrated vapor containing CO₂; and
contacting the concentrated vapor containing CO₂ with a concrete component.

Assignees: UNIV CALIFORNIA; CARBONBUILT; THE UNIV OF CALIFORNIA

87. Family 101109824 (JP2024016700 A2)

[View in PatBase](#)

Title

[EN] CO2 EMISSION REGULATION METHOD

Abstract

[EN] To provide a method for regulating CO2 emissions during production of a hydraulic composition.SOLUTION: A hydraulic composition, comprising water, CO2-emissive materials that emit CO2 during production and CO2-absorptive materials that absorb CO2 during production, is produced by regulating compositional ratios of constituents comprised in the hydraulic composition. This allows for regulation of CO2 emissions. Furthermore, a chemical admixture is blended to guarantee dispersibility and retention performance of the hydraulic composition, thereby regulating workability of the hydraulic composition.SELECTED DRAWING: None

1st Main Claim

[MT] 1. Water and CO during manufacture₂CO₂Effluent and CO during manufacture₂CO which absorbs₂A water-absorbing material, and a water-absorbing material, wherein the compounding ratio of each material contained in the hydraulic composition is adjusted to produce the hydraulic composition₂And a chemical admixture that maintains dispersion and retention of the hydraulic composition to adjust the workability of the hydraulic composition₂A method of adjusting the amount of emission.

Assignees: OHBAYASHI CORP

88. Family 86166171 (CN113149495 A)

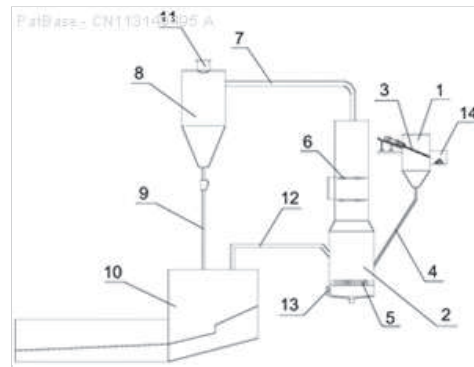
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Title

[EN] DEVICE AND METHOD FOR PRETREATING STEEL SLAG THROUGH AIR QUENCHING OF CO₂-CONTAINING TAIL GAS

Abstract

[EN] The invention discloses a device and method for pretreating steel slag through air quenching of CO₂-containing tail gas. The device comprises a steel slag tank and an air quenching device, wherein the steel slag tank is a square tank, a grating plate is obliquely arranged in the middle of the interior of the steel slag tank, and a waste slag chamber is fixedly connected to the middle of the side wall, away from the air quenching device, of the steel slag tank, and the bottom discharging port of the steel slag tank is fixedly connected with a conveying pipe. The method has the beneficial effects that the content of free calcium oxide in the steel slag at about 100 degrees centigrade obtained by the production method is low, the steel slag has good stability, efficient pretreatment of the steel slag can be well realized, and the subsequent resource utilization rate of the steel slag is greatly improved; after high-temperature flue gas at an air pipe outlet of the cyclone separator is discharged from a flue gas port, waste heat is removed for power generation for waste heat recovery, the heat energy utilization rate is improved, the heater is installed at the bottom of the steel slag tank, the heating temperature of the heater is higher than the steel slag melting temperature, the steel slag tank can be heated when necessary, and the steel slag is ensured to be in a liquid state.



1st Main Claim

[MT] 1. A gas containing CO₂ exhaust gas pretreatment device, including slag slag air quenching tank (1) and wind quenching device (2), characterized in that said slag trough (1) is a square groove, the slag groove (1) provided with a central internal grid plate (3), said grid plate (3) is inclined, the slag groove (1) away from the side wall of the air quenching (2) middle fixedly connected waste chamber (14), the slag groove (1) of the bottom end fixedly connected to the delivery tube spout (4), said conveying tube (4) is fixedly connected to the middle of the side air quenching device (2), the interior of the air quenching device (2) is mounted below the tuyere, the tuyere (5) (5) of export wind speed of 40 to 60 meters per second, the tuyere (5) ejecting a gas containing CO₂ concentration 25 to 40% of industrial exhaust, the air quenching device (2) conveying pipe (4) away from the first side of the lower surface corresponding to the tuyere (5) has inlet opening (13), said air quenching device (2) mounted in the middle of the internal steam nozzle (6), said air quenching device (2) fixedly connected to the top middle of the conveying pipe (7), said conveying pipe (7) away from the air quenching device (2) fixedly connected with one end of the cyclone (8), the cyclone (8) of the bottom end of the middle fixedly connected lower feed tube (9), the lower feed tube (9) is fixedly connected with grate cooler (10).

Assignees: NANJING TENGDA ENVIRONMENTAL PROTECTION TECH CO LTD

89. Family 94269776 (US2022356116 AA)

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Title

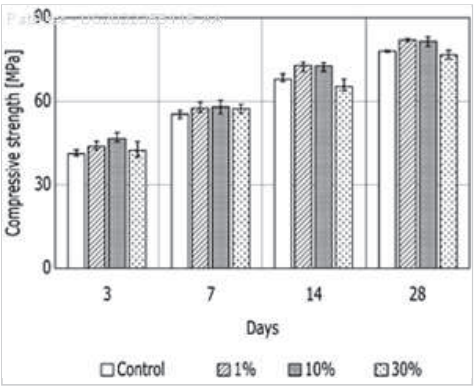
[EN] AQUEOUS CARBONATION CURING METHOD OF BINDER COMPOSITION USING CARBON DIOXIDE ABSORBENT

Abstract

[EN] An aqueous carbonation curing method of a binder composition according to an exemplary embodiment of the present invention includes: forming a binder composition; curing the binder composition in a negative pressure state (pre-curing step); water curing the pre-cured binder composition in an aqueous carbon dioxide absorbent solution (first curing step); and curing the first-cured binder composition in a 95 percent or more relative humidity atmosphere (second curing step).

1st Main Claim

[EN] 1. A curing method of a binder composition, the method comprising: forming a binder composition; curing the binder composition in a negative pressure state (pre-curing step); water curing the pre-cured binder composition in an aqueous carbon dioxide absorbent solution (first curing step); and curing the first-cured binder composition in a 95 percent or more relative humidity atmosphere (second curing step).



Assignees: KOREA ADVANCED INST OF SCIENCE AND TECH; KOREA ADVANCED INST SCI AND TECH

90. Family 104499421 (CN118652065 A)

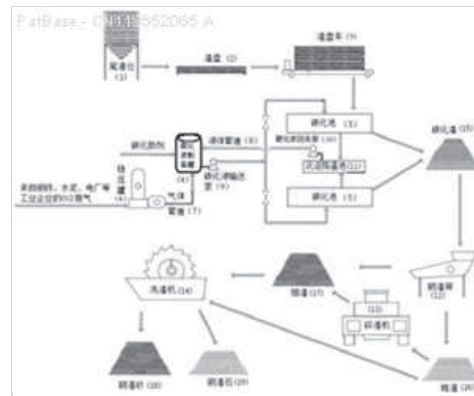
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Title

[EN] METHOD AND DEVICE FOR PREPARING BUILDING MATERIAL GRAVEL FROM STEEL SLAG TAILINGS AND CO₂

Abstract

[EN] The invention provides a method and device for preparing building material sandstone from steel slag tailings and CO₂, and relates to the technical field of building material sandstone preparation. The method for preparing the building material gravel through the steel slag tailings and the CO₂ comprises the following steps that firstly, the steel slag tailings in a tailing bin are placed in a slag tray, and the slag is movably received through a slag tray trolley and conveyed into and out of a carbonization pool; step 2, performing cyclic carbonization treatment on the steel slag tailings in the carbonization tank at normal temperature and normal pressure by using an efficient carbonization solution containing CO₂; and 3, the carbonized slag obtained after carbonization treatment is subjected to steel slag screening, crushing and cleaning operation procedure treatment, and steel slag sand and steel slag stone are obtained. According to the method, resource utilization of the steel slag tailings is achieved, the production cost is reduced, and certain positive significance is achieved for relieving the global climate warming problem by absorbing a large amount of CO₂.



1st Main Claim

[MT] 1. A method of producing building material sand and sand from steel slag tail slag + CO₂, comprising the steps of: Providing a slag tail slag + CO₂;

Step 1: Placing steel slag tails in a slag bin (1) in a slag tray (2), moving the slag through a slag tray truck (3), and transporting the slag in and out of the carbonization tank (5);

Step two: The steel slag tailings in the carbonization tank (5) are subjected to a cyclic carbonization treatment at normal temperature and pressure using a high efficiency carbonization solution containing CO₂;

Step 3: Carbide slag after the carbonization process to carry out the operation process of sieving, crushing and cleaning steel slag, to obtain steel slag and steel slag.

Assignees: SHANDONG HUIHUANG ENVIRONMENTAL PROTECTION TECH CO LTD

91. Family 63077996 (CN105819771 A)

[View in PatBase](#)

Title
[EN] UNSATURATED CARBOXYLATE SOLUTION MODIFIED CONCRETE COMPOSITE MATERIAL

Abstract

[EN] The invention discloses an unsaturated carboxylate solution modified concrete composite material. The composite material comprises, by weight, 100 parts of cement, 20-60 parts of water, 0-40 parts of fly ash, 0-10 parts of silica fume, 100-150 parts of a magnesium acrylate solution with the concentration of 30-40 percent, 0.1-0.15 parts of sodium persulfate, 5-50 parts of sericite powder, 0-50 parts of white carbon black, 5-12 parts of polypropylene fibers and 300-400 parts of aggregates. Compared with composite materials in the prior art, the composite material disclosed in the invention has the advantages of convenient construction, controllable solidification time, good elastoplasticity and short construction time, and has wide application prospect in the field of expansion joints of highways, roads, bridges and other engineering structures.

1st Main Claim

[MT] 1 of an unsaturated carboxylic acid salt solution of modified concrete composite material, characterized in that: comprises the following components in parts by weight: 100 parts cement, 20 to 60 parts of water, ash 0-40 parts, 0 to 10 parts of silica fume, a concentration of 30 percent to 40 percent acrylic acid 100 to 150 parts of a solution of magnesium, 0.1 to 0.15 parts sodium persulfate, 5 to 50 parts of sericite powder, 0 to 50 parts of white carbon, poly 5 to 12 parts of acrylic fiber, 300 to 400 parts of aggregate.

Assignees: CHENGDU JUANCHENG CIVIL ENG INVESTIG AND DESIGN CO LTD

92. Family 94976280 (CN115466072 A)

[View in PatBase](#)

Title

[EN] BUILDING MATERIAL OF CO₂ MINERALIZED STEEL INDUSTRY SOLID WASTE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention relates to the field of C04B28/00 of patent IPC (International Patent Classification), in particular to a building material of CO₂ mineralized steel industry solid waste and a preparation method thereof. The building material at least comprises the following raw materials in percentage by mass: mineralizable solid waste, silicon-aluminum solid waste and water, and the mass ratio of the mineralizable solid waste to the silicon-aluminum solid waste is 1: (0.5-2.8). According to the prepared building material, discharged carbon dioxide waste gas is digested through solid waste generated in the iron and steel industry, carbon dioxide is fixed through active calcium components in the solid waste, the mass ratio of mineralizable solid waste to silicon-aluminum solid waste is limited, and the building material has high mineralization activity; therefore, the carbon sequestration rate of solid waste products is increased, certain compressive strength is achieved, additional heating is not needed in the process, and energy is saved.

1st Main Claim

[MT] 1. A Co.₂Building material for mineralized iron and steel industry solid waste, characterized in that the raw material comprises at least: Mineralized waste, silicoaluminous waste and water, the mass ratio of the mineralized waste to silicoaluminous waste being 1:0.5-2.8.

Assignees: JIANGSU TONGCUIHE TECH CO LTD; JIANGSU JICUI FUNCTIONAL MATERIALS RES INST CO LTD

93. Family 101110009 (JP2024016699 A2)

[View in PatBase](#)

Title

[EN] CO2 EMISSION REGULATION METHOD

Abstract

[EN] To provide a CO2 emission regulation method that facilitates further reduction of CO2 emissions.SOLUTION: A hydraulic composition, comprising water, CO2-emissive materials that emit CO2 during production and CO2-absorptive materials that absorb CO2 during production, is produced by regulating compositional ratios of constituents comprised in the hydraulic composition. This allows for regulation of CO2 emissions.SELECTED DRAWING: None

1st Main Claim

[MT] 1. Water and CO during manufacture₂CO₂Effluent and CO during manufacture₂CO which absorbs₂Absorbing material, and CO by adjusting the compounding ratio of each material contained in the hydraulic composition to produce the hydraulic composition₂CO, characterized in that the emission is adjusted₂A method of adjusting the amount of emission.

Assignees: OHBAYASHI CORP

94. Family 104016869 (US2024270653 AA)

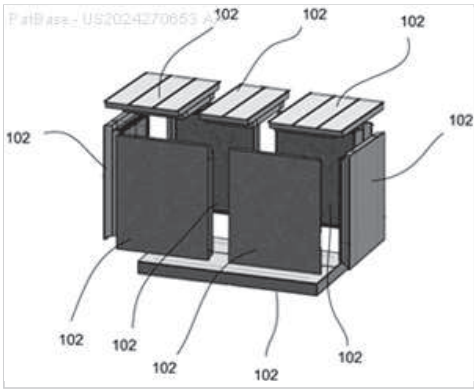
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Title

[EN] MANUFACTURING OF ULTRA-LIGHTWEIGHT COMPOSITES THROUGH ACCELERATED CO₂ MINERALIZATION

Abstract

[EN] A method for producing ultra-lightweight concrete (ULWC), includes: generating CO₂ foam including nanobubbles; forming a brine paste including nanocrystals and nanopores by mixing the nanobubbles with a brine solution; generating the CO₂ foam including microbubbles, where pore sizes of the microbubbles are larger than pore sizes of the nanobubbles; mixing the microbubbles into the brine paste, where the nanocrystals comprised in the brine paste distributes along a surface of each microbubble; and mixing fiber hairs into the brine paste and the microbubbles. Ultra-lightweight aggregate (ULWA) may be formed using the ULWC. A method for producing ULWC panels, includes: printing creases on alkali-resistant fiber paper sheets; folding the fiber paper sheets along the creases; affixing the folded fiber paper sheets into a 3D structure with open channels; injecting atomized brine water into surfaces of the open channels; and injecting CO₂ gas into the open channels until filled with carbonate crystals.



1st Main Claim

[EN] 1. A method for producing ultra-lightweight concrete, comprising:
generating carbon dioxide (CO₂) foam comprising a plurality of nanobubbles;
forming a brine paste comprising nanocrystals and nanopores by mixing the plurality of nanobubbles with a brine solution;
generating the CO₂ foam comprising a plurality of microbubbles, wherein pore sizes of the plurality of microbubbles are larger than pore sizes of the plurality of nanobubbles;
mixing the plurality of microbubbles into the brine paste, wherein the nanocrystals comprised in the brine paste distribute along a surface of each microbubble; and
mixing a plurality of fiber hairs into the brine paste and the plurality of microbubbles.

Assignees: PVT CLEAN ENERGY LLC

95. Family 98204703 (US2025042756 AA)

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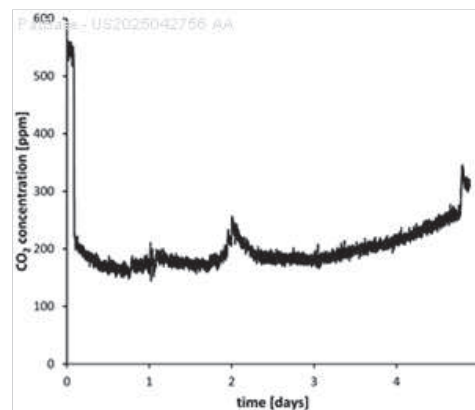
Title (EP4298057 A1)

[EN] SEQUESTRATION OF CO₂

Abstract (EP4298057 A1)

[EN] The invention relates to a process for sequestration of CO₂ which comprises the steps of providing a starting material comprising at least 20 percent by mass of one or more of the following constituents: ultramafic rock, weathering products of ultramafic rock, olivine and/or industrial wastes, homogenizing the starting material and hydrothermal treatment of the homogenized starting material in a thermal treatment apparatus at a temperature of above 100 degrees centigrade for at least 24 hours. Also envisaged is dewatering of the converted starting material to remove bound water by thermal treatment and/or reactive grinding. The resulting product is subsequently contacted with CO₂ to effect binding thereof.

Assignees: OLIMENT GMBH; OLIMEN GMBH; RED STONE GMBH; BAUHAUS UNIV WEIMAR; OLIMENT R GMBH



96. Family 67213252 (KR20170114630 A)

[View in PatBase](#)

Title

[EN] CO2 ENVIRONMENTFRIENDLY CONCERT INCLUDING SHELL AND WASTE GLASS PODER

Abstract

[EN] The present invention relates to a CO₂ reducing environment-friendly concrete composition having a Haliotis shell and a waste glass powder. More specifically, the present invention relates to the CO₂ reducing environment-friendly concrete composition having the Haliotis shell and the waste glass powder, in the concrete composition comprising 18 to 25 wt percent of cement, 30 to 45 wt percent of fine aggregate, 45 to 60 wt percent of coarse aggregate and 8 to 12 wt percent of water, for a total weight of the cement, 10 to 50 wt percent of the cement is replaced with the Haliotis shell, and for a total weight of the Haliotis shell, 10 to 40 wt percent of the Haliotis shell is replaced with the waste glass powder.

1st Main Claim

[MT] 1. According to concrete compositions, coarse aggregate, fine aggregate, cement, and water, the shell comprises a shell characterized in that the waste glass powder and green concrete composition having a reduced CO₂.

Assignees: HANNAM UNIV INST FOR IND ACADEMIA COOP; INDUSTRIAL ACADEMIC COOPERATION GROUP HANNAM UNIV

PatBase - KR20170114630 A

AA		Table weight (kg/m ³)	
Weight (%)	Weight (%)	Weight (%)	Weight (%)
OPC	41.7	8	41.7
CA-18	37.3	81.7	
CA-30	30.8	83.4	
CA-45	20.1	126.1	
CA-60	22.2	106.8	
CA-75	20.5	208.5	
Weight (%) of Haliotis shell		71.2	80.7
Weight (%) of waste glass powder			

97. Family 95378506 (US2023023151 AA)

[View in PatBase](#)

Title (EP4363090 A1)

[EN] PRODUCTION OF SUPPLEMENTARY CEMENTITIOUS MATERIALS THROUGH SEMI-WET CARBONATION, CYCLIC CARBONATION, NON-SLURRY CARBONATION, HIGH TEMPERATURE CARBONATION AND GRANULATION CARBONATION

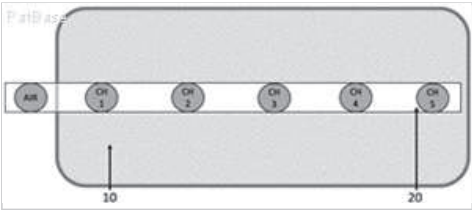
Abstract (EP4363090 A1)

[EN] Methods for preparing a carbonated supplementary cementitious materials, including semi- wet carbonation, cyclic carbonation, non- slurry carbonation, high temperature carbonation and/or granular carbonation of a carbonatable material.

1st Main Claim (EP4363090 A1)

[EN] 1. A method of preparing a carbonated supplementary cementitious material, the method comprising: adding water to a carbonatable material to form a semi-wet mixture, wherein a moisture content of the semi- wet mixture is from about 0.1 percent to about 20 percent by mass based on the total mass of the semi-wet mixture; agitating or stirring the semi-wet mixture for about 0.01 hour to 72 hours; and carbonating the semi-wet mixture to obtain the carbonated cementitious material, wherein carbonating the wet mixture comprises a plurality of carbonation cycles, and wherein each of the plurality of carbonation cycles comprises flowing a gas comprising carbon dioxide into the wet mixture and maintaining a temperature of about 1 degrees centigrade to about 99 degrees centigrade

Assignees: SOLIDIA TECHNOLOGIES INC; SOLIDIA TECH INC



98. Family 100360364 (CN220201784 U)

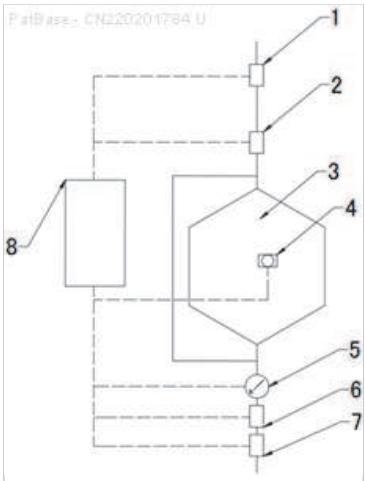
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Title

[EN] CO2 CARBONIZATION MAINTENANCE DEVICE SUITABLE FOR SOLID WASTE RECYCLED AGGREGATE

Abstract

[EN] The utility model discloses a CO2 carbonization curing device suitable for solid waste recycled aggregate, and relates to the technical field of curing equipment. The device comprises a carbon sequestration control system and an aggregate curing kettle, the carbon sequestration control system comprises a PLC (Programmable Logic Controller) control cabinet, data detection and transmission equipment and a flow controller; the aggregate curing kettle comprises a barrel and a support, the barrel and the support are connected through a barrel shaft, an air inlet pipeline and an air outlet pipeline are arranged in the barrel shaft, and an air path pipeline is connected to the carbon sequestration control system. The carbon sequestration control system can be used for completing integral operation and carbonization maintenance of solid waste recycled aggregate under the atmosphere of flue gas or CO2 mixed gas, and meanwhile, the performance of the aggregate is improved, the energy consumption in the production process is reduced, and the carbon emission in the production process is reduced.



1st Main Claim

[MT] 1.A CO suitable for solid and waste recycled aggregate₂A carbonization maintenance device, characterized in that the device is made entirely of two parts of a carbon fixation control system and an aggregate maintenance kettle (3), said carbon fixation control system comprising a PLC control cabinet (8), An inlet-side flow controller (1) connected to an inlet pipe of an aggregate maintenance tank (3), an inlet-side carbon dioxide concentration detector (2), a temperature and humidity transmitter (4) provided on the aggregate maintenance tank (3), A pressure transmitter (5) connected to an outlet pipe of an aggregate maintenance tank (3), an outlet flow controller (6), an outlet carbon dioxide concentration detector (7), said PLC control cabinet (8) being connected to an inlet flow controller (1), A carbon dioxide concentration detector (2), a temperature and humidity transmitter (4), a pressure transmitter (5), A gas outlet flow controller (6) and a gas outlet carbon dioxide concentration detector (7), said aggregate maintenance tank (3) comprising two parts of an aggregate maintenance tank barrel (12) containing solid waste regenerated aggregate and a support frame (11) supporting the barrel, The aggregate-care kettle barrel (12) is provided at its upper and lower ends with a feed opening (17-1) and a discharge opening (17-2), and a barrel shaft (10) is connected to a bracket (11), and an inlet duct (9-1) and an outlet duct (9-2) are provided in the barrel shaft. A sealing seat (14) is provided at the junction of the barrel shaft (10) and the aggregate maintenance tank barrel (12). The support is internally provided with a motor (16), a rotary joint (15) connecting the motor (16) with the barrel shaft (10), The cylinder (12) of the aggregate-care kettle can be rotated by the motor (16), the cylinder shaft (10) as the center of the cylinder shaft (10); above the cylinder (12) of the aggregate-care kettle is provided an aggregate bin (30) connected to a PLC control cabinet (8) for storing unmaintained aggregates.

Assignees: LINHE CLIMATE TECH BEIJING CO LTD

99. Family 102409439 (CN117944163 A)

[View in PatBase](#)

Title

[EN] SYSTEM AND METHOD FOR PREPARING WATER PERMEABLE BRICKS BY UTILIZING MICRO-NANO CO2 BUBBLE WET-PROCESS CARBONIZED REGENERATED SAND POWDER



Abstract

[EN] The invention provides a system for preparing a water permeable brick by utilizing micro-nano CO2 bubble wet carbonization regenerated sand powder. The system comprises a crushing and screening device, a regenerated coarse aggregate carbonization device, a regenerated sand powder carbonization device, a slurry mixing device and a water permeable brick carbonization curing chamber, wherein the recycled coarse aggregate carbonization device is used for carrying out carbonization treatment on conveyed recycled coarse aggregate; the regenerated sand powder carbonization device is used for carrying out carbonization treatment on the conveyed regenerated sand powder; the water permeable brick processing device is used for mixing, stirring and processing carbonized recycled coarse aggregate and recycled sand powder output by the recycled coarse aggregate carbonization device and the recycled sand powder carbonization device to generate water permeable bricks; and the water permeable brick carbonization curing chamber is used for carrying out carbonization treatment and curing on the water permeable bricks. Meanwhile, the invention also provides a method which comprises the following steps: dividing the recycled material into recycled coarse aggregate and recycled sand powder, designing three-step different carbonization equipment to respectively carry out carbonization reaction on the recycled coarse aggregate and the recycled sand powder, and then processing the recycled coarse aggregate and the recycled sand powder into the water permeable brick, so that the carbon absorption capacity in the concrete hydration process can be exerted.

1st Main Claim

[MT] 1. A method of using nano-CO₂A system for producing a water-permeable brick comprising a crushing and screening device, a regenerating coarse aggregate carbonization device, a regenerating sand powder carbonization device, a slurry mixing device, a water-permeable brick carbonization chamber, wherein the crushing and screening device comprises a crushing device, a dust collector, The crushing device for crushing waste concrete to obtain regenerated coarse aggregate and regenerated sand powder; the dust collector, For collecting regenerated sand powder; the regenerated coarse aggregate carbonization device is used for carbonizing the conveyed regenerated coarse aggregate; the regenerated sand carbonization device is used for carbonizing the conveyed regenerated sand powder; the water-permeable brick processing device is used for carbonizing the output of the regenerated coarse aggregate carbonization device and the regenerated sand carbonization device The regenerated coarse aggregate and the regenerated sand powder are mixed, agitated and processed to produce water-permeable bricks; the water-permeable brick carbonization chamber is used to carbonize and preserve the water-permeable bricks.

Assignees: OF SHANGHAI FOR SCIENCE AND TECHNOLOGY UNIV; DONGTAI SIFANGYUAN BUILDING MAT FACTORY; UNIV SHANGHAI SCIENCE AND TECH

100. Family 99466820 (CN116903345 A)

[View in PatBase](#)

Title

[EN] TREATMENT SYSTEM FOR CIRCULARLY MINERALIZING CARBIDE SLAG THROUGH SUPERCRITICAL CO₂ AND APPLICATION OF TREATMENT SYSTEM IN PREPARATION OF CARBON SEQUESTRATION FILLER

Abstract

[EN] The invention discloses a treatment system for mineralizing carbide slag through supercritical CO₂ circulation and application of the treatment system in preparation of carbon sequestration filler, and belongs to the technical field of environmental protection and solid waste treatment, and the treatment system comprises a constant-temperature mineralization reactor, a CO₂ storage tank, a liquid CO₂ tank and a temperature controller which are sequentially connected in series. The invention further discloses application of the treatment system for circularly mineralizing the carbide slag through the supercritical CO₂ to preparation of the carbon sequestration filler through coal-based solid waste mineralization CO₂, and further discloses a method for preparing the carbon sequestration filler through coal-based solid waste mineralization CO₂ and the carbon sequestration filler prepared through the method. Meanwhile, the invention discloses application of the carbon sequestration filler in the field of mine remediation. The carbon sequestration filler is prepared by using the supercritical CO₂ mineralization reaction, so that the efficient production of the material can be realized, and the yield can be increased and the manufacturing cost can be reduced.

1st Main Claim

[MT] A supercritical CO₂ The treatment system for recycling mineralized electric slag is characterized by the fact that it comprises a thermostatic mineralization reactor, CO₂ in series₂Storage tank, liquid CO₂Tank and thermostat.

Assignees: BEIKE YUNHONG ENVIRONMENTAL PROTECTION TECH BEIJING CO LTD



101. Family 103277258 (CN118239517 A)

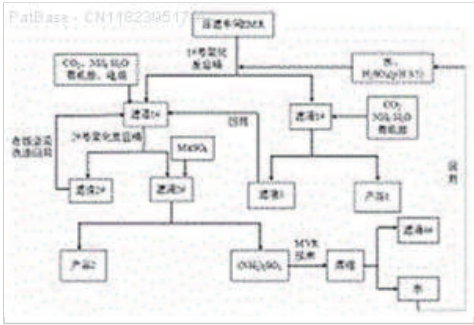
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Title

[EN] METHOD FOR CAPTURING CO2 IN ELECTROLYTIC MANGANESE CHEMICAL COMBINATION WORKSHOP AND MINERALIZING ELECTROLYTIC MANGANESE RESIDUES

Abstract

[EN] The invention discloses a method for capturing CO2 in an electrolytic manganese chemical combination workshop and mineralizing electrolytic manganese residues. The method comprises the following steps: conveying the electrolytic manganese residues to a No.1 slurring reaction kettle, adding water in a set proportion, reacting to obtain filter residues No.1 and filtrate No.1, adding ammonia water, organic amine and an additive in a set proportion into the filtrate No.1, simultaneously introducing CO2 mixed gas, reacting to obtain a product 1 and filtrate 3 #, conveying the filtrate 3 # to a No.2 slurring reaction kettle, simultaneously adding the filter residues No.1, and reacting to obtain a product 2 #; then adding set ammonia water, organic amine, an additive and an electric field into a No.2 slurring reaction kettle, then introducing CO2, and reacting under the conditions of set reaction temperature and time to obtain a filter residue 2 # and a filtrate 2 #; and finally, recycling the filter residue 2 #, adding the filtrate 2 # into a MnSO4 solution, reacting to obtain a product 2 and a (NH4) 2SO4 solution, and treating the (NH4) 2SO4 solution with an MVR (mechanical vapor recompression) technology to obtain a filtrate 4 #, and recycling the filtrate 4 # in an electrolytic manganese workshop. The filter residue 2 # water washing liquid can be recycled to the 2 # slurring reaction kettle, and the MVR evaporation liquid can be recycled to the 1 # slurring reaction kettle.



1st Main Claim

[MT] 1.A trap electrolytic manganese compound workshop CO₂And a method of mineralizing electrolytic manganese slag, characterized in that it comprises the steps of:

- (1) First, the electrolytic manganese slag produced by the pressure filtration plant is transferred to the No. 1 slurry reactor through the conveyor belt, the No. 1 slurry reactor is charged with the set ratio of water and pH adjustment, after the reaction is fully carried out solid-liquid separation to obtain CaSO₄·2H₂O , SiO₂sulfuric acid Magnesium manganese ammonia double salt and other filter residue 1# and containing MnSO₄, (NH₄)₂SO₄, MgSO₄Wait for the filtrate 1# of sulfuric acid salt.
- (2) Add the filtrate 1# to the set proportion of ammonia, organic amine, and also to the electrolytic manganese compound plant produced by the CO₂Mixed gas, solid-liquid separation after reaction for a period of time can result in MnCO₃Of products 1 and containing (NH₄)₂SO₄, (NH₄)₂CO₃, (NH₄) HCO₃Is carbonate filtrate 3#.
- (3) Second, the filtrate 3# is sent to the No. 2 slurry reactor, while the filter residue 1# is added, and then in the No. 2 slurry reactor is added the set ammonia, organic amine, additives and electric field, then passed to the electrolytic manganese compound plant produced CO₂Mixed gas, solid-liquid separation after sufficient reaction at a set reaction temperature and time to obtain CaCO₃, SiO₂, (NH₄)₂SO₄, (NH₄)₂CO₃, (NH₄) HCO₃2# and containing (NH₄)₂CO₃, (NH₄)₂SO₄, (NH₄) HCO₃Equal filtrate 2#.
- (4) Finally, filter residue 2# is washed in-line and can be used resourcally, and filtrate 2# is added to MnSO₄After the solution is fully reacted, solid-liquid separation can result in MnCO containing₃Of products 2 and (NH₄)₂SO₄Solution, (NH₄)₂SO₄Solution through MVR concentration technology can get filtrate 4#, filtrate 4# can be recycled as electrolytic manganese qualified liquor; in addition, the resulting filter residue 2# water wash can be reused to the #2 slurry reactor, MVR evaporation liquor can be reused to the #1 slurry reactor.

Assignees: SOUTHWEST UNIV OF SCIENCE AND TECHNOLOGY; UNIV SW SCI AND TECH SWUST

102. Family 102907071 (JP2024076020 A2)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE FIXATION METHOD AND CARBON DIOXIDE FIXATION DEVICE

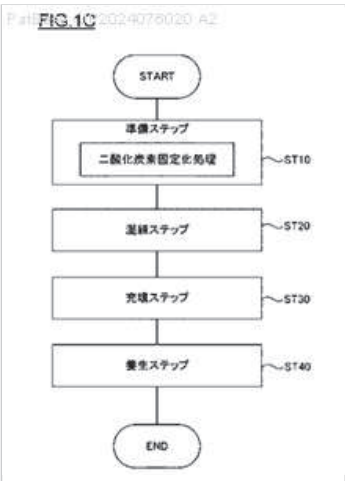
Abstract

[EN] To provide a carbon dioxide fixation method or the like capable of efficiently fixing carbon dioxide and effectively suppressing an increase in the concentration of carbon dioxide in the atmosphere.SOLUTION: A carbon dioxide fixation method of an embodiment comprises a preparation step of preparing a geopolymer material, a kneading step of kneading the geopolymer material to prepare a kneaded material, a filling step of feeding the kneaded material into a container to fill a filler, and a curing step of curing the filler to prepare a geopolymer solidified body. In the preparation step, a base material containing silicon element, aluminum element and calcium element and an alkali stimulator are prepared as a geopolymer material. In at least one of the preparation step, the kneading step, the filling step and the curing step, fixation processing for fixing carbon dioxide is executed.SELECTED DRAWING: Figure 1C

1st Main Claim

[MT] 1. A method for preparing a geopolymer material, comprising the steps of: Preparing a geopolymer material; mixing the geopolymer material to prepare a mixture; filling the mixture by supplying the mixture to a container; and curing the filling to prepare a geopolymer solidified body, Providing a substrate comprising a silicon element, an aluminum element, and a calcium element, and an alkali stimulating agent as the geopolymer material, Wherein an immobilization process for immobilizing carbon dioxide is performed in at least one of the preparation step, the mixing step, the filling step, and the curing step.

Assignees: TOSHIBA CORP; TOSHIBA ENERGY SYSTEM AND SOLUTION CORP



103. Family 104847496 (CN118767843 A)

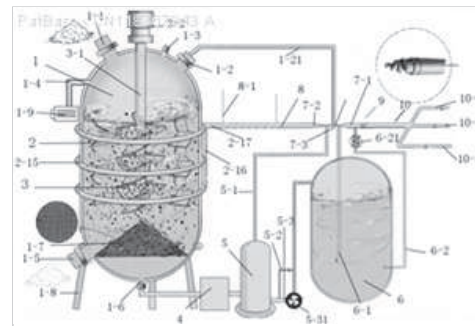
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Title

[EN] MINERALIZATION REACTION DEVICE FOR FILLING CO₂/SO₂ BASED ON EJECTION FLOW AND OPERATION CONTROL STRATEGY OF MINERALIZATION REACTION DEVICE

Abstract

[EN] The invention discloses a mineralization reaction device based on injecting flow filling CO₂/SO₂ and an operation control strategy thereof, the device comprises a mineralization reaction system, an injecting and filling system and a water storage system, the mineralization reaction system comprises a mineralization reaction tank which is a reaction container for mineralization reaction, the water storage system stores water discharged from the mineralization reaction tank, and the injecting and filling system is used for injecting CO₂/SO₂ into the mineralization reaction tank. A water source is further provided for the mineralization reaction tank through the injection and charging system, and the injection and charging system is also externally connected with a high-pressure gas tank to provide high-pressure gas for the mineralization reaction tank; according to the operation control strategy, the filling flow of the high-pressure gas and the filling sequence of the gases are adjusted by monitoring the pressure in the mineralization reaction tank in the reaction process. According to the invention, CO₂ and SO₂ are sealed by the recycled aggregate, so that the production of high-performance building materials and the resource utilization of solid wastes are realized, meanwhile, the mineralization reaction time is short, and the industrial production and application of the reinforced recycled aggregate can be realized.



1st Main Claim

[MT] 1.A priming CO based on a jet₂/SO₂A mineralization reaction apparatus for carrying out a mineralization reaction of a gas-liquid-solid three-phase reaction system consisting of regenerated aggregate, liquid water, high-pressure gas, characterized in that it comprises a mineralization reaction system, an injection charging system, a water storage system, Wherein the mineralization reaction system comprises a mineralization reaction tank (1), the bottom of the mineralization reaction tank (1) being in communication with a water storage system via a water supply line in communication with an injection charging system, and the inner wall of the mineralization reaction tank (1) being provided with a plurality of static vane groups (2), The static blade is provided with a flow guide structure (2-1) communicating the injection charging system with the space inside the tank of the mineralization reaction tank (1), the water storage system stores the water body discharged from the mineralization reaction tank (1) and further provides the water source for the mineralization reaction tank (1) through the injection charging system, The injection charging system is equipped with a high-pressure gas charging tube (10) connected to a high-pressure gas tank, which supplies high-pressure gas to the mineralization reaction tank (1).

Assignees: SOUTHEAST UNIV; UNIV SOUTHEAST

104. Family 90032130 (PE20220054 A1)

[View in PatBase](#)

Title

[MT] Process FOR THE PRODUCTION OF LIME AND HIGH QUALITY CO₂ from the leaflets of SHELLS OF RANGE AND CONCHUELAS

Abstract

[MT] The invention refers to a non-conventional process for the production of lime and high quality CO₂ that uses the leaflets of shells of range as a raw material and which is carried out at temperatures of from 700 to 900 degrees centigrade compared to the conventional 1200 degrees centigrade that would require the process, thanks to the fact that used a closed reactor under pressures of up to 20 times lower than the atmospheric pressure. The process does not conventional utilize combustion as a source of thermal energy but the energy electrical energy and/or solar concentration, reaching a high decomposition kinetics of the calcium carbonate constitute nearly 100 percent of the mass of the leaflets or conchuelas. convertir fotosíntesis using the process of the invention for the microalgas CO₂ obtained from the leaflets in m and wherein the microalga is to turn the power of a new generation of shells of range, closing a virtuous circle and removing the problem environmental and space that implies the availability of these valves. The invention separates by a hot solution the soft residues attached to the leaflets discarded, and produces a with biofertilizante They also used the oxygen generated during the growth of microalgae and is same to precipitate and/or absorb dissolved metals such as manganese at pHs moderate (8.5) compared to pHs 10-11 that requires the conventional technology. The process has application in the fisheries and aquaculture sector, in the treatment of metallurgical, chemical processes, mining, industrial and household effluent treatment, as well as in agriculture and industry, both at the national and global level.

1st Main Claim

[MT] 1. A non-conventional process of production of Cal (CaO) and carbon dioxide (CO₂) in a vacuum-operated and electrically heated closed reactor, It takes advantage of the synergies of the negative pressure and forced evacuation of the CO₂ to reduce the energy consumption and time of calcination of fan Conches and similar species containing carbonates, and thus obtain directly gas CO₂ of high concentration and purity. Characterized in that the Calcination Reactor operates at pressures in the range of 0.1 to 12 psi and temperatures of 700 to 850 degrees centigrade and residence times of 0.5 to 3.0 hours.

Assignees: CONSULTORES Y CONTRATISTAS GENERALES S A C

105. Family 102741540 (KR20240072959 A)

[View in PatBase](#)

Title

[EN] DRY TYPE CO₂ TREATMENT DEVICE FOR IMPROVING QUALITY OF RECYCLED AGGREGATE AND SYSTEM THEREOF

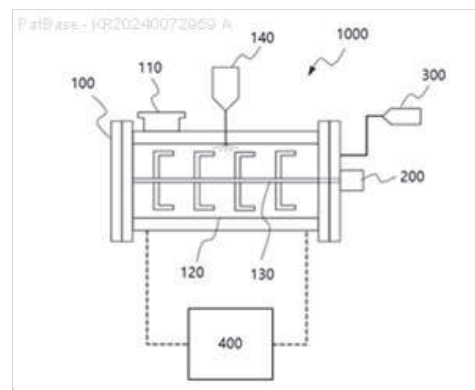
Abstract

[MT] The present invention relates to a dry carbon dioxide processing apparatus and processing method which can improve the quality of circulating aggregates . the aggregate carbon dioxide processing apparatus of the present invention includes a reaction vessel including a dosing port into which the aggregates are inserted , a basket for receiving the interposed aggregates , and an impeller for agitating the aggregates for a homogeneous reaction of the aggregates and carbon dioxide , a drive unit for rotating the impeller , A water-constant tank for keeping the temperature of the reactor constant and a supply tank for supplying carbon dioxide to the reactor tank , and has the advantage that the circulating aggregate can be treated with carbon dioxide dry to form calcium carbonate , thereby improving the physical strength and chemical properties of the aggregate .

1st Main Claim

[MT] 1. An apparatus for treating aggregate carbon dioxide comprising : a reactor including an inlet into which aggregate is to be charged , and a basket to receive the inputted aggregate ; a drive device to stir the aggregate for a homogeneous reaction of the inputted aggregate and carbon dioxide ; a warm water tank to maintain a temperature of the reactor constant ; and a supply tank to supply carbon dioxide to the reactor .

Assignees: KOREA ADVANCED INST OF SCIENCE AND TECHNOLOGY; KOREA ADVANCED INST OF SCIENCE AND TECH;
KOREA ADVANCED INST SCI AND TECH



106. Family 100407368 (CN117263550 A)

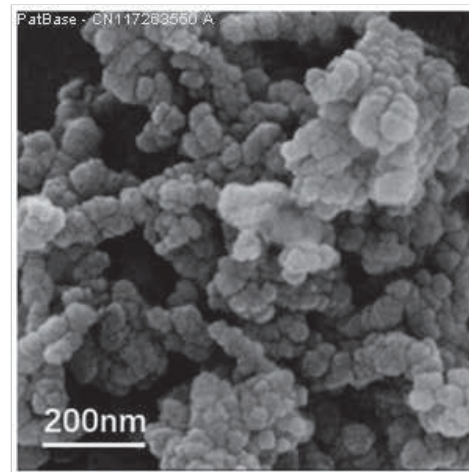
[View in PatBase](#)

Title

[EN] WASTE SLURRY SLAG ADMIXTURE CONTAINING CO₂ MICRO-NANO BUBBLES AS WELL AS PREPARATION METHOD AND APPLICATION OF WASTE SLURRY SLAG ADMIXTURE

Abstract

[EN] The invention relates to the technical field of concrete production, and discloses a waste slurry slag admixture containing CO₂ micro-nano bubbles and a preparation method and application thereof. The preparation method comprises the following steps that CO₂ gas is introduced into water to obtain carbonated water with the CO₂ concentration not lower than 5 percent; the solid waste of the mixing plant is crushed to be below 3 mm, and a crushed material is obtained; mixing and grinding the crushed material and carbonated water into a fine material, and controlling the pH value of the fine material to be not less than 7.5; the ground fine material is subjected to sedimentation treatment, a lower-layer substance is taken as a final product, and the waste slurry slag admixture containing the CO₂ micro-nano bubbles prepared through the method can serve as an auxiliary cementing material to be applied to concrete production; the alkalinity of the waste slurry slag subjected to carbon absorption is reduced, and meanwhile, a new product nano calcium carbonate is formed, so that the activity is further improved; in addition, micro-nano bubbles are introduced into the ground fine materials, the effects of ball lubrication and cohesive force reduction are achieved, and then the problems that the consistency of waste slurry residues is large, and work loss is fast are solved.



1st Main Claim

[MT] 1.A type containing CO₂Process for the preparation of a waste pulp blend of micro-nano-bubbles, characterized in that it comprises the following steps:

S100, to the water, introduce CO₂The gas system has obtained CO₂Carbonated water at a concentration of not less than 5%;

S200, crushing the stirring station solid waste to less than 3 mm to obtain a crusher;

S300, grinding the crusher mixed with carbonated water to a fine material, and controlling the pH of the fine material to be not less than 7.5;

S400 , the fines after grinding are settled, the layer material is removed as the final product.

Assignees: CHINA WEST CONSTRUCTION BUILDING MATERIALS SCIENCE RES INST CO LTD; CHINA WEST CONSTR GROUP CO LTD

107. Family 97990349 (JP2023097218 A2)

[View in PatBase](#)

Title

[EN] METHO FOR MANUFACTURING CARBON DIOXIDE GAS FIXATION RE-ALKALIZATION CONCRETE, CARBON DIOXIDE GAS FIXATION RE-ALKALIZATION METHOD OF CONCRETE, AND FRESH CONCRETE FOR CARBON DIOXIDE GAS FIXATION RE-ALKALIZATION CONCRETE

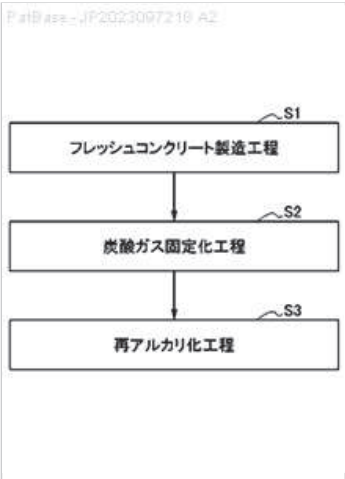
Abstract

[EN] To provide a method for manufacturing carbon dioxide gas fixation re-alkalization concrete which can achieve fixation of carbon dioxide gas and maintenance for a long period of alkalinity accompanied by re-alkalization.SOLUTION: A method for manufacturing carbon dioxide gas fixation re-alkalization concrete includes: a fresh concrete manufacturing step of manufacturing fresh concrete containing water, cement, an aggregate, and an alkali supply material; a carbon dioxide gas fixation step of obtaining carbon dioxide gas fixation gas obtained by placing and curing carbon dioxide gas fixation fresh concrete obtained by supplying a carbon dioxide gas source to the fresh concrete, or obtaining carbon dioxide gas fixation concrete by supplying a carbon dioxide gas source to concrete obtained by curing fresh concrete before curing after placing of the fresh concrete and/or the fresh concrete; and a re-alkalization step of re-alkalizing the carbon dioxide gas fixation concrete by an alkaline component from the alkali supply material.SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1. A fresh concrete manufacturing step of manufacturing fresh concrete containing water, cement, aggregate, and a particulate alkaline supply material composed of a cured product of a cement material; A carbon dioxide gas-immobilized fresh concrete obtained by supplying a carbon dioxide gas source to the fresh concrete before placement is placed, and carbon dioxide gas-immobilized concrete obtained by curing the carbon dioxide gas-immobilized fresh concrete is obtained, or after placement of the fresh concrete, a carbon dioxide gas source is supplied to at least one of the fresh concrete before curing and concrete obtained by curing the fresh concrete, A carbon dioxide immobilization step of obtaining carbon dioxide immobilized concrete, and a re-alkalization step of re-alkalizing the carbon dioxide immobilized concrete with an alkaline component released from the alkaline supply material, A method for producing carbon dioxide gas-immobilized realkalized concrete.

Assignees: KAJIMA CORP



108. Family 30905245 (US2004228788 AA)

[View in PatBase](#)

Title

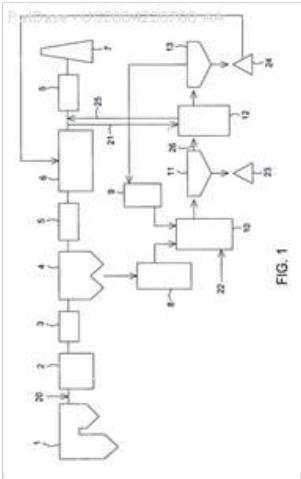
[EN] CARBON DIOXIDE ABSORPTION AND FIXATION METHOD FOR FLUE GAS

Abstract

[EN] The present invention provides a low-cost carbon dioxide fixation method that allows effective usage of a large amount of generated coal ashes, and effective fixation of carbon dioxide included in flue gas generated from coal, refuse, or waste product, as well as improvement in the applicability of coal ashes to various applications and effective usage of by-product carbonate. Carbon dioxide is absorbed and fixated by subjecting the flue gas to gas-liquid contact with coal ash water slurry or coal ash eluate so as to make the carbon dioxide in the flue gas react and be absorbed therein, thereby fixating the carbon dioxide as carbonate. This method can be favorably used for disposal of flue gas from a boiler at a coal thermal power plant.

1st Main Claim

[EN] 1. A carbon dioxide absorption and fixation method, which fixates the carbon dioxide as carbonate by gas-liquid contacting flue gas with coal ash water slurry or coal ash eluate so as to react with the carbon dioxide in the flue gas and be absorbed therein.



Assignees: TOKYO ELECTRIC POWER CO; KUWABARA TAKASHI; KOSHIBA YOSHIHIRO; NAGAI TERUO; AMANO KOJI

109. Family 95962799 (CN115703674 A)

[View in PatBase](#)

Title

[EN] ANTI-CORROSION CEMENT PASTE SYSTEM FOR WELL CEMENTATION OF GAS WELL WITH HIGH CO₂ CONTENT AND PREPARATION METHOD OF ANTI-CORROSION CEMENT PASTE SYSTEM

Abstract

[EN] The invention relates to the field of oil-gas exploration and development well cementation engineering, in particular to an anti-corrosion cement paste system for well cementation of a gas well with high CO₂ content and a preparation method of the anti-corrosion cement paste system, and the anti-corrosion cement paste system is prepared from the following raw materials in parts by weight: 65-70 parts of G-grade oil well cement, 30-35 parts of an anti-corrosion admixture, 8-12 parts of an anti-corrosion reinforcing agent, 0.8-1.7 parts of a dispersing agent, 1.0-2.5 parts of a fluid loss agent, 0.1-0.35 part of a retarder and 0.05-0.1 part of a defoaming agent, and the balance of water. According to the cement paste system disclosed by the invention, the aim of improving the CO₂ corrosion resistance of the well cementation cement sheath is fulfilled by improving the anti-permeability performance of the well cementation cement sheath body to an acid medium and a formation fluid and reducing the content of easily-corroded alkaline components in the well cementation cement sheath matrix. The problems that after a well cementation cement sheath is eroded and damaged by CO₂ for a long time, the strength declines, the interlayer packing effect fails, and the integrity of a shaft is damaged are effectively solved, and important technical guarantee is provided for prolonging the production life of a gas well and accelerating efficient exploration and development of oil and gas resources.

1st Main Claim

[MT] 1. A high CO content₂Corrosion-resistant cement grout system for gas well cementing, characterized in that it consists of the following raw materials in parts by weight: Grade G oil well cement 65,70 parts by weight, extra-corrosion-resistant 30 35 parts by weight, corrosion-resistant reinforcing agent 8,12 parts by weight, dispersant 0.8-1.7 parts by weight, The water loss reducing agent is in the range of 1.0 parts by 2.5 parts by weight, the setting retarding agent is in the range of 0.1 parts by weight, the antifoaming agent is in the range of 0.05 parts by weight and 0.1 parts by weight, the balance being water.

Assignees: CHINA NAT PETROLEUM CORP; CNPC CHUANQING DRILLING ENGINEERING CO LTD; CNPC CHUANQING DRILLING ENG CO; CNPC SICHUAN PETROLEUM GEOPHYSICAL PROSPECTING CO

110. Family 44283708 (US2010018435 AA)

[View in PatBase](#)

Title

[EN] COMPOSITIONS AND METHODS TO PREVENT CORROSION BY CO₂ ON CEMENT COMPOSITIONS

Abstract

[EN] Methods and compositions that protect cement compositions from corrosion, particularly from wet carbon dioxide, are provided. A soluble salt additive is provided to react with reaction products generated during the reactions that occur when cement is exposed to wet carbon dioxide. The soluble salt reacts to form an insoluble salt that forms a protective layer on the surface of the cement that protects it from further corrosion from exposure to wet carbon dioxide.

1st Main Claim

[EN] **1.** A method of reducing corrosion in cement applications comprising the step of adding an additive to a cement composition, the additive being capable of forming an insoluble salt by reacting with a calcium cation or by reacting with a carbonate anion that forms after or during which the cement composition sets up, hardens, and begins to corrode.

Assignees: VORDERBRUGGEN MARK ALAN; STEVENS RICHARD F; QU QI; BAKER HUGHES INC



111. Family 104872467 (WO24215727 A2)

[View in PatBase](#)

Title
[EN] COMPOSITION AND METHODS OF MAKING CEMENTITIOUS BINDERS VIA CARBONATION

Abstract

[EN] A carbonatable-based cementitious material may include a carbonatable material comprising magnetite (Fe₃O₄), hematite (Fe₂O₃), siderite (FeCO₃), goethite (FeO(OH)), ilmenite (FeTiO₃), limonite (FeO(OH)) nH₂O, FeS₂ (Pyrite), Obsidian (Volcanic Glass), iron powder, heterosite, bernalite, greenalite, cubanite, annite, electric arc furnace slag (EAF), reducing steel slag, oxidizing steel slag, converter steel slag, basic oxygen furnace slag, ladle slag, slow or fast cooled steel slag, GGBFS, air-cooled slag, copper slag, Solvay slag phosphorous slag, bauxite slag, zinc and lead slag, wollastonite and pseudowollastonite formed through sintering of limestone and sand, or combinations thereof. A carbonatable-based cementitious material may include a reducing agent. A carbonatable-based cementitious material may include an uncarbonatable material comprising sand, gravel, or combinations thereof. A carbonatable-based cementitious material may include one or more admixtures.

1st Main Claim

[EN] 1. A carbonatable-based cementitious material comprising: a carbonatable material comprising magnetite (FeO-i). hematite (FeiCh). siderite (FeCCh), goethite (FeO(OH)), ilmenite (FeTiO₃), limonite (FeO(OH)) nH₂O. FeSe (Pyrite), Obsidian (Volcanic Glass), iron powder, heterosite, bernalite, greenalite, cubanite, annite, electric arc furnace slag (EAF), reducing steel slag, oxidizing steel slag, converter steel slag, basic oxygen furnace slag, ladle slag, slow or fast cooled steel slag, GGBFS, air-cooled slag, copper slag, Solvay slag phosphorous slag, bauxite slag, zinc and lead slag, mine tails, wollastonite and pseudo wollastonite formed through sintering of limestone and sand, or combinations thereof; a reducing agent; an uncarbonatable material comprising sand, gravel, or combinations thereof; and one or more admixtures.

Assignees: C CRETE TECH LLC

112. Family 95755902 (CN115646434 A)

[View in PatBase](#)

Title

[EN] PREPARATION METHOD OF HIGH-PERFORMANCE CARBON DIOXIDE ADSORPTION MATERIAL AS WELL AS PRODUCT AND APPLICATION OF HIGH-PERFORMANCE CARBON DIOXIDE ADSORPTION MATERIAL

Abstract

[EN] The invention discloses a preparation method of a high-performance carbon dioxide adsorption material as well as a product and application of the high-performance carbon dioxide adsorption material. The preparation method comprises the steps of extracting calcium from waste and preparing a calcium aluminate spinel composite material. According to the characteristic that a part of kitchen waste in household garbage contains calcium elements, resourceful treatment is carried out, the calcium elements in the kitchen waste are extracted through a chemical method, secondary utilization is carried out, the calcium elements and aluminum salt form a spinel structure, and the calcium-aluminum-based double-activity chemical adsorption carbon dioxide composite material is obtained. When applied to the aspect of a carbon dioxide trapping material, due to the synergistic effect of calcium atoms and aluminum atoms, the material can show very excellent adsorption performance in a relatively high temperature section. The material is good in stability, low in preparation cost and suitable for large-scale production.

1st Main Claim

[MT] 1. A method for preparing a high performance carbon dioxide adsorbent material, characterized by comprising the steps of:

A. waste extraction of calcium: Calcium containing waste having a water content of less than 1 percent is placed in a boat type crucible, covered, and calcined to ash in a high temperature muffle furnace in 800-1100 degrees centigrade; And by centrifugation, water washing, followed by mineral acid washing, The sample obtained and the complexing agent are placed in a reaction kettle in a mass ratio of 1:1 to 1:5, fed into an oven for 50 to 110 degrees centigrade for heating for 15 to 100 minutes, and the resulting sample is centrifuged and water washed to obtain a calcium-containing product;

B. preparation of calcium aluminum spinel-type composite: The calcium-containing product obtained in step a is weighed out, dispersed into an aqueous solution of aluminum salt in a mass ratio of 1:1 to 1:4, and alkaline solution is added to adjust the pH to 8. The filter cake obtained by suction filtration was oven dried at a temperature of 110 degrees centigrade for 24 hours. Calcium aluminum spinel-type composites were obtained by calcination in a muffle furnace at 300-600 degrees centigrade for 3 hours.

Assignees: SHANGHAI NAT ENGINEERING RES CENTER NANOTECHNOLOGY CO LTD

113. Family 71705555 (CN108726910 A)

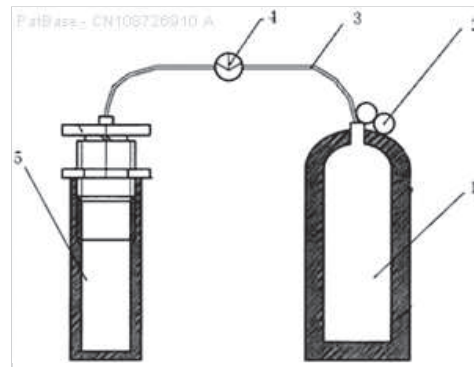
[View in PatBase](#)

Title

[EN] METHOD FOR STRENGTHENING RECYCLED CONCRETE COARSE AGGREGATE BY USING CO₂

Abstract

[EN] The invention discloses a method for strengthening recycled concrete coarse aggregate by using CO₂. The method comprises the following steps: (1) manually primary breaking waste concrete, secondary breaking the waste concrete by adopting a jaw-type breaking machine, screening to obtain recycled coarse aggregate for standby use; (2) sprinkling prepared nano SiO₂ slurry onto the recycled coarse aggregate prepared in step (1), spreading, and air drying for standby use; (3) strengthening the recycled coarse aggregate prepared in step (2) in a self-made carbonization apparatus to obtain high-quality recycled concrete aggregate; and (4) completely substituting natural aggregate by using the recycled coarse aggregate strengthened by CO₂ in step (3), and preparing recycled concrete. Compared with the unprocessed recycled coarse aggregate, the water absorption rate of the recycled concrete coarse aggregate strengthened by CO₂ is decreased by 18.98 to 34.17 percent, the breaking index is decreased by 13.79 to 31.03 percent, the void ratio is decreased by 3.85 to 13.47 percent, and the apparent density is increased by 1.13 to 4.55 percent.



1st Main Claim

[MT] 1. Reinforced concrete coarse aggregate using CO₂ regeneration, comprising the steps of:

- (1) the recycled concrete aggregate preparation: The waste concrete through artificial crushing, then using Jaw crusher crushing, screening to obtain recycled coarse aggregate secondary broken spare;
- (2) pre-treatment: recycled coarse aggregate The prepared nano-SiO₂ slurry spray stains in the step (1) Preparation of recycled coarse aggregate, the tile dried to spare;
- (3) CO₂ strengthening regeneration concrete aggregate: The step (2) Preparation of recycled coarse aggregate into the homemade carbonation device in its strong treatment, to obtain a high-quality recycled concrete aggregate;
- (4) Recycled Concrete Preparation: The step (3) CO₂ strengthening treatment after 100% instead of natural aggregate and recycled coarse aggregate concrete preparation regeneration.

Assignees: ZHENGZHOU UNIV OF AERONAUTICS; UNIV ZHENGZHOU AERONAUTICS; ZHENGZHOU INST OF AERONAUTICAL IND MANAGEMENT

114. Family 52528560 (US2012304894 AA)

[View in PatBase](#)

Title

[EN] REDUCTION OF CARBON DIOXIDE IN THE MANUFACTURING OF COMPOSITE CONSTRUCTION MATERIALS

Abstract

[EN] Disclosed are a system, a method and/or composition of reduction of carbon dioxide in the manufacturing of cement and concrete. In one embodiment, a method of producing a concrete, includes preparing a dried powder mixture of an alkali hydroxide, a sodium silicate, clay and a pozzolanic material. The dried powder with water may be reacted to form a cement paste. In addition, the cement paste may be mixed with at one of sand, an aggregate, a plasticizer and a nano additive to form the concrete.

1st Main Claim

[EN] 1. A method of producing a concrete, comprising: preparing a dried powder mixture of an alkali hydroxide, a sodium silicate, a clay and a pozzolanic material; reacting the dried powder mixture with water to form a cement paste; and mixing the cement paste with at least one of a sand, an aggregate, a plasticizer and a nano additive to form the concrete.



Assignees: ABDULLAH MOHD MUSTAFA ALBAKRI; BINHUSSAIN MOHAMMED A; GHAZALI MOHD RUZAIDI; HUSSIN KAMARUDIN; KING ABDULAZIZ CITY SCIENCE AND TECHNOLOGY; NOOR NORAZIAN MOHAMMED; SELIMIN MOHAMMAD TAMIZI

115. Family 80553838 (US2022126237 AA)

[View in PatBase](#)

Title (EP3915666 A1)

[EN] CARBON DIOXIDE FIXATION METHOD

Abstract (EP3915666 A1)

[EN] Provided is a simple and low-cost method for efficiently fixing a sufficient amount of carbon dioxide contained in a carbon dioxide-containing gas (e.g. a plant exhaust gas). The method of fixing carbon dioxide comprises a contact step of bringing a carbon dioxide-containing gas having a temperature of 350 degrees centigrade or more into contact with a cementitious hardened body to fix carbon dioxide in the carbon dioxide-containing gas to the cementitious hardened body. The carbon dioxide-containing gas may be a gas that is free from being supplied with moisture before the contact step and during the contact step. One of examples of the carbon dioxide-containing gas is a plant exhaust gas.

1st Main Claim (EP3915666 A1)

[EN] 1. A method of fixing carbon dioxide, comprising a contact step of bringing a carbon dioxide-containing gas having a temperature of 350 degrees centigrade or more into contact with a cementitious hardened body to fix carbon dioxide in the carbon dioxide-containing gas to the cementitious hardened body.

Assignees: TAIHEIYO CEMENT CORP; UNIV TOKYO; UNIV OF TOKYO

(54) Designated Contracting States AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IL IT LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR Designated Extension States BA ME Designated Validation States KH MA MD TN	
(30) Priority 14.02.2019 JP 2019024659	(72) Inventors • WANG Dianchao Tokyo 113-8554 (JP) • NOGUCHI Takahiro Tokyo 113-8554 (JP) • NOZAKI Takahito Sakura-eki, Chiba 285-8655 (JP) • HIGO Yasuhiko Sakura-eki, Chiba 285-8655 (JP)
(71) Applicants • Taiheiyō Cement Corporation Bunkyo-ku Tokyo 112-8553 (JP) • The University of Tokyo Bunkyo-ku Tokyo 113-8654 (JP)	(74) Representative Isarpatent Patent- und Rechtsanwälte Barth Charles Hesse Pockmann & Partner mbB Friedrichstrasse 31 80801 München (DE)

116. Family 65480314 (US2018312436 AA)

[View in PatBase](#)

Title (EP3365301 A1)

[EN] HYDRAULIC COMPOSITION HAVING IMPROVED CARBONATION RESISTANCE

Abstract (EP3365301 A1)

[EN] The present invention relates to a composition including: at least one hydraulic binder, containing at least one clinker, and at least one branched polyalkyleneimine having a molecular weight of from 400 g/mol to 1000000 g/mol in a weight ratio of the polyalkyleneimine(s)/binder of from 0.05 percent to 5.0 percent.

Assignees: HOLCIM TECHNOLOGY LTD; LAFARGE SA; HOLCIM TECH LTD

117. Family 96886424 (US2023124103 AA)

[View in PatBase](#)

Title (EP4419617 A1)

[EN] CARBON DIOXIDE ENHANCED CEMENT

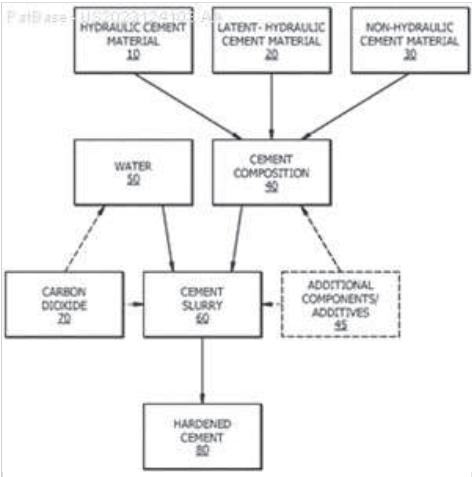
Abstract (EP4419617 A1)

[EN] A cement composition including a hydraulic cement material, a latent-hydraulic cement material, and a non-hydraulic cement material. Also provided is a method including combining, at a jobsite, the cement composition comprising the hydraulic cement material, the latent-hydraulic cement material, and the non-hydraulic cement material with water to provide a cement slurry, and allowing the cement slurry to harden in the presence of carbon dioxide (CO2) to provide a hardened cement.

1st Main Claim (EP4419617 A1)

[EN] 1. A cement composition comprising: a hydraulic cement material; a latent-hydraulic cement material, and a non-hydraulic cement material.

Assignees: HALLIBURTON ENERGY SERVICES INC



118. Family 107969841 (US2025153098 AA)

[View in PatBase](#)

Title (EP4556102 A1)

[EN] METHOD OF CAPTURING CARBON DIOXIDE

Abstract (EP4556102 A1)

[EN] A method of capturing carbon dioxide, including providing a particle containing magnesium oxide, calcium oxide, or a combination thereof; and providing a mixture gas to contact the particle, wherein the mixture gas includes water vapor, carbon dioxide, and nitrogen oxide, and the particle captures the carbon dioxide to form a carbonated particle and a treated gas. The mixture gas has a relative humidity of 25 percent to 95 percent, a nitrogen oxide concentration of 20 ppm to 2000 ppm, and a carbon dioxide concentration of 0.05 percent to 15 percent.

1st Main Claim (EP4556102 A1)

[EN] 1. A method of capturing carbon dioxide, comprising:

- providing a particle containing magnesium oxide, calcium oxide, or a combination thereof; and
- providing a mixture gas to contact the particle, wherein the mixture gas comprises water vapor, carbon dioxide, and nitrogen oxide, and the particle captures the carbon dioxide to form a carbonated particle and a treated gas,
- wherein the mixture gas has a relative humidity of 25 percent to 95 percent, a nitrogen oxide concentration of 20 ppm to 2000 ppm, and a carbon dioxide concentration of 0.05 percent to 15 percent.

Assignees: IND TECH RES INST; INDUSTRIAL TECH RESEARCH INST

119. Family 58132115 (NL2007928 C)

[View in PatBase](#)

Title

[EN] A METHOD FOR THE PREPARATION OF A CARBON DIOXIDE SEQUESTERED PRODUCT AND USE THEREOF AS A CARBON FOOTPRINT LOWERING SUBSTANCE.

Abstract

[EN]

THE INVENTION RELATES TO A METHOD FOR THE PREPARATION OF A CARBON DIOXIDE SEQUESTERED PRODUCT (CSP), WHEREIN THE CSP S PREPARED BY REACTING CARBON DIOXIDE AND A REACTIVE SILICATE ABSORBENT FORMING A (HYDRO-)SILICATE AND CARBONATE CONTAINING PRODUCT. THE PRESENT INVENTION RELATES TO A METHOD FOR THE PREPARATION OF A CARBON DIOXIDE SEQUESTERED PRODUCT (CSP), THE CSP OBTAINABLE BY THE METHOD, TO THE USE THEREOF AS A CARBON FOOTPRINT LOWERING SUBSTANCE AND TO BUILDING MATERIALS COMPRISING THE CSP HAVING A REDUCED CARBON FOOTPRINT.

DIT OCTROOI IS VERLEEND ONGEACHT HET BIJGEVOEGDE RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK EN SCHRIFTELIJKE OPINIE. HET OCTROOISCHRIFT KOMT OVEREEN MET DE OORSPRONKELIJK INGEDIENDE STUKKEN.

1st Main Claim

[MT] 1. A process for the preparation of a product koolstofdioxidegesekwestreerd (CSP), in which the CSP is prepared by reacting carbon dioxide and a reactive silicate absorbent to form a (hydro) carbonate and silicate-containing product.

Assignees: HARLINGER KALKZANDSTEENFABRIEK HOLDING BV

120. Family 105237509 (JP2024160586 A2)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE ABSORPTION MATERIAL AND PRODUCTION METHOD OF CARBON DIOXIDE ABSORPTION MATERIAL

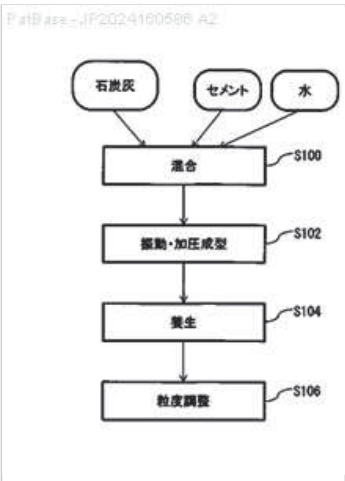
Abstract

[EN] To provide a carbon dioxide absorption material recycled with coal ash.SOLUTION: A carbon dioxide absorption material to absorb carbon dioxide contained in gas includes coal ash emitted due to combustion of coal, and cement. The carbon dioxide absorption material is a coal ash recycling material generated by mixing the coal ash and the cement.SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1. A carbon dioxide absorbing material for absorbing carbon dioxide contained in a gas, the carbon dioxide absorbing material comprising: Coal ash discharged by the combustion of coal; and cement.

Assignees: KAIHATSU FRC CO LTD



121. Family 105289784 (WO24233994 A1)

[View in PatBase](#)

Title

[EN] PROCESS FOR VATERITE PRODUCTION VIA THE CARBONATION OF LIME, AND HYDRATED LIME AND ALKALINE CA-CONTAINING PRECURSORS

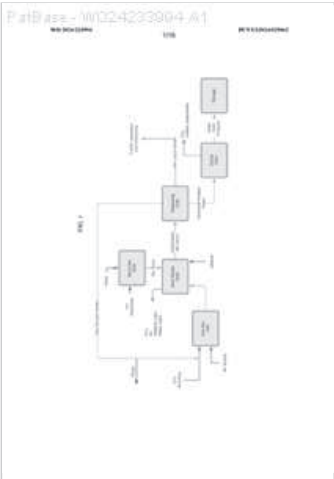
Abstract

[EN] The present invention provides tri-phasic methods of preparing a vaterite composition from a calcium source, such as calcium hydroxide, and carbon dioxide. The methods advantageously produce a calcium carbonate with high conversion and selectivity for the vaterite polymorph. The present invention further provides vaterite compositions and systems for producing vaterite.

1st Main Claim

[EN] 1. A method of preparing a vaterite product, comprising: a) combining a calcium source, water, and at least one additive to produce a calcium rich solution or slurry; b) carbonating the calcium rich solution or slurry with a gaseous carbon dioxide source, thereby forming a carbonation product mixture; c) separating the carbonation product mixture to provide a wet vaterite mixture, and an additive mixture comprising water and the at least one additive; and d) drying the wet vaterite mixture to produce the dry vaterite product.

Assignees: UNIV CALIFORNIA; ROSNER FABIAN; THE UNIV OF CALIFORNIA



122. Family 33096176 (GB2437280 A1)

[View in PatBase](#)

Title

[EN] CONCRETE INCORPORATING ORGANIC LIQUIDS OR SOLIDS TREATED WITH SUPER CRITICAL CARBON DIOXIDE

Abstract

[EN] Organic liquids or solids whose carbon dioxide content has been enhanced through their exposure to high pressure carbon dioxide are introduced into cement aggregate mixtures. The carbon dioxide may be in the super critical state. The organic solid may be vulcanised rubber chips which may be treated with super critical carbon dioxide for between 1 and 120 minutes. The vulcanised rubber chips are then added to a cement aggregate and water mix, the mix is then allowed to harden. The resultant concretes are mechanically stronger than those produced without the super critical carbon dioxide laden granules.

1st Main Claim

[EN] 1. The introduction of organic liquids or solids whose carbon dioxide content has been enhanced through their exposure to high pressure carbon dioxide into cement aggregate mixtures.

Assignees: HAMMOND PETER

123. Family 53122704 (US2013048284 AA)

[View in PatBase](#)

Title (EP2751220 A1)

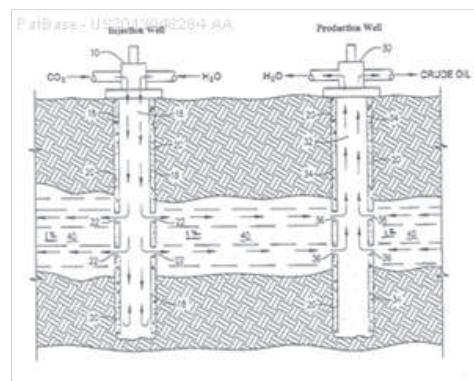
[EN] CARBON DIOXIDE-RESISTANT PORTLAND BASED CEMENT COMPOSITION

Abstract (EP2751220 A1)

[EN] The invention provides a carbon dioxide-resistant hydraulic cement composition, The inventive composition comprises a Portland cement, Class C fly ash and water. The Class C fly ash is present in the composition in an amount in the range of from about 5 percent to less than about 30 percent by weight based on the total weight of the cementitious components in the composition, hi another aspect, the invention provides a method of cementing in a carbon dioxide environment. In yet another aspect, the invention provides a method of enhancing the recovery of a hydrocarbon fluid from a subterranean formation.

1st Main Claim (EP2751220 A1)

[EN] 1. A carbon dioxide-resistant hydraulic cement composition, comprising: a Portland cement;



Assignees: HALLIBURTON ENERGY SERVICES INC; SANTRA ASHOK K; KULAKOFSKY DAVID; HALLIBURTON ENERGY SERV INC; HALLIBURTON CO

124. Family 70790215 (US2020001273 AA)

[View in PatBase](#)

Title (EP3581267 A1)

[EN] COMPOSITION FOR MINERALISING CARBON DIOXIDE AND NITROGEN OXIDE GASES AND USES OF SAME

Abstract (EP3581267 A1)

[EN] The invention relates to a composition for mineralising carbon dioxide and nitrogen oxide gases, which comprises a mixture of magnesium (between 1 and 25 percent), iron (between 1 and 23 percent), calcium monoxide (between 1 and 25 percent), titanium dioxide (between 0.1 and 11 percent) and silicon dioxide (between 16 and 75 percent), with a particle diameter between 100 nm and 4000 micrometres. The composition causes the mineralisation of carbon dioxide (CO₂) and of the gaseous chemical compounds known as "nitrogen oxides" (NO_x) in the atmosphere. This composition can be added or mixed as an additive in paints, dyes, resins and elastic polymers (gum and natural rubber) in parts with wear, and for any type of covering.

1st Main Claim (EP3581267 A1)

[EN] 1. A composition for mineralising carbon dioxide and nitrogen oxides gases comprising a mixture of magnesium (between 1 and 25 percent by weight), iron (between 1 and 23 percent), calcium monoxide (between 1 and 25 percent), titanium dioxide (between 0.1 and 11 percent) and silicon dioxide (between 16 and 75 percent), with a particle diameter between 100 nm and 4000 micrometres.

Assignees: PRIMLAB GLOBAL SL; PRIMLAB GLOBAL S L

125. Family 105613374 (JP2024169084 A2)

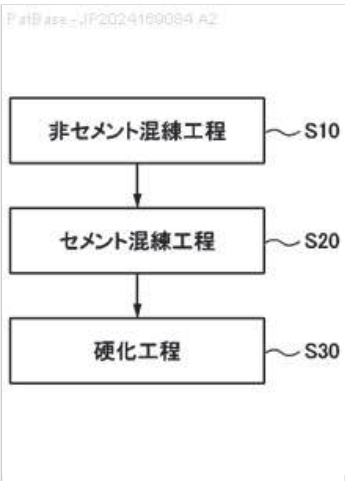
[View in PatBase](#)

Title
[EN] METHOD FOR PRODUCING CARBON DIOXIDE-FIXED HYDRAULIC HARDENED BODY

Abstract
[EN] To provide a method for producing a carbon dioxide-fixed hydraulic hardened body with a high CO2 fixation amount, capable of suppressing a slump decrease in a fluid composition accompanying the supply of a CO2 source.SOLUTION: A method according to the present invention for producing a carbon dioxide-fixed hydraulic hardened body includes: a non-cement kneading step of kneading a cement-free CO2 absorbent that absorbs CO2 and does not contain cement, a CO2 source, and an additive comprising one or more selected from the group consisting of a water-reducing agent, an AE agent, and a high-performance AE water-reducing agent, to obtain a carbon dioxide-fixed non-cement kneaded material in which the carbon dioxide is fixed; a cement kneading step of kneading the carbon dioxide-fixed non-cement kneaded material obtained in the non-cement kneading step with cement to obtain a fluid composition; and a hardening step of casting and hardening the fluid composition obtained in the cement kneading step to obtain a carbon dioxide-fixed hydraulic hardened body.SELECTED DRAWING: Figure 1

1st Main Claim
[MT] 1. Co.₂Of CO and no cement₂An absorbent and Co.₂Source and an additive containing one or more selected from the group consisting of a water reducing agent, an AE agent, and a high performance AE water reducing agent to obtain a carbon dioxide gas-immobilized non-cement mixture in which carbon dioxide gas is immobilized, A cement mixing step of mixing the carbon dioxide gas-immobilized non-cement mixture obtained in the non-cement mixing step with cement to obtain a fluid composition, and a curing step of casting and curing the fluid composition obtained in the cement mixing step to obtain a carbon dioxide gas-immobilized hydraulic cured body.

Assignees: KAJIMA CORP



126. Family 51509748 (US2013284073 AA)

[View in PatBase](#)

Title (EP2476478 A1)

[EN] PROCESS FOR CARBON DIOXIDE REMOVAL FROM A GAS BY CONTACTING IT WITH A SOLID

Abstract (EP2476478 A1)

[EN] The invention provides a process for reducing the concentration of carbon dioxide in a gas comprising carbon dioxide and water vapour (preferably a flue gas, more preferably a cement plant flue gas) which process comprises contacting the gas with a particulate solid, which solid comprises an alkaline earth metal oxide or hydroxide or a mixture thereof and an alkali metal compound which is an alkali metal hydroxide, carbonate or bicarbonate, or a mixture thereof.

1st Main Claim (EP2476478 A1)

[EN] 1. A process for reducing the concentration of carbon dioxide in a gas comprising carbon dioxide and water vapour which process comprises contacting the gas with a particulate solid, which solid comprises an alkaline earth metal oxide or hydroxide or a mixture thereof and an alkali metal compound which is an alkali metal hydroxide, carbonate or bicarbonate, or a mixture thereof.

Assignees: GARTNER ELLIS; LAFARGE SA; LAFARGE GROUP

127. Family 65964690 (EP3175889 A1)

[View in PatBase](#)

Title (EP3175889 B1)

[EN] DEVICE AND METHOD FOR CARBONATION OF ALKALINE SOLIDS

Abstract

[MT] The invention relates to a device and a method for accelerating carbonation of rust ash or other alkaline solids with the aim of a cost-optimized disposal or a Baustofflichen use using CO₂-containing exhaust gases as reactive. The execution is preferably carried out in continuous form in a suitably ausgeruesteten rotary reactor.

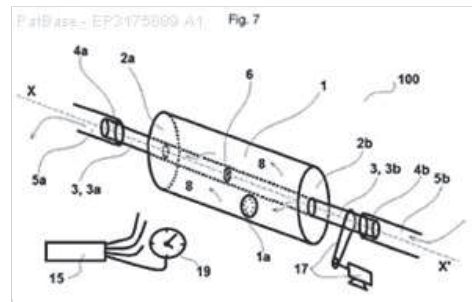
1st Main Claim (EP3175889 B1)

[EN] 1. Process for the carbonation of at least one alkaline solid, **characterized in that** it is carried out in a reactor (**100**) having a rotatably mounted reactor chamber (**1**) and comprises the following steps,

- a) feeding CO₂-containing reactive gas and at least one alkaline solid into the reactor (**100**) under exclusion of ambient air, so that carbonation takes place, and
- b) the removal of the reactive gas used and the carbonated solid from the reactor (**100**),

wherein

- - the solid material is constantly moved by rotation of the rotatably mounted reactor chamber (**1**), and the rotational speed of the reactor chamber is between 10 rotations per minute and 1 rotation per hour;
- - the supply and discharge of the CO₂-containing gas takes place via pipe (**3**) and the connecting pipes (**5a**, **5b**);
- - the process is controlled or regulated via a control unit (**15**).



Assignees: STADTWERKE GIESSEN AG; TECHNISCHE HOCHSCHULE MITTELHESSEN

128. Family 97815412 (CN116283141 A)

[View in PatBase](#)

Title

[EN] PERVIOUS CONCRETE CAPABLE OF EFFICIENTLY ADSORBING CARBON DIOXIDE THROUGH COOPERATION OF MULTIPLE SOLID WASTES AND PREPARATION METHOD OF PERVIOUS CONCRETE

Abstract

[EN] The invention provides pervious concrete capable of synergistically and efficiently adsorbing carbon dioxide by multiple solid wastes and a preparation method of the pervious concrete. The pervious concrete is prepared from 600 to 900 parts of Portland cement, 240 to 450 parts of functional admixture, 2100 to 4050 parts of gravel and 180 to 360 parts of water. On one hand, the carbon sequestration effect is achieved through the solid waste material alkaline wet grinding effect; on the other hand, layered double hydroxides (LDHs) with a unique layered structure and an anion adsorption function are prepared from the solid waste-based material, so that the carbon dioxide adsorption and fixation effects of the concrete are improved; the sustainable development of a low-carbon concrete material is promoted, and a theoretical basis is provided for achieving carbon neutralization of a construction project in the construction period.

1st Main Claim

[MT] 1. A method for producing a water permeable concrete having a multi-solid waste synergistic high efficiency adsorption of carbon dioxide, comprising the steps of:

- 1) Take 60 to 90 parts of fly ash, 60 to 90 parts of electric slag, 300 to 400 parts of grinding medium, 40 to 100 parts of water into the ball mill, wet mill at a speed of 400 to 450 r/min for 60 to 80 minutes, pass through a 30 mesh square mesh screen, To obtain an alkaline slurry with a median particle size of 3 to 5 micro m, to dry the alkaline slurry in an oven at 70 to 100 degrees centigrade temperature, and to remove, to ground through a 100 mesh square mesh screen, to obtain 50 to 100 parts of powder A;
- 2) 50 to 100 parts of powder A, 40 to 100 parts of water, 4 to 6 parts of 0.078 mol/L of HNO_3 The solution, 300 to 400 parts of grinding medium are put into a ball mill, wet-milled at a speed of 400 to 450 r/min for 40 to 60 minutes, passed through a 30 mesh square mesh screen, to obtain a slurry with a median particle size of 4 to 6 micro m, Heat the slurry at 30 to 40 degrees centigrade for 2 to 3 hours to obtain CaAl-LDHs crystal suspension B;
- 3) Take 30 to 60 parts of slag, 30 to 60 parts of steel slag, 200 to 300 parts of grinding medium, 40 to 100 parts of water into the vertical ball mill, circulate the CO from the bottom to the top at a rate of 0.5 to 1 L/min.², Wet milling at a speed of 400 to 450 r/min for 60 to 120 min, through a 30 mesh square mesh screen, to obtain an ultrafine slurry blend C with a median particle size of 5 to 8 micro m;
- 4) mixing the suspension B and the ultrafine slurry blend C uniformly in a mass ratio of 1:1 or 5:6, to obtain a functional blend;
- 5) 240 to 450 parts of functional blend, 600 to 900 parts of silicate cement, 180 to 360 parts of water in a strong mixer for 30 to 45 seconds, thoroughly mix well and then take 2100 to 4050 parts of crushed stone in the mixer, continue to mix 120 to 180 seconds, The slurry is uniformly attached to the surface of the crushed stone aggregate, and finally the slurry is poured, after maintenance and demolding, resulting in a multi-solid waste synergistic water-permeable concrete with high efficiency adsorption of carbon dioxide.

Assignees: UNIV HUBEI TECHNOLOGY; HUBEI UNIV OF TECHNOLOGY

129. Family 105315397 (CN118954992 A)

[View in PatBase](#)

Title

[EN] LIGHTWEIGHT AGGREGATE CAPABLE OF SEALING CARBON DIOXIDE AND PREPARATION METHOD OF LIGHTWEIGHT AGGREGATE

Abstract

[EN] The invention relates to the technical field of carbon dioxide mineralization sealing, and discloses a lightweight aggregate capable of sealing carbon dioxide and a preparation method thereof. The preparation method comprises the following steps: S10, mixing fly ash, mineral powder and carbide slag as raw materials, adjusting the addition amount of the fly ash, the mineral powder and the carbide slag according to the content of CaO and SiO₂ in the fly ash, the mineral powder and the carbide slag, and controlling the C/Si mass ratio of the mixture to be 0.8-1.2; s20, mixing water with the mixture to prepare a ball blank; s30, the ball blank is subjected to pre-curing treatment; s40, the ball blank obtained after pre-curing treatment is placed in a curing kettle, CO₂ gas is introduced into the curing kettle to conduct curing on the ball blank, and the interior of the curing kettle is in a pressure stabilizing state; and S50, after curing is finished, discharging CO₂ gas in the curing kettle, and taking out a spherical sample, namely the lightweight aggregate. The lightweight aggregate with excellent comprehensive performance such as bulk density, cylinder compressive strength and carbon sequestration rate can be prepared.

1st Main Claim

[MT] 1. A method for preparing a light aggregate capable of sequestration of carbon dioxide, comprising the steps of: Providing a first substrate having a first surface and a second surface;

S10 , based on the fly ash, the ore powder, the electric slag as raw materials are mixed, according to the CaO and SiO in the fly ash, the ore powder, the electric slag₂The content of adjusting the added amount of the fly ash, the ore powder, and the electric slag, controlling the C/Si mass ratio of the mix to be 0.8-1.2;

S20, mixing water with the mix and forming a pellet;

S30, placing the pellet in a constant temperature and humidity cabinet for pre-care treatment;

S40 , the pellet after pre-conditioning treatment is placed in a maintenance kettle and CO is passed into the maintenance kettle₂A gas to preserve the blanks and to keep the retort in a steady-pressure state;

S50, after the maintenance is completed, the CO in the maintenance kettle will be maintained₂The gas is vented and the spherical sample is removed, i.e. light aggregates.

Assignees: GUANGDONG ENERGY GROUP SCIENCE AND TECH RESEARCH INST CO LTD

130. Family 49315792 (US2012291672 AA)

[View in PatBase](#)

Title (EP2347815 A1)

[EN] PROCESS FOR REDUCING THE CONCENTRATION OF CARBON DIOXIDE IN AN EXHAUST GAS

Abstract (EP2347815 A1)

[EN] The invention provides a process for reducing the concentration of carbon dioxide in a gas comprising carbon dioxide and water vapour (preferably a flue gas, more preferably a cement plant flue gas) which process comprises contacting the gas with a particulate solid, which solid comprises an alkaline earth metal oxide or hydroxide and an alkanolamine.

1st Main Claim (EP2347815 A1)

[EN] 1. A process for reducing the concentration of carbon dioxide in a gas comprising carbon dioxide and water vapour which process comprises contacting the gas with a particulate solid, which solid comprises an alkaline earth metal oxide or hydroxide and an alkanolamine.

Assignees: LAFARGE SA; GIMENEZ MICHEL; GARTNER ELLIS; LAFARGE GROUP

131. Family 32398615 (US2005252421 AA)

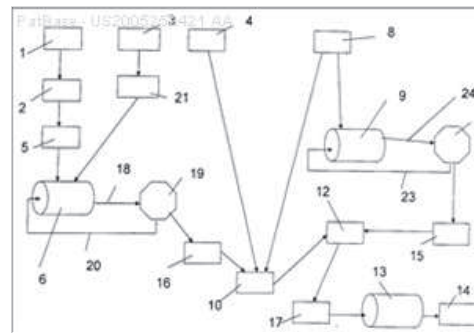
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Title (EP1744998 B1)

[EN] PROCESSING SYSTEM FOR MANUFACTURING COMPOSITE CEMENTITIOUS MATERIALS WITH REDUCED CARBON DIOXIDE EMISSIONS

Abstract (EP1744998 B1)

[EN] A processing arrangement for manufacturing composite cementitious materials, such as hydraulic blended cements, with significantly reduced Portland clinker minerals content. The arrangement includes a milling unit for pregrinding supplementary cementitious materials and highly reactive pozzolans or mineral fillers, such as fly ash, blast furnace slag, fine quartz, granitic quarry fines, and the like, and a milling unit for pregrinding the Portland cement. The pregrinding units are followed by grinding unit for grinding the preground components. The pregrinding units are adapted to work as an open circuit or as a closed circuit for the material being ground.



1st Main Claim (EP1744998 B1)

[EN] 1. A processing arrangement for manufacturing composite cementitious materials such as hydraulic blended cements with significantly reduced Portland clinker minerals content and correspondingly with an increased amount of supplementary cementitious materials and highly reactive pozzolans or mineral fillers as e.g. fly ash, blast furnace slag, fine quartz, granitic quarry fines for direct replacement of Portland cement in concrete, comprising a silo for Portland cement, a silo for fly ash or other type of supplementary materials and a silo for cement kiln dust or other type of setting time regulating agent, a storage unit for polymer additive, proportioning means, mixing means, grinding devices and discharge means, **characterised in that** the arrangement is equipped with a milling unit (6) for pregrinding said supplementary materials and a milling equipment (9) for pregrinding the Portland cement, which pregrinding equipments (6,9) are followed by a grinding equipment (13) for grinding the preground components and **in that** said pregrinding equipment (6,9) are adapted to work as an open circuit or a closed circuit for the material being ground.

Assignees: PROCEDO ENTPR ETABLISSEMENT; PROCEDO ENTERPRISES ETABLISSEMENT; PROCEDO ENTPR ETS; RONIN VLADIMIR; PROSEDO EHNTERPRAJZES EHTABLIS; PROCEDO ENTPR ETABLISSEMENT

132. Family 103774372 (KR20240117240 A)

[View in PatBase](#)

Title

[EN] CONCRETE INTERLOCKING BLOCK COMPOSITION CONTAINING CARBON DIOXIDE FIXING MATERIAL MANUFACTURING METHOD OF CONCRETE INTERLOCKING BLOCK CONTAINING CARBON DIOXIDE FIXING MATERIAL AND CONCRETE INTERLOCKING BLOCKS CONTAINING CARBON DIOXIDE FIXING MATERIALS

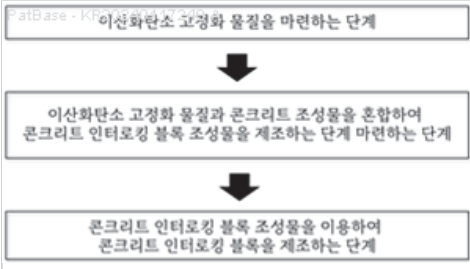
Abstract

[MT] The present invention relates to a method for producing a carbon dioxide-immobilized material , comprising the steps of : (a) providing a carbon dioxide-immobilized material ; (b) mixing the carbon dioxide-immobilized material with a concrete composition to prepare a concrete interlocking block composition ; And (c) producing a concrete interlocking block by using the concrete interlocking block composition ; wherein the step of preparing the carbon dioxide-immobilized material comprises the steps of : introducing solid by-products generated at the time of operating the CFBC (C1-1) refinery used for producing high pressure steam by hydrating with water to form a hydration reactant ; (A-2) injecting carbon dioxide into the hydration reactant to form a carbonation reaction; and (a-3) dehydrating and drying the carbonation reaction to form a carbon dioxide-immobilized material.

1st Main Claim

[MT] 1. (A) providing a carbon dioxide-immobilized material; (b) mixing said carbon dioxide-immobilized material with a concrete composition to produce a concrete interlocking block composition; And (c) producing a concrete interlocking block by using the concrete interlocking block composition ; wherein the step of preparing the carbon dioxide-immobilized material comprises the steps of : introducing solid by-products generated at the time of operating the CFBC (C1-1) refinery used for producing high pressure steam by hydrating with water to form a hydration reactant ; (A-2) injecting carbon dioxide into the hydration reactant to make a carbonation reaction to form a carbonation reaction; and (a-3) dehydrating and drying the carbonation reaction to form a carbon dioxide-immobilized material.

Assignees: HANIL CONCRETE CO LTD



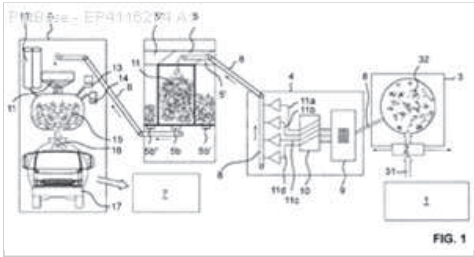
133. Family 95431247 (EP4116274 A1)

[View in PatBase](#)

Title
[EN] LARGE SCALE CARBONATION OF CONCRETE WASTE

Abstract

[EN] The present invention concerns a method for recycling concrete aggregates from demolition waste (31), the method comprising the following steps: providing an individual fraction (11a, 11b, 11c, 11d) of concrete aggregates obtained from concrete waste (31) from a demolition site (1) with a defined grain size distribution d/D, measuring and adjusting a water content in said fraction of the concrete aggregates, introducing a defined amount of CO₂ (21) into a reactor vessel (5, 5', 5", 5?), introducing said individual fraction (11a) of concrete aggregates into the reactor vessel pre-filled with CO₂ separately from other fractions (11b, 11c, 11d); controlled carbonation of the individual fraction (11a, 11b, 11c, 11d) of concrete aggregates in the reactor vessel resulting in a carbonated fraction (11) of concrete aggregates; removal of the carbonated fraction of concrete aggregates from the reactor vessel for subsequent use in the production of a new concrete composition (16).



1st Main Claim

[EN] 1. Method for recycling concrete aggregates from demolition waste (31), comprising the following steps:

- a.) providing an individual fraction (11a, 11b, 11c, 11d) of concrete aggregates obtained from a demolition site (1) with a defined grain size distribution d/D selected from a group consisting of 0/1, 0/2, 0/4, 1/2, 1/4, 2/4, 0/8, 1/8, 2/8, 4/8, 5.6/11.2, 0/16, 1/16, 2/16, 4/16, 8/16, 0/20, 1/20, 2/20, 4/20, 8/20, 16/20, 0/22, 1/22, 2/22, 4/22, 8/22, 16/22, 11.2/22.4, 8/31.5, 16/31.5, 0/32, 1/32, 2/32, 4/32, 8/32, 16/32, 20/32, 22/32, 0/64, 2/64, 4/64, 8/64, 16/64, 20/64, 22/64, 32/64, and 64/128;
- b.) introducing a defined amount of CO₂ (21) into a reactor vessel (5, 5', 5'', 5?);
- c.) introducing said individual fraction (11a, 11b, 11c, 11d) of concrete aggregates into the reactor vessel (5, 5', 5'', 5?);
- d.) controlled carbonation of the individual fraction (11a, 11b, 11c, 11d) of concrete aggregates in the reactor vessel (5, 5', 5'', 5?) resulting in a carbonated fraction (11) of concrete aggregates, the step of carbonation comprising a first phase of carbonation (P1) and a subsequent second phase of carbonation (P2), wherein the second phase (P2) of carbonation comprises a drying process, in which a gas mixture (21a) within the reactor vessel (5, 5', 5'', 5?) is dried in order to reduce a relative humidity (RH2) of the gas mixture within the reactor vessel (5, 5', 5'', 5?) with respect to a relative humidity (RH1) of the gas mixture (21a) within the reactor vessel (5, 5', 5'', 5?) in the first phase of carbonation (P1);
- e.) removal of the carbonated fraction (11) of concrete aggregates from the reactor vessel (5, 5', 5'', 5?) for subsequent use in a production of a new concrete composition (16).

Assignees: ZIRKULIT AG

134. Family 32864781 (JP2006076825 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR UTILIZING CARBON DIOXIDE

Abstract

[EN] PROBLEM TO BE SOLVED: To attempt effective utilization of carbon dioxide for reducing discharge amount of the same.
SOLUTION: Magnesium carbonate is prepared from carbon dioxide and a magnesium oxide-containing substance. The magnesium carbonate is utilized as a cement admixture together with silica and a setting retarder.

1st Main Claim

[MT] One. cement 10-20 percent by weight, fine aggregate 35-45 percent by weight, coarse aggregate is 40-55 percent by weight, in total 100 percent by weight of the cement mixture, adding water and concrete magnesium carbonate is added during the manufacture, generated from magnesium oxide-containing material gas containing carbon dioxide gas in place of 15 wt percent or less beyond the 0 percent by weight of cement, fine aggregate from 0.3 to 1.2 How to use carbon dioxide gas which is characterized by the addition of silica instead of percent by mass, and further, by adding 0.05 to 0.15 percent by weight of the total amount of retarder for cement and magnesium carbonate.

Assignees: NIPPON STEEL CORP

135. Family 77520570 (JP2020015659 A2)

[View in PatBase](#)

Title

[EN] STABILIZATION METHOD OF CARBON DIOXIDE

Abstract

[EN] To provide a method for stabilization of carbon dioxide included in a carbon dioxide containing gas (for example, an exhaust gas in a plant) by a sufficient amount, by a simple method at low cost. SOLUTION: There is provided a stabilization method for carbon dioxide comprising: a step for bringing a carbon dioxide containing gas into contact with a cement hardening body, for stabilizing the carbon dioxide included in the carbon dioxide containing gas to the cement hardening body, as the carbon dioxide containing gas, a gas configured so that, a moisture content measured by a method described in 7: measurement of moisture content in the exhaust gas in a measurement method of dust density in the exhaust gas JIS Z 8808:2013, is 1.5 percent or greater and temperature of the gas is 75-175 degrees centigrade, is used, in the invention. SELECTED DRAWING: None

1st Main Claim

[MT] 1 cementitious hardened body, carbon dioxide-containing gas, the carbon dioxide-containing gas is brought into contact with the carbon dioxide contained in the cementitious cured product, comprising the step of immobilizing the immobilization of carbon dioxide. Contact the carbon dioxide-containing gas, the concentration of the "JIS Z 8808:2013 dust in the exhaust gas in the exhaust gas measurement methods" Measurement of the moisture content of 7 to 1.5 percent was measured in the amount of water or more and the temperatures of up to 75 to 175 degrees centigrade, characterized in that it is a gas carbon dioxide immobilization method.

Assignees: TAIHEIYO CEMENT CORP; UNIV TOKYO

136. Family 77529991 (US2021284576 AA)

[View in PatBase](#)

Title (EP3831795 A1)

[EN] PROCESS FOR OBTAINING CAO-MGO BINDERS AND CONSTRUCTION PRODUCTS WITH REUSE OF SUBPRODUCTS AND/OR RESIDUES AND ABSORPTION OF CARBON DIOXIDE

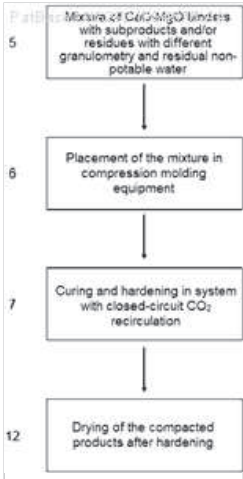
Abstract (EP3831795 A1)

[EN] The present invention is related to the process of obtaining CaO-MgO binders and construction products, with reuse of subproducts and/or residues and carbon dioxide, by compression molding (6). The binders are produced by crushing and grinding. The process of manufacturing the products consists of mixing binders and subproducts and/or residues with residual non-potable water (5), and curing this mixture with carbon dioxide (7), under constant humidity, temperature and pressure conditions. The process of hardening is carried out by recirculating carbon dioxide in a closed circuit, followed by drying of the products (12). The subproducts and/or residues contain calcium and magnesium and may be slag from the steel manufacturing industry or sand and mud resulting from the pulp, paper and cardboard production industry. The construction products may include other residues and materials containing silica and aluminum.

1st Main Claim (EP3831795 A1)

[EN] 1. A process of obtaining CaO-MgO binders and construction products with reuse of subproducts and/or residues **characterized in that** the curing and hardening process is done with absorption of carbon dioxide.

Assignees: UNIV DA BEIRA INTERIOR



137. Family 102712941 (CN118047586 A)

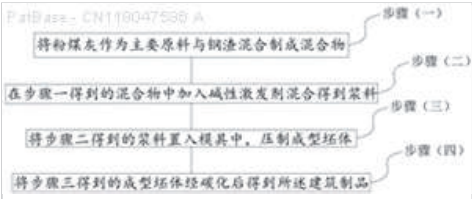
[View in PatBase](#)

Title

[EN] PREPARATION METHOD AND APPLICATION OF BUILDING PRODUCT OF ALKALI-ACTIVATED SOLID WASTE CONSOLIDATED CARBON DIOXIDE

Abstract

[EN] The invention relates to the technical field of building products prepared from solid waste, and discloses a preparation method of a building product of alkali-activated solid waste consolidated carbon dioxide, and the preparation method comprises the following steps: step 1, mixing fly ash as a main raw material with steel slag to prepare a mixture; 2, adding an alkaline activator into the mixture obtained in the step 1, and mixing to obtain slurry; 3, putting the slurry obtained in the step 2 into a mold, and pressing to form a green body; and 4, carbonizing the molded green body obtained in the step 3 to obtain the building product. The preparation method of the building product with alkali-activated solid waste consolidated carbon dioxide has the advantages of high carbon sequestration efficiency, short carbon sequestration time, low energy consumption and high compressive strength of the product.



1st Main Claim

[MT] 1. A method for preparing a building article of alkali-excited solid waste consolidated carbon dioxide, characterized in that it comprises the steps of:

- Step 1: Mixing fly ash as a main raw material with steel slag to make a mixture;
- Step two: Adding an alkaline trigger to the mixture obtained in step one to mix to obtain a slurry;
- Step three: Placing the slurry obtained in step two into a mold and pressing the preform;
- Step 4: Carbonization of the shaped body obtained in step 3 to obtain the building article.

Assignees: XINJIANG UNIV; UNIV XINJIANG

138. Family 67956545 (CN107500589 A)

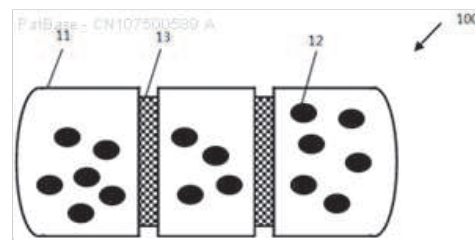
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Title

[EN] SELF-REPAIRING MICROCAPSULE CONCRETE CAPABLE OF IMMOBILIZING CARBON DIOXIDE

Abstract

[EN] The invention relates to self-repairing microcapsule concrete capable of immobilizing carbon dioxide. The microcapsule concrete comprises self-compacting concrete and first steel capsules dispersed therein, wherein each of the first steel capsules comprises a first steel capsule wall, first capsule cores and first ceramic rings, each of the first capsule cores comprises a carbon dioxide adsorbent having absorbed carbon dioxide, and the first ceramic rings are arranged at the central part of the steel capsule. The fragile ceramic rings are timely broken with stress; after breakage of the ceramic rings, carbon dioxide diffuses from the steel capsules and reacts with free calcium ions in water to produce solid calcium carbonate which fills in cracks. The self-repairing microcapsule concrete has the beneficial effects that the self-repairing microcapsule concrete realizes an intelligent self-repairing function, converts carbon dioxide into calcium carbonate so as to reduce discharge of carbon dioxide, and can recover the solid carbon dioxide adsorbent and reduce generation of solid waste.



1st Main Claim

[MT] 1. A self-repairing concrete microcapsules fixed carbon dioxide, the carbon dioxide may be fixed self-healing microcapsules concrete self-compacting concrete and comprising dispersed therein a first steel capsule, the capsule comprises a first a first steel steel, the first microcapsule core microcapsule wall, and the first ceramic ring, wherein the first capsule capsule core comprises the adsorption of carbon dioxide carbon dioxide solid sorbent, and the first ceramic ring disposed between the steel in the middle of the capsule.

Assignees: UNIV BINZHOU; BINZHOU UNIV; SHANDONG JIANZHU UNIV

139. Family 99333878 (JP2023147117 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR IMMOBILIZING CARBON DIOXIDE

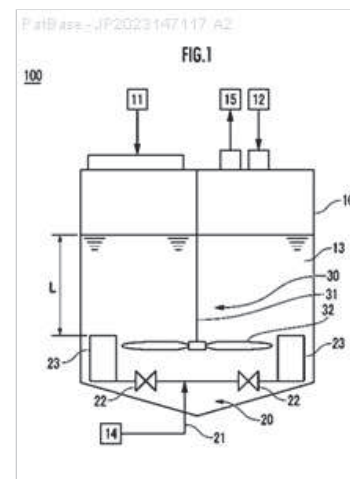
Abstract

[EN] To provide a highly efficient production method of a cement hydrate, capable of immobilizing CO₂ to a cement hydrate, and reducing the possibility of occurrence of an alkali aggregate reaction (ASR) of concrete when being added to cement. SOLUTION: A production method of a cement hydrate as a method for immobilizing CO₂ to a cement hydrate includes a CO₂ blowing step of putting a cement hydrate and water 12 into a container 10 and blowing CO₂ 14 into the container 10 while stirring the mixed liquid of the cement hydrate and the water 12. In the CO₂ blowing step, a CO₂ blowing speed is 3,600 kg/t h or less, and a CO₂ blowing amount is more than 800 kg/t. SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1. Co.₂A method of fixing the cement hydrate to a cement hydrate, the method comprising: Placing the cement hydrate and water in a container; and stirring a mixture of the cement hydrate and water to the container.₂Co blowing.₂Wherein the CO comprises a blowing step.₂In the blowing step CO₂The blowing rate is 3600 kg/t.h or less and Co.₂The blowing volume is greater than 800 kg/T.₂To a cement hydrate.

Assignees: TAIHEIYO CEMENT CORP



140. Family 103864892 (KR20240118333 A)

[View in PatBase](#)

Title

[EN] PC PC PC CONCRETE PC RETAINING WALL BLOCK COMPOSITION CONTAINING CARBON DIOXIDE FIXING MATERIAL MANUFACTURING METHOD OF CONCRETE PC RETAINING WALL BLOCK CONTAINING CARBON DIOXIDE FIXING MATERIAL AND CONCRETE PC RETAINING WALL BLOCK CONTAINING CARBON DIOXIDE FIXING MATERIAL

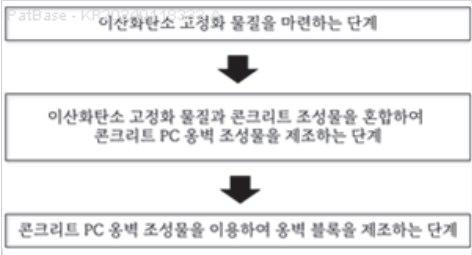
Abstract

[MT] The present invention relates to a method for preparing a concrete PC retaining wall composition , comprising the steps of : (a) providing a carbon dioxide fixing material ; (b) providing the steps of mixing the carbon dioxide fixing material and a concrete composition to prepare a concrete PC retaining wall composition ; And (c) preparing the retaining wall block by using the concrete PC retaining wall composition ; wherein the step of preparing the carbon dioxide fixing material comprises : a step of introducing solid by-products generated at the time of the CFBC (C1-1) refinery used for preparing high pressure steam by introducing together with water to form a hydration reactant ; (A-2) injecting carbon dioxide into the hydration reactant to perform a carbonation reaction to form a carbonation reaction; and (a-3) dehydrating and drying the carbonation reaction to form a carbon dioxide-immobilized material; and (a-3) forming a carbon dioxide-immobilized material.

1st Main Claim

[MT] 1. A method for preparing a concrete PC retaining wall composition , comprising the steps of : (a) preparing a carbon dioxide-fixing material ; (b) preparing a step of mixing the carbon dioxide-fixing material and a concrete composition to prepare a concrete PC retaining wall composition ; And (c) preparing the retaining wall block by using the concrete PC retaining wall composition ; wherein the step of preparing the carbon dioxide fixing material comprises : a step of introducing solid by-products generated at the time of the CFBC (C1-1) refinery used for preparing high pressure steam by introducing together with water to form a hydration reactant ; (A-2) injecting carbon dioxide into the hydration reactant to make a carbonation reaction to form a carbonation reaction; and (a-3) dehydrating and drying the carbonation reaction to form a carbon dioxide-immobilized material; and (a-3).

Assignees: SINWOO DEV CO LTD



141. Family 102149311 (CN117865536 A)

[View in PatBase](#)

Title

[EN] METHOD FOR FIXING CARBON DIOXIDE BY USING STEEL SLAG

Abstract

[EN] The invention discloses a method for fixing carbon dioxide by using steel slag, and belongs to the technical field of solid waste resource utilization, and the method comprises the following steps: S1, adding steel slag and water into a reaction kettle according to a solid-to-liquid ratio of 1: 3-1: 15, stirring, and introducing carbon dioxide gas with the concentration of 5-45 percent and a certain amount of nitrogen for reaction; s2, after the reaction is completed, the steel slag and water are separated through filtering, the steel slag subjected to carbon sequestration is obtained, and the separated water is recycled. The steel slag is used as a raw material for fixing carbon dioxide, the content of free calcium oxide in the steel slag can be effectively reduced, the stability of the steel slag can be improved while the carbon dioxide is fixed, the resource utilization rate of the steel slag is improved, and the method can be widely applied to industries such as road building and building materials to improve the utilization rate of the steel slag and reduce carbon emission.

1st Main Claim

[MT] 1. A method of fixing carbon dioxide using steel slag, comprising the steps of:

S1: Steel slag and water are added to the reaction kettle in a solids-to-liquid ratio of 1:3 to 1:15 for agitation, while carbon dioxide gas having a concentration of 5% to 45% and nitrogen gas are bubbled in to react;

S2 : After the reaction is complete, the steel slag and water are separated by filtration, resulting in carbon-fixed steel slag, separated water is recycled.

Assignees: MAANSHAN IRON AND STEEL CO LTD

142. Family 57389750 (CN104045251 A)

[View in PatBase](#)

Title

[EN] METHOD FOR CARBON DIOXIDE STRENGTHENING OF RECYCLED CONCRETE AGGREGATE

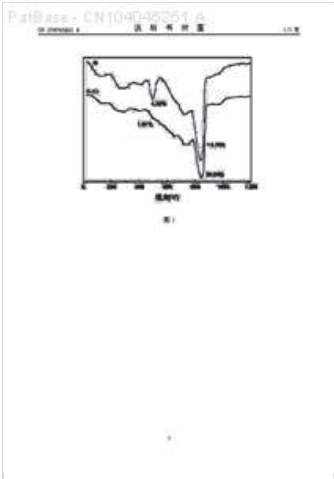
Abstract

[EN] A method for carbon dioxide strengthening of a recycled concrete aggregate comprises the following steps: (1) crushing and sieving waste concrete; (2) placing the sieved recycled concrete aggregate in a sealed container, controlling the relative humidity of 30-90 percent and the CO2 concentration of 5-90 percent, and carrying out carbonization treatment; and (3) making the treated recycled concrete aggregate particles into recycled mortar and concrete. Compared with mortar prepared from a recycled concrete aggregate without treatment, the mortar prepared from the obtained recycled concrete aggregate after CO2 strengthening treatment enables the mortar early strength to be improved by 20.1 percent -22.0 percent and the later strength to be improved by 12.1 percent -13.9 percent; the 28 d drying shrinkage value can be reduced by 7.8 percent -16.7 percent; and the 28 d water absorption rate can be reduced by 7.7 percent -13.3 percent.

1st Main Claim

[MT] 1 one carbon dioxide reinforced recycled concrete aggregate method comprising the steps of:
(1) Recycled Concrete Aggregate: The waste concrete crushing, screening, get recycled concrete fine particle size of 0. I-5mm Aggregate or particle size of 5-40mm of recycled concrete coarse aggregate; (2) CO2 strengthening treatment: after the screening of recycled concrete fine aggregate or coarse aggregate is placed in a sealed container, the control phase Humidity 30-90 percent, 5-90 percent CO2 concentration, carbonization treatment, until not completely carbonized San recycled concrete aggregate 5 percent; (3) Preparation of mortar and concrete Regeneration: The treated recycled concrete aggregate particles made of renewable mortar and coagulation earth.

Assignees: UNIV HUNAN; HUNAN UNIV



143. Family 105390053 (KR102732586 B1)

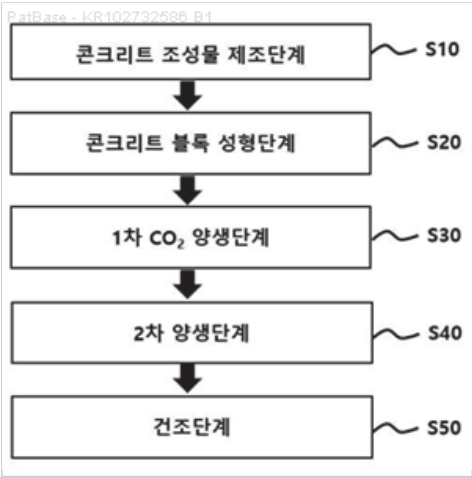
[View in PatBase](#)

Title
[EN] CONCRETE BLOCK WITH CARBON DIOXIDE CAPTURE FUNCTION

Abstract
[MT] The present invention provides a carbon dioxide-collecting concrete block comprising 85 to 100 parts by weight of a cement , 85 to 100 parts by weight of a residual aggregate , 350 to 500 parts by weight of a lime stone powder , 10 to 20 parts by weight of water and 1 to 5 parts by weight of an additive . At this time , the cement is characterized in that a CO2 reaction curing cement and a fineness-improving cement having a fineness of 4,000 to 4,500 cm2/g are mixed at a ratio of 25 to 50:50 to 75 by weight ratio . The carbon dioxide-trapping concrete block produced by mixing the CO2 reaction-cured cement and the powdery-enhancing cement according to the present invention can exhibit the compression strength and the bending strength required as a bodoblock . In addition , the carbon dioxide-collecting concrete block according to the present invention can adsorb and fix CO2 in the air inside the block in an installation environment to reduce a dioxide discharge amount , thereby providing an effect of reducing an environmental load .

1st Main Claim
[MT] 2. Deletion

Assignees: DECOPAVE CO LTD



144. Family 36063131 (JP2007190538 A2)

[View in PatBase](#)

Title

[EN] TREATMENT METHOD OF READY-MIXED CONCRETE USING CARBON DIOXIDE

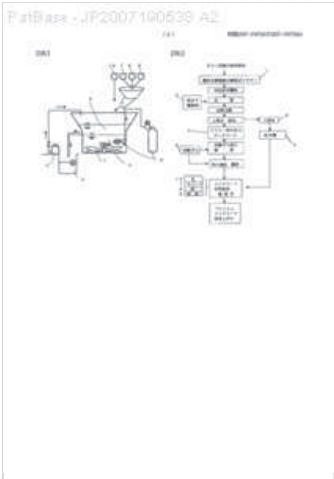
Abstract

[EN] PROBLEM TO BE SOLVED: To resolve problems wherein, research and development of ready-mixed concrete aim at curing concrete and cement technology development of an admixture shortening or delaying a coagulation time of a cement component in ready-mixed concrete, controlling of curing time by changing a blending ratio of the cement main components, according to the usage of cement, is advanced, while search on concrete with no ready-mixed concrete cured, cement components difficult to coagulate by hydration reaction have not been proceeded. SOLUTION: Water is added to ready-mixed concrete to form slurry-like ready-mixed concrete, carbon dioxide is mixed therein and agitated to change lime in the cement component into calcium carbonate, thus recycling it as a stable concrete material causing no coagulation.

1st Main Claim

[MT] 1. By using a carbon dioxide gas cleaning residue in the waste water generated from the ready-mixed concrete production facilities, by changing the properties of calcium carbonate and lime cement is a component of the wastewater, the wastewater residue processing method using a carbon dioxide-mixed concrete and drainage characteristics of the material to be reused as part of the concrete.

Assignees: KAJII SUSUMU; NOMURA TAKAYUKI



145. Family 96232762 (CN218590525 U)

[View in PatBase](#)

Title

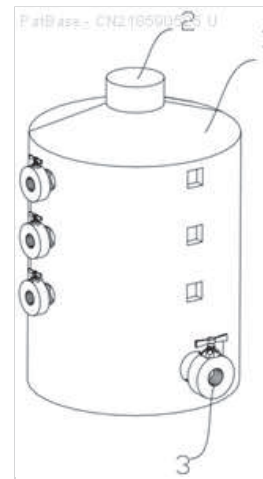
[EN] CARBON DIOXIDE MINERALIZATION RECYCLED CONCRETE AGGREGATE REACTION KETTLE

Abstract

[EN] The utility model discloses a carbon dioxide mineralization recycled concrete aggregate reaction kettle which comprises a reaction kettle shell, a feed port and a discharge port which are used for feeding and discharging are respectively arranged around the reaction kettle shell, and a vibration filtering assembly used for screening aggregate particles in advance is arranged in the reaction kettle shell. A rotary stirring assembly for promoting particle size screening and mineralization reaction is arranged in the reaction kettle shell, and a liquid spraying assembly for avoiding reduction of the reaction water-solid ratio is also arranged in the reaction kettle shell. Meanwhile, due to the fact that the stirring rod is added, the aggregate and CO₂ gas can be better subjected to contact reaction, the problem that the reaction is not thorough due to aggregate stacking of a traditional curing kettle is solved, water or a solution can be added in real time in the reaction process through the spraying opening, and the problem that the solution is uniformly added into the traditional curing kettle before curing is solved. However, due to water evaporation in the curing process, the reaction water-solid ratio is reduced.

1st Main Claim

[MT] 1. A carbon dioxide mineralized regenerated concrete aggregate reactor, characterized by comprising a reactor housing (1) with a feed opening (5) and a discharge opening (10) for feeding and discharge, respectively, one week around the reactor housing (1), A shock filter assembly for pre-screening aggregate particles is provided inside the reactor housing (1), a rotary stirring assembly for promoting particle size screening and mineralization reactions is provided inside the reactor housing (1), And a liquid spray assembly for avoiding a reduction in the reaction water to solids ratio is also provided in the reactor housing (1).



Assignees: ZHEJIANG UNIV; UNIV ZHEJIANG; QINGBULINGTAN BEIJING TECH CO LTD

146. Family 34982534 (JP2007177585 A2)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE FIXING SURFACE LAYER AND ITS MANUFACTURING METHOD

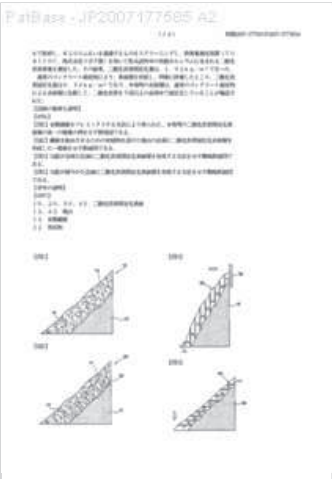
Abstract

[EN] PROBLEM TO BE SOLVED: To provide a carbon dioxide fixing surface layer capable of easily being formed in a required domain and effectively fixing carbon dioxide in the atmosphere.
SOLUTION: The carbon dioxide fixing surface layer is constituted by spraying a concrete composition containing an organic fiber 14 consisting of water, cement, admixture, aggregate and alkali decomposite resin or ultraviolet ray decomposite resin on a slope 12 or the surface of a building, and it is characterized that the carbon dioxide fixing surface layer 10 formed by providing a cavity hole resulting from the organic fiber making three dimensional orientation in the concrete composition is formed and that carbon dioxide in the atmosphere can be fixed.

1st Main Claim

[MT] 1. slope, the surface of the inner wall of the tunnel or building, water, cement, admixture, aggregates, and concrete compositions comprising organic fibers made from biodegradable plastic resin or ultraviolet alkaline degradation consists of blowing has a hollow hole due to the oriented three-dimensional organic fibers in the composition of concrete, the surface layer of carbon dioxide fixation to immobilize the carbon dioxide in the atmosphere.

Assignees: TAKENAKA DOBOKU; TAKENAKA KOMUTEN CO



147. Family 49398223 (KR20110091177 A)

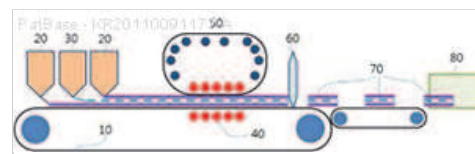
[View in PatBase](#)

Title

[EN] CONTINUOUS MANUFACTURING DEVICE FOR BUILDING MATERIAL USING MUNICIPAL SOLID WASTE INCINERATION BOTTOM ASH WITH FIXED CARBON DIOXIDE

Abstract

[EN] PURPOSE: An apparatus for continuously manufacturing construction materials using incinerated bottom ash is provided to reduce the discharge of carbon dioxide and recycling bottom ash. CONSTITUTION: A raw material(30) containing calcium carbonate which is obtained by drying municipal solid waste-based incinerated bottom ash and a plastic sheath material(20) are continuously transferred on a belt. A secondary drying process is implemented. The secondarily dried materials pass a belt press(50) equipped with a heating unit(40) in order to undergo a compressive shaping process. A cutting process is followed to obtain construction materials. The construction materials are inserted into a packing material and are sealed.



1st Main Claim

[MT] 1. Incineration ash flooring flooring material, including calcium carbonate to dry the raw material (30), the plastic outer skin material (20) continuously with a belt 10 while moving on a secondary drying after heating means (40) mounted while passing through a belt press, cut into an appropriate size, and then compression molding (60) construction, including calcium carbonate using cutting, and cut and moved in a direction perpendicular to the flooring 70, belt 10 and inserted carried in the packaging material (90) processing a sealed using a sealing device 100 is characterized in that the carbon dioxide is fixed domestic waste incineration of continuous manufacturing apparatus as building materials using the flooring.

Assignees: KOREA INST GEOSCIENCE AND MINERA; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES

148. Family 97973370 (IN202321036002 A)

[View in PatBase](#)

Title

[EN] METHOD OF MAKING ATMOSPHERIC CARBON DIOXIDE CAPTURE PAINTS FOR WALL OR ANY SOLID SURFACE FROM COAL FLY ASH / BOTTOM ASH OR OTHER BIOMASS ASH

Abstract

[EN] The present invention deal with the method of preparing a paints from coal fly/bottom ash or other biomass ash least contain 30 percent silica which is capable capture atmosphere carbon dioxide through chemisorption. sodium /potassium hydroxide react with reactive silica present in coal fly/bottom ash or other biomass ash to form reactive sodium /potassium silicate This reactive sodium /potassium silicate react easily to atmosphere carbon dioxide at normal temperature and pressure to form solid sodium/potassium carbonate which remain fix on wall or any surface along with paints, while precipitated. silica prepared by neutralizing the reactive sodium /potassium silicate provided large surface area for this reaction also this silica act as an extender, filler, an agent enhance gloss. This paints also resistant to were and tear of atmosphere and maintain its colour, smoothness and finish for long time. One litre of such paints able to capture 350gm of CO₂ said method is consisting of preparation of precipitated. silica and reactive sodium silicate from coal /bottom ash or other biomass ash then mix this precipitated silica and reactive sodium silicate with other ingredient of paints such as binder, alkali stable surfactant, deforming agent, biocide, colour. The said paints has basic advantage that along the function of paints it also capture atmospheric carbon dioxide. ie One straightforward solution is proposed to address two issues simultaneously.

1st Main Claim

[EN] 1. Carbon dioxide capture paints comprises of fly ash and other biomass ash contain least 30 percent silica

149. Family 58962439 (RU151756 U1)

[View in PatBase](#)

Title

[MT] RAW MIX FOR production of cellular concrete, hardening in carbon dioxide

Abstract

[MT] The raw material mixture for the production of cellular aerated solidifying carbon dioxide in a medium containing a filler, a binder, a pore former and water, wherein the waste is used as a filler and processing stone sawing shell limestone, and as an astringent substance - calcium hydrated lime with following proportion of dry matter, by weight. percent: wherein the blowing agent is administered in an amount of 0,07-0,2 wt. percent of the total weight of the filler and binder on a dry matter basis, in addition, to the raw mixture of solids introduced into the solution by mixing water and a blowing agent in an amount of 40-60 wt. percent of the total weight of said components of the dry matter.

1st Main Claim

[MT] The raw material mixture for production of cellular aerated solidifying carbon dioxide in a medium containing a filler, a binder, a pore former and water, wherein the waste is used as a filler and processing stone sawing shell limestone, and as binder - calcium hydrated lime with the following ratio of the dry matter, by weight. percent:

Slaked lime calcium	15-45
and stone sawing waste processing izvestnyaka- limestone	55-85

In this case, the blowing agent is administered in an amount of 0,07-0,2 wt. percent of the total weight of the filler and binder on a dry matter basis, in addition to the raw mixture of solids introduced into the solution by mixing water and a blowing agent in an amount of 40-60 wt. percent of the total weight of said components on a dry matter basis.

150. Family 92195092 (KR20220094624 A)

[View in PatBase](#)

Title

[EN] ACCELERATED CARBONATION OF RECYCLED AGGREGATES AND STEEL-MAKING USING THE PRESSURIZED SUPERCRITICAL CARBON DIOXIDE SPARGING PROCESS

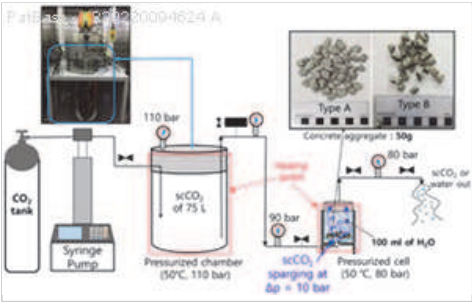
Abstract

[EN] The present invention relates to a method for promoting pH neutralization of recycled aggregate and steelmaking slag, including the steps of: injecting recycled aggregate and/or steelmaking slag and water into a reaction cell; and injecting supercritical carbon dioxide at high pressure into the reaction cell.

1st Main Claim

[MT] 1. A method for promoting neutralization of circulating aggregate and steel slab using an injection method of supercritical carbon dioxide, the method comprising: introducing the circulating aggregate and/or steel slab and water into a reaction cell; and injecting supercritical carbon dioxide into the reaction cell at a high pressure.

Assignees: PUKYONG NATIONAL UNIV IND UNIV COOPERATION FOUNDATION; NAT UNIV PUKYONG IND UNIV COOP FOUND



151. Family 87750950 (JP2021169398 A2)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE STORAGE METHOD AND CEMENT-BASED HARDENED BODY

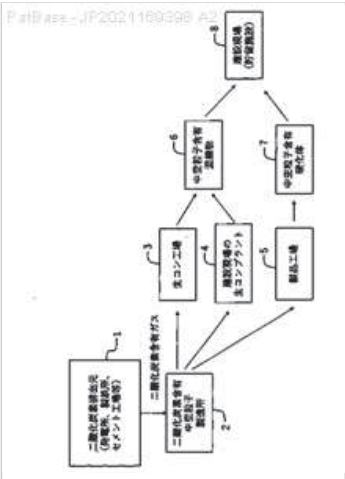
Abstract

[EN] To provide a storage method of carbon dioxide or the like, in which the execution place is not limited to the vicinity of a site where a carbon dioxide-containing gas is generated, a large facility or the like is not required, and it can be easily carried out.SOLUTION: A hollow body containing a carbon dioxide-containing gas is produced, and the hollow body is stored in a cement-based hardened body. The hollow body is mixed with one of the cement-based materials and kneaded together with other cement-based materials to form a cement kneaded material, and the cement kneaded material can be cured. The hollow body can be kneaded with a cement-based material to form a cement kneaded material, and the cement kneaded material may be cured. The cement-based material is kneaded to form a cement kneaded material, and the hollow body may be mixed with the cement kneaded material and then cured. The hollow body containing the carbon dioxide-containing gas is produced in a facility discharging carbon dioxide-containing gas, and the hollow body can be stored in the cement-based hardened body in the facility other than the facility discharging the carbon dioxide-containing gas.SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1.A method for storing carbon dioxide, comprising: producing a hollow body containing a carbon dioxide-containing gas; and storing the hollow body in a cement-based hardened body.

Assignees: TAIHEIYO CEMENT CORP



152. Family 106676516 (CN119430797 A)

[View in PatBase](#)

Title

[EN] FLUIDIC SOLIDIFIED SOIL FOR TRAPPING AND IMMOBILIZING CARBON DIOXIDE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention discloses a preparation method of flow-state solidified soil for capturing and immobilizing carbon dioxide, which comprises the following steps: step 1, carrying out cross-linking reaction and pyrolytic reaction on coal pitch and an organic high-molecular polymer solution at 300-450 degrees centigrade to obtain porous coal pitch particles, the organic high-molecular polymer solution at least comprises any one of a polyacrylonitrile solution and a polyvinylpyrrolidone solution; and 2, mixing the porous coal pitch particles, cement, fly ash, clay, water and an efficient water reducing agent, and stirring to form the flow-state solidified soil for capturing and immobilizing carbon dioxide. The prepared flow-state solidified soil has excellent carbon dioxide capturing, utilizing and storing capacity, is small in environmental pollution, and can meet the requirements for strength, durability and fluidity of the flow-state solidified soil in engineering application at the same time.

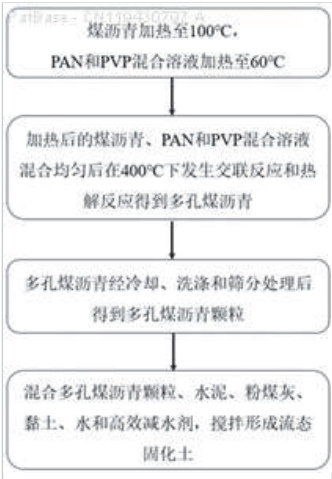
1st Main Claim

[MT] 1. A method for preparing fluidized solidified soil for capturing and storing carbon dioxide, characterized in that the method comprises:

Step 1, crosslinking reaction and pyrolysis reaction of coal tar and organic polymer solution at 300-450 degrees centigrade to obtain porous coal tar particles, wherein the organic polymer solution comprises at least one of polyacrylonitrile solution and polyvinyl pyrrolidone solution;

Step 2: Mix the porous coal tar particles, cement, fly ash, clay, water and high-efficiency water reducing agent, and stir to form a fluidized solidified soil for capturing and storing carbon dioxide.

Assignees: SHANGHAI CIVIL ENG CO LTD OF CREC; SHANGHAI CIVIL ENGINEERING CO LTD OF CREC



153. Family 74777378 (US2020290925 AA)

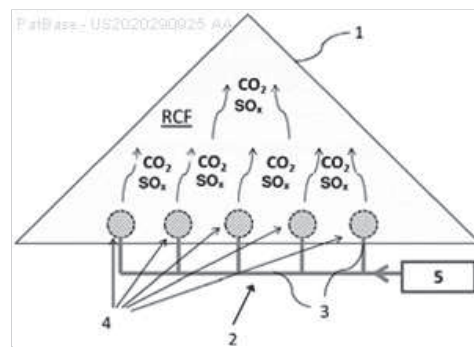
[View in PatBase](#)

Title (EP3724147 B1)

[EN] METHOD FOR SIMULTANEOUS EXHAUST GAS CLEANING AND MANUFACTURING OF SUPPLEMENTARY CEMENTITIOUS MATERIAL

Abstract

[EN] A method for manufacturing a binder of a hydratable material includes providing a starting material from one or more raw materials convertible by tempering at 600 to 1200 degrees centigrade into the hydratable material and tempering the starting material to provide the hydratable material containing not more than 10 percent by weight monocalcium silicate and at least 15 percent by weight hydratable phases in the form of lime and dicalcium silicate. The residence time and the tempering temperature are adapted to obtain the hydratable material by converting not more than 80 percent by weight of the starting material, and the hydratable material is then cooled to provide the binder comprising the hydratable material. The binder can be mixed with water and optionally one or more of aggregate, additives, admixtures to obtain a binder paste that is placed, hydrated and carbonated to produce a building product.



1st Main Claim (EP3724147 B1)

[EN] 1. Method for simultaneous cleaning of exhaust gas from CO₂ and manufacturing a supplementary cementitious material from recycled concrete fines, comprising the steps:

- - providing recycled concrete fines with d₉₀ less than or equal to 1000 micrometres in a stockpile or silo as starting material
- - flushing the starting material with the exhaust gas providing a carbonated material,
- - withdrawing the carbonated material and cleaned exhaust gas, and
- - de-agglomerating the carbonated material to form the supplementary cementitious material.

Assignees: HEIDELBERGCEMENT AG; HCONNECT 2 GMBH

154. Family 107355983 (JP2025044026 A2)

[View in PatBase](#)

Title
[MT] PLASTIC INJECTION MATERIAL AND CARBON DIOXIDE EMISSION CONTROL METHOD

Abstract
[MT] [Problem] To provide a plastic injection material that has fluidity and hardened strength equivalent to conventional plastic injection materials while suppressing carbon dioxide emissions, and a method for adjusting the amount of carbon dioxide emissions during the production of the same. [Solution] The plastic injection material contains a carbon dioxide absorbent, cement, and bentonite. [Selected Figures] None

1st Main Claim
[MT] A plastic injection material characterized by containing a carbon dioxide absorbent, cement, and bentonite.

Assignees: OHBAYASHI CORP

155. Family 108102739 (CN120025145 A)

[View in PatBase](#)

Title

[MT] SOLID WASTE-BASED 3D PRINTING CONCRETE MATERIAL BASED ON CARBON DIOXIDE MINERALIZATION AND BIOCHAR MODIFICATION AND PREPARATION METHOD THEREOF

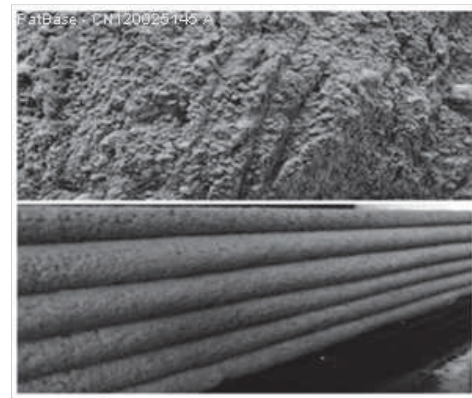
Abstract

[MT] [0001] The present invention discloses a solid waste-based 3D printing concrete material based on carbon dioxide mineralization and biochar modification and a preparation method thereof, a solid waste-based 3D printing concrete material based on carbon dioxide mineralization and biochar modification, a 3D printing concrete material comprising a carbon dioxide mineralization material, a solid waste material and a 3D printing coarse aggregate ink material, a 3D printing coarse aggregate ink material comprising a 3D printing mortar ink material and ink materials of different particle sizes, a 3D printing mortar ink material being an ink material, a silicate cement, an aggregate and a water mixture, and an ink material comprising the following components by weight percentage: 6 percent to 7 percent cement, 0.5 percent to 1.5 percent fly ash, and 0.5 percent to 1.5 percent mineral powder. Compared with the prior art, the solid waste-based 3D printing concrete material based on carbon dioxide mineralization and biochar modification of the present invention and a preparation method thereof combine the advantages of carbon dioxide mineralization technology, biochar modification and solid waste utilization, aiming to achieve green, low-carbon and high-performance materials.

1st Main Claim

[MT] 1. A solid waste-based 3D printing concrete material based on carbon dioxide mineralization and biochar modification, characterized in that: the 3D printing concrete material comprises a carbon dioxide mineralization material, a solid waste material and a 3D printing coarse aggregate ink material;

The 3D printing coarse aggregate ink material includes a 3D printing mortar ink material and ink materials with different particle sizes.



156. Family 50503388 (KR101094859 B1)

[View in PatBase](#)

Title

[EN] ECO-FRIENDLY BRICK REDUCING CARBON DIOXIDE AND METHOD FOR MANUFACTURING THE SAME

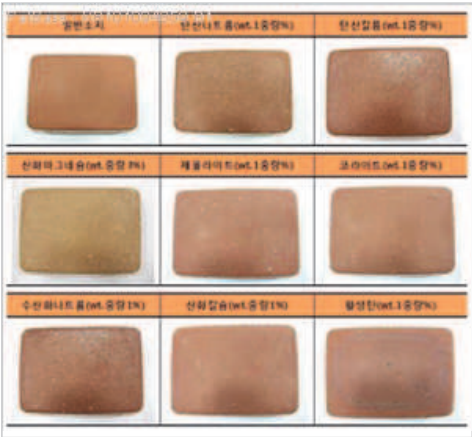
Abstract

[EN] PURPOSE: An environmentally-friendly brick having a carbon dioxide reduction function and a manufacturing method thereof are provided to improve the carbon dioxide adsorption capacity of a brick without degradation of other properties. CONSTITUTION: A method for manufacturing an environmentally-friendly brick having a carbon dioxide reduction function comprises steps of: mixing yellow soil or kaolin 60~70 weight percent, granite soil or silica 27~39 weight percent, and mineral having a carbon dioxide reduction function 0.5~3 weight percent, molding the mixture, drying the molded product at 50~100 degrees centigrade for 50~60 hours in a dryer, preheating the dried molded product at 600~800 degrees centigrade for 12~14 hours, and plasticizing the preheated molded product at 1000~1300 degrees centigrade for 20~30 hours.

1st Main Claim

[MT] 5. (A) 60-70% by weight of kaolin, ocher or silica sand 27-39% by weight, or as a mineral and carbon dioxide reduction function comprising: mixing a 0.5-3% by weight; (b) shaping the mixture; (c) by preparing a molded article The molded article in a dryer for drying for 50-60 hours at 50-100 °C; (d) 12 to 14 hours at 600 to 800 degrees centigrade The dried molded product; and (e) the step of pre-heating the pre-heated to the 1000~1300 °C 20-30 hours, comprising the step of firing the carbon dioxide reduction function of manufacturing vehicles with a brick.

Assignees: SAMHANC1 CO LTD



157. Family 108119536 (KR102814144 B1)

[View in PatBase](#)

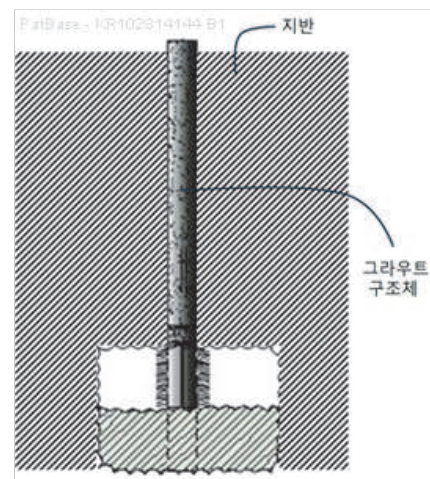
Title

[EN] WATER BLOCKING GROUTING METHOD USING GROUT MATERIAL WITH FIXED CARBON DIOXIDE

Abstract

[MT] The present invention relates to a water-proof grouting method using a grout material that fixes carbon dioxide.

The grouting method according to the present invention comprises the steps of: forming an injection hole by boring a ground requiring a waterproofing seal; inserting a grout injection pipe into the injection hole and sealing it; and spraying and curing grout through the injection pipe. The grout is manufactured and used directly at a construction site and comprises 40 to 90 wt percent of cement slurry obtained by mixing and stirring cement and water; and 10 to 60 wt percent of a reactive mixture. The reactive mixture is characterized in that it comprises calcium carbonate formed through a carbon mineralization reaction by mixing and stirring water into a powdery industrial by-product composed of 15 wt percent or more of CaO , 25 wt percent or more of SiO_2 , 30wt percent or less of Al_2O_3 , and 15 wt percent or less of Fe_2O_3 .



1st Main Claim

[MT] It includes a step of forming an injection hole by boring the ground requiring grouting, a step of inserting a grout injection pipe into the injection hole and sealing it, and a step of spraying grout through the injection pipe and curing it.

The above grout material comprises 40 to 90 wt percent of cement slurry mixed and stirred with cement and water and 10 to 60 wt percent of reactive mixture.

The above reactive mixture is a grouting method characterized in that it comprises calcium carbonate formed through a carbon mineralization reaction by injecting carbon dioxide into a slurry made by mixing and stirring water into a powdery industrial by-product composed of 15 to 60 wt percent of CaO , 25 to 50 wt percent of SiO_2 , 10 to 30 wt percent of Al_2O_3 , and 1 to 15 wt percent of Fe_2O_3 .

Assignees: ZERO NEXT MAT CO LTD; SCMKEUMYOUNG CO LTD

158. Family 106955894 (JP2025029765 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR ESTIMATING AMOUNT OF CARBON DIOXIDE FIXED IN RECYCLED COARSE AGGREGATE

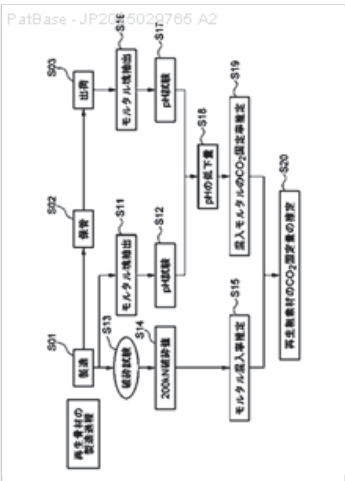
Abstract

[EN] To provide a method for estimating the amount of carbon dioxide fixed in recycled coarse aggregate, which enables the amount of carbon dioxide fixed by the recycled coarse aggregate during a storage period to be estimated in a short period of time. SOLUTION: A method includes: measuring pH of a sample of mixed mortar obtained from recycled a coarse aggregate after production and before storage; estimating a mortar mixing rate of a mixed mortar contained in the recycled coarse aggregate based on a crushing value obtained by a crushing test conducted using samples taken from the recycled coarse aggregate before storage or during storage after production; measuring pH of a sample of the mixed mortar obtained from the recycled coarse aggregate at the time of shipment after storage; calculating a decrease in pH of the mixed mortar during the storage period from the pH measurement results; estimating a CO₂ fixation rate of the mixed mortar during the storage period based on the decrease in pH; and estimating an amount of CO₂ fixed by the recycled coarse aggregate during the storage period based on the estimated mortar mixing rate and CO₂ fixation rate. SELECTED DRAWING: Figure 1

1st Main Claim

[MT] A method for estimating the amount of carbon dioxide fixed by recycled coarse aggregate during a storage period from production of the recycled coarse aggregate from concrete blocks to shipment, comprising:
A first step of obtaining a sample of mixed mortar from the recycled coarse aggregate after production and before storage and measuring the pH;
A second step of performing a crushing test using a sample taken from the recycled coarse aggregate after production and before or during storage to obtain a crushing value of the recycled coarse aggregate;
A third step of estimating a mortar mixing ratio of the mixed mortar contained in the recycled coarse aggregate based on the crushing value;
A fourth step of obtaining a sample of mixed mortar from the recycled coarse aggregate after the storage and at the time of shipping and measuring the pH;
A fifth step of calculating a decrease in pH of the mixed mortar during the storage period from the pH measurement results of the first step and the fourth step;
A sixth step of estimating the CO₂ fixation rate of the mixed mortar during the storage period based on the decrease in pH;
and a seventh step of estimating the amount of CO₂ fixed by the recycled coarse aggregate during the storage period based on the mortar mixing rate in the third step and the CO₂ fixation rate in the sixth step.

Assignees: PENTA OCEAN CONSTRUCTION CO LTD; PENTA OCEAN CONSTRUCTION



159. Family 54046033 (DE102011088117 A1)

[View in PatBase](#)

Title

[EN] PRODUCING FILLER OR COATING PIGMENT USEFUL FOR PAPER- OR CARDBOARD PRODUCTION, FROM THERMALLY TREATED SOLIDS, COMPRISES SUSPENDING SOLIDS IN WATER OR AQUEOUS SOLUTION, AND PASSING OBTAINED SUSPENSION THROUGH CARBON DIOXIDE-CONTAINING GAS

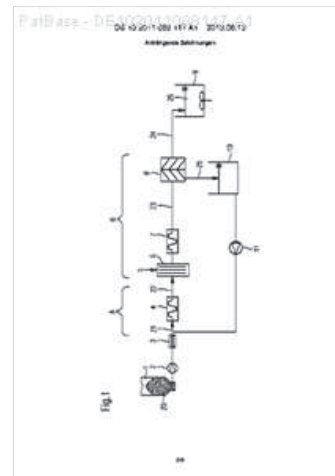
Abstract

[EN] Producing filler or coating pigment for paper- or cardboard production, from thermally treated solids, which are: prepared from calcium and kaolin; are thermally treated in a combustion process at 600-850[deg] C, preferably 700-780[deg] C; discharged with a gas stream that is removed from the combustion process; and are separated from the gas stream in a filter unit, comprises suspending the separated thermally treated solids in water or aqueous solution, and passing the obtained suspension through a carbon dioxide-containing gas (5) or spraying the suspension into the carbon dioxide-containing gas. Producing filler or coating pigment for paper- or cardboard production, from thermally treated solids, which are: prepared from raw materials comprising calcium and kaolin; are thermally treated in a combustion process at 600-850[deg] C, preferably 700-780[deg] C; discharged with a gas stream that is removed from the combustion process; and are separated from the gas stream in a filter unit, comprises (a) suspending the separated thermally treated solids in water or aqueous solution, and (b) passing the obtained suspension through a carbon dioxide-containing gas or spraying the suspension into the carbon dioxide-containing gas exhibiting a carbon dioxide content of at least 5 vol. percent, based on dry gas.

1st Main Claim

[MT] 1 A process for producing a filler (24) or coating pigment for paper or paperboard production of thermally treated solids (20), which consists of raw material, the calcium and kaolin contains was prepared, and which in a combustion process at a temperature of 600-850 degrees centigrade, preferably 700-780 degrees centigrade, was thermally treated **Characterized** that the solids thermally treated is a Gasstroemung who is leaving the combustion process, discharged and separated from this Gasstroemung in a filter unit, then the separated solid was heat-treated (20) in a first step (A) is suspended in water or aqueous solution, and in a second step (B), the suspension (22) with a CO₂-containing gas (5) durchstroemt or in a CO₂-containing gas is sprayed which has a CO₂ content of at least 5 volume percent, based on the dry gas.

Assignees: VOITH PATENT GMBH



160. Family 58406516 (UA67259 U)

[View in PatBase](#)

Title

[EN] PROCESS FOR THE PRODUCTION OF POROUS GAS CONCRETE HARDENED IN CARBON DIOXIDE MEDIUM

Abstract

[EN] A process for the production of porous gas concrete hardened in carbon dioxide medium comprises the preparation of cellular mixture in mixing device, pouring of mixture into molds and its foaming, getting of necessary plastic strength, further hardening. The cellular mixture is prepared on the basis of burnt calcium lime, carbonate filler, foaming agent and water. Foaming of mixture is carried out in preparatory chamber, and its further hardening is carried out in carbonization chamber by supply of lime burner flue gases containing 20-40 percent of carbon dioxide.

Assignees: NAT ACADEMY OF ENVIRONMENT AND RESORTS CONSTRUCTION

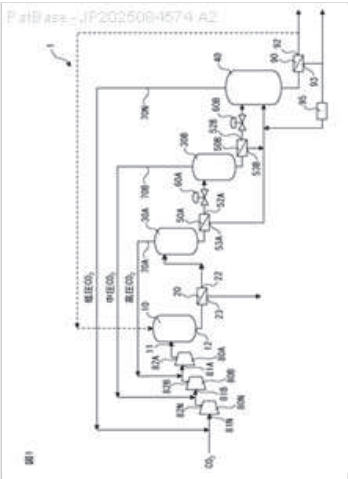
161. Family 108214440 (JP2025084574 A2)

[View in PatBase](#)

Title
[MT] CO2 FIXATION DEVICE AND CO2 FIXATION METHOD

Abstract
[MT] [Problem] To provide a CO2 fixation device and a CO2 fixation method that can increase the precipitation efficiency of alkaline earth metal carbonates while reducing the costs of equipment and energy related to CO2 fixation. [Solution] One or more vacuum tanks and crystallization tanks connected in series are arranged downstream of an extraction tank that extracts alkaline earth metals, and alkaline earth metal carbonates are precipitated while gradually reducing the pressure in the vacuum tank and crystallization tank, and the alkaline earth metal carbonates precipitated in the vacuum tank are supplied to the crystallization tank as seed crystals, and the CO2 gas generated in the vacuum tank and crystallization tank are each pressurized and supplied to the extraction tank. [Selected Figure] Figure 1

1st Main Claim
[MT] An extraction tank equipped with a CO2 gas supply port and a slurry discharge port; a first solid-liquid separation device having a liquid phase outlet connected to the slurry outlet of the extraction tank; one or more pressure reduction tanks, where when the one or more pressure reduction tanks are two or more, the one or more pressure reduction tanks are connected in series with each other, and the most upstream pressure reduction tank among the one or more pressure reduction tanks is connected to the liquid phase outlet of the first solid-liquid separation device; a crystallization tank connected to a most downstream pressure reduction tank among the one or more pressure reduction tanks; a second solid-liquid separation device and a pressure reducing valve downstream of the second solid-liquid separation device, the second solid-liquid separation device being disposed between a most downstream pressure reducing tank among the one or more pressure reducing tanks and the crystallization tank; When the one or more pressure reduction tanks are two or more, one or more second solid-liquid separation devices and one or more pressure reduction valves downstream of the one or more second solid-liquid separation devices are disposed between the one or more pressure reduction tanks, respectively; A plurality of CO2 gas recovery pipes connected to the one or more decompression tanks and the crystallization tank, respectively; A plurality of compressors having a primary side and a secondary side and connected in series, the CO2 gas supplied to the primary side is pressurized and discharged from the secondary side, and the secondary side of the most downstream compressor among the plurality of compressors is connected to the CO2 gas supply port; A CO2 fixation device comprising: The primary sides of the plurality of compressors are each connected to one of the plurality of CO2 gas recovery pipes so that the pressure of the CO2 gas supplied to the primary sides of the plurality of compressors increases from the upstream side to the downstream side, A CO2 fixation apparatus, wherein the solid phase enrichment side of the second solid-liquid separation device is connected to the crystallization tank.



162. Family 60819566 (JP2015189617 A2)

[View in PatBase](#)

Title

[EN] METHOD OF DETERMINING WHETHER OR NOT RECYCLED AGGREGATE CAN BE EXPECTED TO SHOW QUALITY IMPROVEMENT EFFECT DUE TO ADSORPTION OF CARBON DIOXIDE

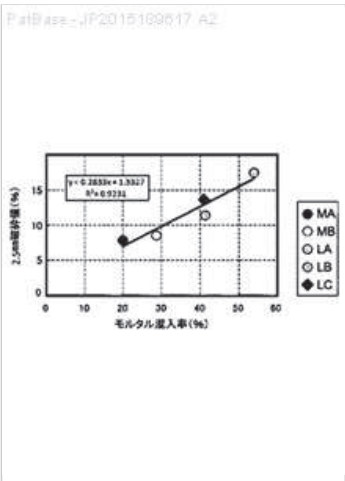
Abstract

[EN] PROBLEM TO BE SOLVED: To provide a method which enables determining whether or not recycled aggregate can be expected to show quality improvement effects due to adsorption of carbon dioxide without measuring a mortar contamination ratio of the recycled aggregate.SOLUTION: A method of determining whether or not recycled aggregate can be expected to show quality improvement effects due to adsorption of carbon dioxide is characterized by using the crushing value and/or the carbon dioxide adsorption ratio of recycled aggregate as indicator. Quality improvement effects of recycled aggregate due to adsorption of carbon dioxide include a dry shrinkage reduction effect when the recycled aggregate is used in concrete.

1st Main Claim

[MT] 1. Is characterized by the crush values and / or carbon dioxide adsorption percentage indication of the recycled aggregate, the quality improvement due to the adsorption of carbon dioxide a method of determining whether or not the recycled aggregate that can be expected.

Assignees: TOKYO TECHNO CO LTD; SHIBAURA INST TECHNOLOGY



163. Family 52667325 (WO13002542 A2)

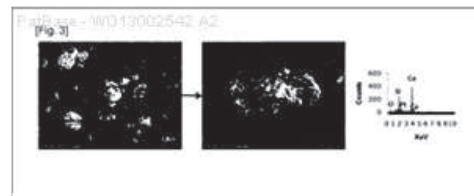
[View in PatBase](#)

Title

[EN] METHOD FOR FIXING CARBON DIOXIDE USING WASTE

Abstract

[EN] Provided is a method for fixing carbon dioxide using waste. First, it is possible to make a material containing asbestos to be harmless to improve the fixation efficiency of carbon dioxide and to generate a raw material for cement through carbonate mineralization by heat treating an material containing asbestos at 710-840°, injecting a carrier solution, and injecting carbon dioxide. In addition, it is possible to fix carbon dioxide using the reaction of asbestos board waste and carbon dioxide and to employ calcium carbonate, a synthesized final product, as a raw material for cement by pulverizing an asbestos board, injecting the pulverized asbestos board into a carrier solution to prepare an asbestos board solution, injecting carbon dioxide into the asbestos board solution to fix carbon dioxide, and heat treating the same so as to make asbestos harmless. Furthermore, it is possible to fix carbon dioxide through the synthesis of calcium carbonate (calcite) using the reaction of asbestos board waste and carbon dioxide and to employ calcium carbonate, a synthesized final product, as a raw material for cement by injecting an asbestos board into a carrier solution to form slurry, injecting carbon dioxide into the slurry, and pressurizing and heating the same at 0.1-0.5 MPa and at 100-150°, respectively.



1st Main Claim

[MT] 710 degrees centigrade asbestos-containing building material heat-treated at a temperature of to 840 degrees centigrade; and asbestos-containing material to the heat-treated solution was added to the reaction solution, and the mediator medium comprising the step of injecting the carbon dioxide to the carbon dioxide fixation waste.

Assignees: UNIV NAT CHONNAM IND FOUND; YOON SUNG JUN; ROH YUL

164. Family 58406520 (UA67261 U)

[View in PatBase](#)

Title

[EN] RAW MIXTURE FOR THE PRODUCTION OF POROUS HARDENING GAS CONCRETE IN CARBON DIOXIDE MEDIUM

Abstract

[EN] A raw mixture for the production of porous gas concrete hardened in carbon dioxide medium contains filler, binder, foaming agent and water. Waste of shell limestone cutting and processing is used as filler, and burnt calcium lime is used as binder – in the following ratio of dry substances, weight percent:- burnt calcium lime – 15-45;- waste of shell limestone cutting and processing – 55-85. The foaming agent is added in quantity of 0.07-0.2 percent from total weight of filler and binder in dry matter equivalent. To the raw mixture of dry substances, while mixing a solution of water and foaming agent is added in quantity of 40-60 weight percent of total weight of above mentioned components in dry matter equivalent.

Assignees: NAT ACADEMY OF ENVIRONMENT AND RESORTS CONSTRUCTION

165. Family 49398220 (KR20110091176 A)

[View in PatBase](#)

Title

[EN] BUILDING MATERIAL USING MUNICIPAL SOLID WASTE INCINERATION BOTTOM ASH WITH FIXED CARBON DIOXIDE

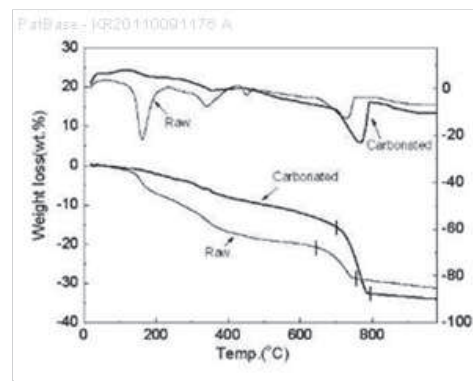
Abstract

[EN] PURPOSE: A construction material using the bottom ashes of domestic waste with carbon dioxide is provided to reduce the emission of carbon dioxide by stably fixing the carbon dioxide. CONSTITUTION: A construction material using the bottom ashes of domestic waste with carbon dioxide is composed as follows. A bottom ash slurry is produced by mixing the bottom ashes of domestic waste with distilled water and stirring the mixture. The slurry is reacted with carbon gas to produce carbon dioxide. The produced carbon dioxide is fixed to a bottom ash gel. The bottom ash gel is dried and is injected as the core of a plastic sheath.

1st Main Claim

[MT] 1. A municipal waste incineration ash, ground and prepared by mixing and stirring distilled water slurry of carbonic acid gas incineration ash from PH 6 to PH 12.5 prepared by reacting a carbonic acid gas while adjusting the gel after drying the carbon dioxide is fixed, plastic outer shell of incineration flooring as producing the injection and sealing material characterized in that the carbon dioxide is fixed domestic waste incineration flooring construction materials using the same.

Assignees: KOREA INST GEOSCIENCE AND MINERA; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES



166. Family 43078131 (CN101381217 A)

[View in PatBase](#)

Title

[EN] BUILDING MATERIAL BASED ON INTERACTION OF ALKALI AND CO₂

Abstract

[EN] The invention discloses a building material product based on the synergic action between alkali and CO₂ and a method for preparing the same, which belongs to the field of silicate building material and product thereof. In the building material product, the fly ash the fineness of which is controlled in the range of between 400 and 600m²/Kg and the slag form a mixed powder material, and an aggregate and water glass are added into the mixed powder material for forming so as to obtain a blank, and the blank is subjected to natural curing and carbonization to obtain the building material product. In the invention, the industrial waste slag is used as raw materials, the high-performance silicate product is prepared under the conditions of low alkali and not doping lime and cement clinker, so that the strength level is high, no scumming phenomenon occurs on the surface of the product, the release quantities of various toxic and harmful ions are far below the threshold value; moreover, the building material product has the advantages of good durability, strong freezeproof and weather resistance capabilities, and is suitable to be the building wall material. The invention has active effect on utilizing waste slag resources, saving energy and reducing emission.

1st Main Claim

[MT] 1, based on the base and CO₂ synergy building materials, is controlled within 400~ 600m² / Kg by the scope of the fineness of fly ash and slag composition mixed powder, mixed with aggregate and water glass molding obtained blank, and then by The Nature Conservancy, obtained after carbonization.

Assignees: CHINA BUILDING MAT ACADEMY

167. Family 106684576 (JP2025022444 A2)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE ADSORPTION METHOD, REGENERATED BUILDING MATERIAL GENERATION METHOD, AND ASPHALT MIXTURE MANUFACTURING METHOD

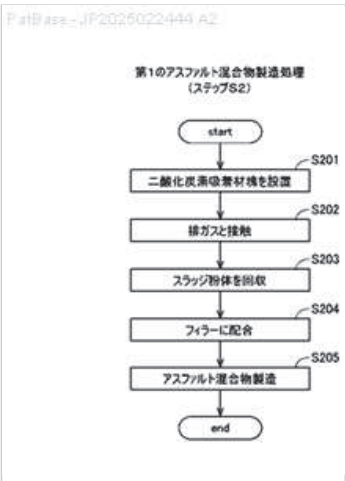
Abstract

[EN] To provide a carbon dioxide adsorption method, regenerated building material generation method, and an asphalt mixture manufacturing method, capable of efficiently consuming concrete sludge by adsorbing carbon dioxide.SOLUTION: The carbon dioxide adsorption method, regenerated building material generation method, and asphalt mixture manufacturing method include the steps of: a) molding a dehydrated cake of concrete sludge to obtain a carbon dioxide adsorbent block; and b) bringing the carbon dioxide adsorbent block into contact with an exhaust gas stream containing carbon dioxide and dust. This ensures that carbon dioxide is adsorbed and the concrete sludge can be efficiently consumed.SELECTED DRAWING: Figure 3

1st Main Claim

[MT] a) forming a dehydrated cake of concrete sludge to obtain a carbon dioxide adsorbent mass; b) contacting the mass of carbon dioxide sorbent with a stream of exhaust gas containing carbon dioxide and dust;
A method for adsorbing carbon dioxide in exhaust gas, comprising:

Assignees: NIKKO CO LTD; NIKKO KK



168. Family 92450491 (US2022227677 AA)

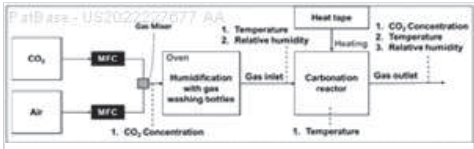
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Title

[EN] CARBONATION SYSTEM FOR CURING OF CONCRETE PRODUCTS AT AMBIENT PRESSURE

Abstract

[EN] Provided herein are systems for carbonation curing and CO₂ mineralization of concrete composites and methods of manufacturing a carbonated concrete composite. A method of manufacturing a carbonated concrete composites includes contacting concrete with CO₂-containing gas streams in the carbonation reactor having a gas stream inlet and an outlet to provide optimal gas flow distribution and gas velocity. The concrete precursor includes a binder, one or more aggregates, and water. A gas stream is received at the carbonation reactor. The gas stream includes carbon dioxide. The concrete precursor is maintained at a suitable temperature in the carbonation reactor to thereby react the concrete precursor with the gas stream to produce carbonate minerals in the carbonated concrete composite.



1st Main Claim

[EN] 1. A method of manufacturing a carbonated concrete composite, the method comprising: placing a concrete precursor into a carbonation reactor for carbonation curing, the concrete precursor comprising a binder, one or more aggregates, and water, and the carbonation reactor having at least one gas stream inlet and an outlet; receiving a gas stream at the at least one inlet of the carbonation reactor, the gas stream comprising carbon dioxide; maintaining a suitable temperature, relative humidity, CO₂ amount, gas stream flow rate, or a combination thereof in the carbonation reactor so a carbonation rate constant of the concrete precursor is at or above 0.005 to thereby react the concrete precursor with the gas stream and form the carbonated concrete composite.

Assignees: MEHDIPOUR IMAN; GUPTA RAGHUBIR; FALZONE GABRIEL D; SANT GAURAV N; SIMONETTI DANTE

169. Family 98322321 (CN116496061 A)

[View in PatBase](#)

Title

[EN] HIGH-CO₂-ADSORPTION-CAPACITY BUILDING MATERIAL PREPARED BY DOPING MODIFIED SiO₂ AEROGEL INTO CALCIUM-RICH SOLID WASTE AND METHOD

Abstract

[EN] The invention relates to the technical field of carbon dioxide capture and utilization, in particular to a high-CO₂-adsorption-capacity building material prepared by doping modified SiO₂ aerogel into calcium-rich solid waste and a method. Comprising the following raw materials in parts by weight: 50 to 100 parts of desulfurized gypsum, 0 to 30 parts of steel slag, 0 to 50 parts of fly ash, 0 to 30 parts of carbide slag, 0.5 to 4 parts of a carbonization activator, 0.04 to 0.08 part of a retarder, 0.1 to 0.4 part of a water reducing agent, 0.1 to 0.3 part of a defoaming agent, 0.07 to 0.12 part of a thickening agent, 1 to 5 parts of modified SiO₂ aerogel and 50 to 65 parts of water. The building material test block prepared by doping the modified SiO₂ aerogel into the calcium-rich solid waste has good carbon adsorption performance, the carbon sequestration capacity of the building material test block can be enhanced by about 50 percent compared with that of the calcium-rich solid waste, the performance can be further improved by increasing the water-solid ratio, and every 1 ton of the building material has the capacity of immobilizing 8-15 Kg of CO₂.

1st Main Claim

[MT] 1.A modified SiO₂Aerogel is incorporated into high CO prepared from calcium-rich solid waste₂Adsorption quantity building material, characterized in that it comprises the following parts by weight of raw materials in a ratio: sulfur gypsum 50-100 parts, steel slag 0-30 parts, fly ash 0-50 parts, electroslag 0-30 parts, carbonization stimulant 0.5-4 parts, retarder 0.04-0.08 parts, Water reducing agent 0.1-0.4 parts, defoamer 0.1-0.3 parts, thickener 0.07-0.12, modified SiO₂Aerogel 1-5 parts, water 50-65 parts;

Said modified SiO₂The aerogel was prepared by:

- (1) mixing methanol or ethanol with an amount of organic amine or potassium carbonate, and agitating the mixture at room temperature for 10-15 minutes to obtain a homogeneous modifier solution;
- (2) The modifier solution will be half the mass of SiO₂The aerogel particles were slowly added to the modifier solution and mixed with a magnetic stirrer at room temperature for 4-20 hours for impregnation modification;
- (3) The resulting mixture is placed in an oven and kept at a temperature of 40 degrees centigrade overnight, the resulting solid is sieved to obtain modified SiO₂Aerogel particles.

Assignees: UNIV SHANXI; SHANXI UNIV

170. Family 96731151 (CN115925381 A)

[View in PatBase](#)

Title

[EN] CALCIUM-BASED SOLID WASTE LIGHT COMPOSITE SLURRY MATERIAL FOR COAL MINE DISASTER REDUCTION AND CARBON DIOXIDE SEQUESTRATION AND PREPARATION AND USE METHODS OF CALCIUM-BASED SOLID WASTE LIGHT COMPOSITE SLURRY MATERIAL

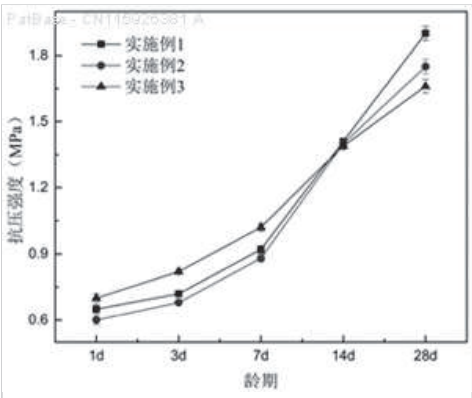
Abstract

[EN] The invention discloses a calcium-based solid waste light composite slurry material for coal mine disaster reduction and carbon dioxide sequestration and a preparation and use method thereof. The composite slurry material is prepared by mixing high-water-retention foam and composite slurry according to the volume ratio of 1.8-2.2: 1, and the composite slurry is obtained by mixing solid waste dry powder raw materials, additives and water; the solid waste dry powder raw material consists of steel slag, mineral slag, carbide slag and desulfurized gypsum; the high-water-retention foam is prepared by mixing an anionic surfactant, a zwitterionic surfactant, an organic polymer and water and then introducing compressed gas for foaming. And the prepared calcium-based solid waste light composite slurry is conveyed to a goaf through a conveying pipeline to be poured and filled. The composite slurry is low in bleeding rate, controllable in setting time and excellent in seepage and diffusion performance, solid waste materials can be efficiently utilized, power plant waste can be reasonably treated, CO₂ can be effectively mineralized and stored, an air leakage area can be blocked and filled, and spontaneous combustion disasters of a coal mine can be prevented and controlled.

1st Main Claim

[MT] 1. A calcium-based solid waste lightweight composite slurry for coal mine disaster mitigation and carbon dioxide sequestration, characterized in that it is prepared by mixing a high water-retention foam with a composite slurry in a volume ratio of 1.8-2.2:1, wherein the composite slurry is obtained by mixing a solid waste dry powder raw material, additives, water, The solid waste dry powder feedstock is comprised of the following components in weight percent: 28% to 35% steel slag, 38% to 47% slag, 16% to 24% electros slag, 9% to 17% sulfur gypsum, and the additive is used in an amount of 4% to 6% by weight of the solid waste dry powder feedstock. The high water retention foam is prepared by mixing an anionic surfactant, a zwitterionic surfactant, an organic polymer with water, and then physically foaming with a compressed gas, the mass ratio of anionic surfactant to zwitterionic surfactant being 3:2. The organic polymer is added in an amount of 3.8-4% by weight of the high water-retention foam.

Assignees: CHINA UNIV OF MINING AND TECHNOLOGY; UNIV CHINA MINING AND TECH



171. Family 51372163 (KR20120070342 A)

[View in PatBase](#)

Title

[EN] ENVIRONMENTAL LOW CARBON DIOXIDE BINDER COMPRISING METAL SALT REACTIVE COMPOUNDS AND CONCRETE COMPOSITION USING THE SAME

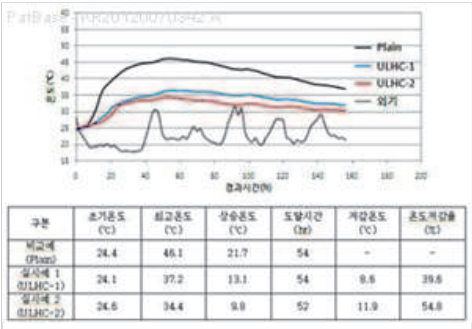
Abstract

[EN] PURPOSE: An environment-friendly low carbon binder which is grafted with metallic salt-based reactive compound and a concrete composition using thereof are provided to reduce hydration heat followed by use of reaction accelerator and to improve mobility and durability. CONSTITUTION: An environment-friendly low carbon binder which is grafted with metallic salt-based reactive compound comprises 1-5 parts by weight of reactive compound and 1-3 parts by weight of acetate based compound based on 100.0 parts by weight of binder. The binder comprises 10-40 parts by weight of cement and 60-90 weight percent of blending material. The blending material is one or more which are selected from fly ash and blast furnace slag. The reactive compound is one or more which are selected from magnesium salt based compound, lithium salt based compound, and sodium salt based compound. The cement is a first OPC(ordinary Portland cement). The magnesium salt based compound is $MgCl_2 \cdot 6H_2O$. The lithium salt based compound is $LiNO_3 \cdot 3H_2O$. The sodium salt based compound is $Na_2S_2O_3 \cdot 5H_2O$. The acetate based compound is $CH_3COONa \cdot 3H_2O$.

1st Main Claim

[MT] 1. 10 to 40% by weight, and fly ash and cement, blast furnace slag, which is at least one selected from the group consisting of 60-90% by weight of the admixture relative to 100 parts by weight of the binder, a magnesium salt-based compound, a lithium salt-based compound, and the sodium salt-based compound at least one selected from the group consisting of 1-5 parts by weight of acetic acid, and the reaction active compound 1-3 parts by weight of salt-based compound, characterized in that it comprises a low-carbon binder composition.

Assignees: DAELIM IND CO LTD; TRIPOD CO LTD; SAM PYO IND CO LTD



172. Family 48507470 (KR20110030125 A)

[View in PatBase](#)

Title

[EN] THE STABILIZATION TREATMENT METHOD OF RECYCLED AGGREGATES BY NEUTRALIZATION USING CARBON DIOXIDE GAS

Abstract

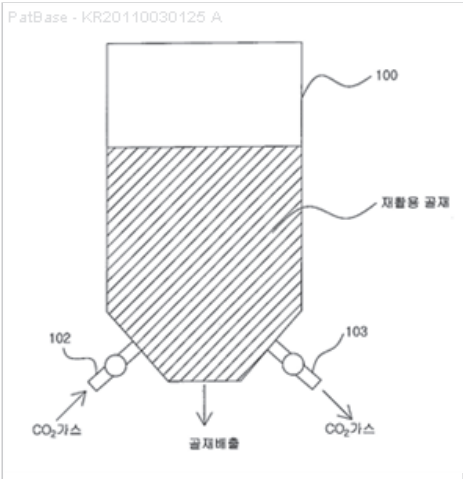
[EN] PURPOSE: A stabilizing method of recycled aggregate and the recycled aggregate are provided to improve the compressive strength, the mass per unit volume, and the absorption rate of a secondary product using the recycled aggregate. CONSTITUTION: A stabilizing method of recycled aggregate comprises the following steps: inserting the recycled aggregate into a chamber with the temperature of 50~60deg C and the humidity of 60~90 percent; supplying carbon dioxide gas into the chamber for exposing the recycled aggregate to the carbon dioxide gas and for neutralizing the recycled aggregate; and supplying waste incineration gas generated from a waste incinerator for supplying more carbon dioxide gas into the chamber.

1st Main Claim

[MT] 1. As a stabilizing method of recycled aggregate

is 50 ~ 60 °C, the humidity is 60-90%, the internal temperature to maintain the state, into the chamber, the chamber is added to the recycled aggregate, recycled aggregate is a carbon dioxide gas is exposed to the carbon dioxide gas by such contact is to occur when the neutralization of recycled aggregate characterized in that the stabilization method of recycled aggregate.

Assignees: KOREA INST CONSTRUCTION TECH; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY
KICT



173. Family 95725533 (WO23006136 A1)

[View in PatBase](#)

Title (EP4341227 A1)

[EN] PROCESS FOR USING BIOCHAR IN THE PRODUCTION OF CONCRETE HAVING AN IMPROVED COBALANCE

Abstract (EP4341227 A1)

[EN] The invention relates to a process for using biochar in the production of any type of concrete having an improved CO₂ balance by combining binders, aggregates and biochar and optionally further additives with addition of aqueous solutions to produce a mixture, wherein the biochar is produced beforehand as biochar in a two-stage pyrolysis process as a partial replacement for the cement and/or the aggregates used in each case and is provided for and supplied to the process of concrete production after a comminution and pelletization process.

1st Main Claim

[MT] Process for the use of biocoal in the production of concrete having an improved CO₂Balance Patent Claim 1. Process for the use of biocoal in the production of any concrete with an improved CC>2 balance, by combining binders, aggregates and biocoal and possibly further additives with the addition of aqueous solutions to produce a mixture, wherein cement is used as binder and sand, gravel, gravel, gravel is used as additives, Slag and/or recycled building material, characterized in that In that the biochar is produced as a partial replacement for the cement and/or the additives used in each case beforehand in a two-stage pyrolysis process at first 350 degrees c to 450 degrees c degrees and in the second stage at at least 800 degrees c degrees and a minimum residence time in the entire pyrolysis process of 3 hours as biochar And is provided and supplied for the process of concrete production after a comminution process and in that the biochar is treated and mixed with a suspension of at least 50 per cent water and at least 50 per cent of a bio-based polymer before mixing with the additives and the binder, That a satiation behavior in the case of biochar and has established and a biochar granulate has formed.

Assignees: KOERNING HANS OTTO; PREUSS AXEL

174. Family 46814472 (WO10051458 A1)

[View in PatBase](#)

Extended Family Number: 42613795

Title (EP2203241 A1)

[EN] NON-CEMENTITIOUS COMPOSITIONS COMPRISING CO2 SEQUESTERING ADDITIVES

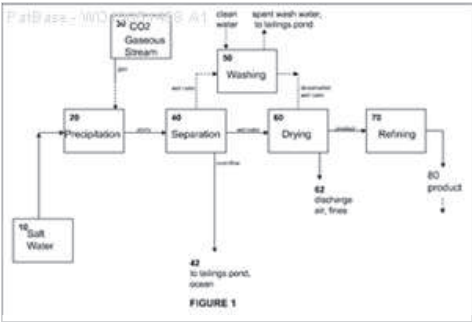
Abstract (EP2203241 A1)

[EN] Non-cementitious CO2 sequestering compositions are provided. The compositions of the invention include a CO2 sequestering additive, e.g., a CO2 sequestering carbonate composition. Additional aspects of the invention include methods of making and using the non-cementitious CO2 sequestering compositions.

1st Main Claim (EP2203241 A1)

[EN] 1. A non-cementitious composition comprising a CO₂ sequestering additive, wherein the CO₂ sequestering additive comprises carbon that was released in the form of CO₂ from the combustion of fuel.

Assignees: ARELAC INC; CALERA CORP; PATTERSON JOSHUA; YOUNGS ANDREW; CONSTANTZ BRENT R



175. Family 105897741 (JP2024177852 A2)

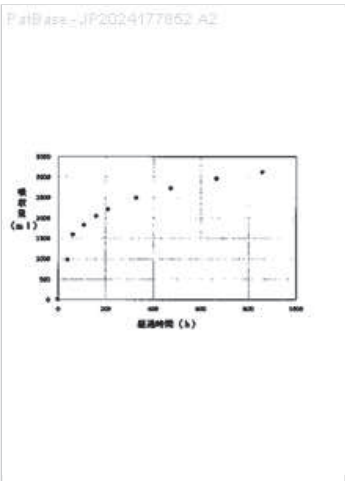
[View in PatBase](#)

Title

[EN] CURING COMPOSITION FOR ABSORBING CARBON DIOXIDE AND/OR NITROGEN-BASED MALODOROUS SUBSTANCE AND APPLICATION THEREOF

Abstract

[EN] To provide a technology for reducing the emission of carbon dioxide and nitrogen-based malodorous substances from a building material used in finishing.SOLUTION: A curing composition for absorbing carbon dioxide and/or a nitrogen-based malodorous substance is a curing composition comprising: magnesium oxide; magnesium carbonate; hemihydrate gypsum; and silicate compounds, wherein the curing composition contains 30-60 mass percent of magnesium oxide. In the curing composition, an average BET specific surface area of magnesium oxide is 5 to 25 m²/g, a mass ratio of magnesium oxide to magnesium carbonate is 3 to 10:1, and the hemihydrate gypsum is 6 to 25 mass percent relative to the mass of magnesium oxide. The curing composition does not contain magnesium chloride. A hardened body or molded body for absorbing the carbon dioxide and/or nitrogen-based malodorous substance obtained by hardening a mixture of the curing composition and water is also provided.SELECTED DRAWING: Figure 1



1st Main Claim

[MT] 1. A curable composition comprising magnesium oxide, magnesium carbonate, hemihydrate gypsum, a silicate compound, wherein the composition comprises magnesium oxide at 30-60C mass perent, The average bet specific surface area of magnesium oxide is 5-510-25m²G, the mass ratio of magnesium oxide to magnesium carbonate is 3:10:1, the hemihydrate gypsum is 6:25 mass perent, based on the mass of magnesium oxide, The compound of formula I is obtained by reaction of a compound of formula II with a compound of formula III in the presence of a base such as a base such as a compound of formula III (R is

Assignees: ABC TRADING CO

176. Family 7653907 (JP60046955 A2)

[View in PatBase](#)

Title

[EN] CARBONATION PROCESS FOR FLYASH CEMENT PELLET

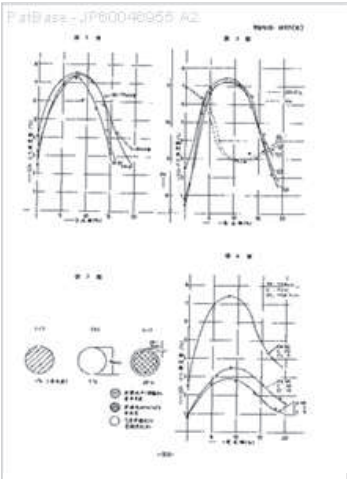
Abstract

[MT] [Summary] The present application of electronic data of the previous summary data is not recorded.

1st Main Claim

[MT] [The claims] in a mixture of fly ash and cement 1 to 10 percent by weight of clinker outside of the total formulation, the hydrogenated assembly to the rolling granulation, then a granulated product after curing and without its moisture content adjusted to total 3 to 15 percent, then the granulated product was oxidized to the inside coal fly ash cement, the total of the granulated product. The method carbonation

Assignees: ONODA CEMENT CO LTD



177. Family 61870781 (WO16039512 A1)

[View in PatBase](#)

Title

[EN] BLAST FURNACE SLAG FINE POWDER COMPOSITION CAPABLE OF IMPROVING CARBONATION RESISTANCE AND INITIAL STRENGTH

Abstract

[EN] The present invention relates to a blast furnace slag fine powder composition and, more specifically, to a blast furnace slag fine powder composition which is capable of improving the carbonation resistance and the initial strength thereof by mixing a grinded blast furnace slag with petro coke combustion ash and natural anhydrous gypsum having a pH of 11.5 or higher and pulverizing the same to a specific surface area of 3,500-10,000cm²/g. The blast furnace slag fine powder composition capable of improving the carbonation resistance and initial strength thereof, according to the present invention, comprises 1-20 parts by weight of petro coke combustion ash and 0.5-10 parts by weight of natural anhydrous gypsum with respect to 100 parts by weight of the blast furnace slag, and has a specific surface area of 3,500-10,000cm²/g.

1st Main Claim

[MT] About 100 parts by weight of granulated blast furnace slag,

Petro coke combustion ash and 1-20 parts by weight, natural anhydrite comprises 0.5 to 10 parts by weight,

The specific surface area 3,500 ~ 10,000cm² blast furnace slag composition which can improve the carbonation resistance and initial strength wherein a / g.

Assignees: CMD GROUP CO LTD; ZI AN IND CO LTD

178. Family 30936250 (JP2004224680 A2)

[View in PatBase](#)

Title

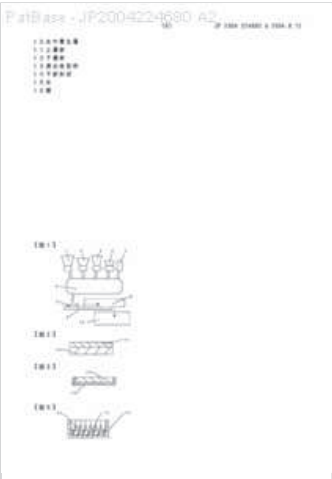
[EN] METHOD OF PRODUCING WATER RETENTIVE CIVIL ENGINEERING CONSTRUCTION MATERIAL CAPABLE OF UTILIZING VAPORIZATION COOLING OF WATER AND FIXING OF CARBON DIOXIDE

Abstract

[EN] PROBLEM TO BE SOLVED: To suppress the increase of atmospheric temperature in summer while vaporizing water over a long period of time by retaining a large quantity of water without causing clogging even when rain water or supply water is stained to some extent, and to obtain the fixing function of carbon dioxide and construction strength. SOLUTION: Cement, fibers, and water are added to porous coal ash as the main material to which, if required, crushed matters such as shells are added, and the material is solidified to a water retentive product.

1st Main Claim

[MT] 1. 1-5 parts by weight of cement to 5-9 parts by weight of fly ash particulate effervescent porous fibers from 0.002 to 0.5 parts by weight, mixing well water from 80 to 150 percent per which is characterized by a hardening and curing heat or cold poured into such a mold the mixture obtained by method of manufacturing the construction materials water retention that can be used to immobilize carbon dioxide and evaporative cooling of water.



Assignees: NT NITTO SANGYO KK

179. Family 102259704 (CN117902845 A)

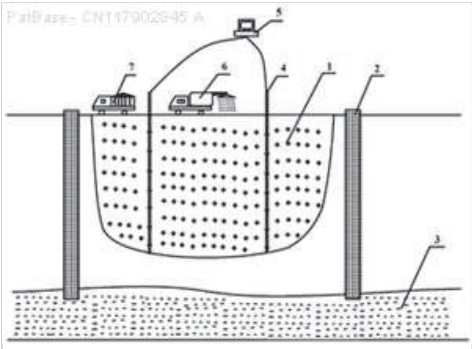
[View in PatBase](#)

Title

[EN] SYSTEM AND METHOD FOR FIXING CO2 BY USING STOCKPILED STEEL SLAG

Abstract

[EN] The invention provides a system and method for fixing CO2 by using stockpiling steel slag, and the system comprises a steel slag stockpiling site used for storing steel slag generated in the steelmaking process of a steel mill; the blocking system is used for carrying out environmental risk management and control on the steel slag stockpiling site; the CO2 injection system is arranged in the steel slag stockpiling site and is used for injecting CO2 discharged in the steel production process into the steel slag stockpiling site, so that the CO2 and the steel slag in the steel slag stockpiling site are subjected to contact reaction; and the spraying system is used for spraying a spraying agent to the steel slag stockpiling site, so that the CO2 fixing effect of the stockpiling steel slag is enhanced. According to the system and method for fixing CO2 through stockpiled steel slag, free CaO and free MgO existing in the steel slag react with CO2 to generate stable calcium carbonate and magnesium carbonate, so that the stability of the steel slag is improved, the stability of the steel slag for building materials is improved, injected CO2 can be fixed without pretreatment of solid waste steel slag, and the cost is reduced. The dual problems of carbon emission reduction and steel slag solid waste utilization are solved.



1st Main Claim

[MT] 1. A method of fixing CO by stockpiling steel slag₂Of the system, characterized in that it comprises:

A slag storage site for storing slag produced by the steelmaking process in a steel plant;

A barrier system for environmental risk management of the stockpiled slag site;

CO₂An injection system provided in the stockpiled slag site for injecting CO emitted during steel production into the stockpiled slag site₂, Make CO₂Contact reaction with slag in the stockpiled slag site;

Sprayer system for spraying spray agent to stockpiled slag sites to enhance stockpiled slag to CO₂Fixed effect of the .

Assignees: ENERGY SAVING AND ENVIRONMENTAL PROT CO LTD MCC GROUP; CENTRAL RES INST OF BUILDING AND CONSTRUCTION CO LTD MCC GROUP; CENTRAL RES INST BUILDING AND CONSTR CO LTD MCC GROUP; ZHONGYE ENERGY SAVING ENVIRONMENTAL PROTECTION CO LTD; CENTRAL RESEARCH INST OF BUILDING AND CONSTRUCTION CO LTD

180. Family 84809144 (IN201941044211 A)

[View in PatBase](#)

Title

[EN] A METHOD OF IMPROVING THE DURABILITY OF CONCRETE FORMULATIONS BY ABSORBING CO₂

Abstract

[EN] The present invention relates to a method of improving the durability of concrete formulations by absorbing CO₂. In one embodiment, this is accomplished by combining cement, water, and supplementary cementitious materials, aggregates, admixtures, and/or additives to form an aqueous cement mixture having a water to cementitious ratio, adding zeolite particles to the cement mixture to form a concrete formulation, the concrete with zeolite as partial replacement material with mean ratio absorbs harmful gases and gives high compressive strength, eco-friendly.

1st Main Claim

[EN] 1. A method of improving the durability of concrete formulations by absorbing CO₂, the comprising: combining cement, water, and supplementary cementitious materials, aggregates, admixtures, and/or additives to form an aqueous cement mixture having a water to cementitious ratio, adding zeolite particles to the cement mixture to form a concrete formulation, wherein zeolites includes volcanic rocks and ash layers which react with alkaline groundwater, and wherein the concrete with zeolite as partial replacement material with mean ratio absorbs harmful gases and gives high compressive strength, eco-friendly

181. Family 51145702 (US2012131973 AA)

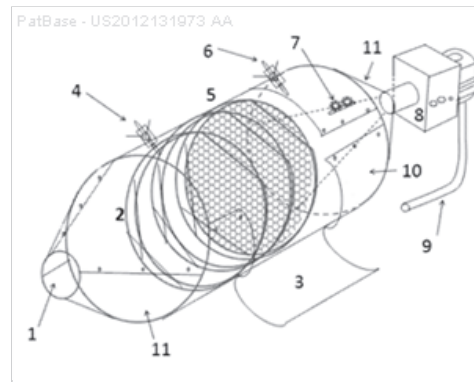
[View in PatBase](#)

Title (EP2457638 B1)

[EN] UTILIZATION OF PERIDOTITE-TYPE ROCK FOR THE TREATMENT OF CO₂ FROM A CO₂-EMITTING INDUSTRIAL PLANT

Abstract

[EN] A filter for treating CO₂ from a CO₂-emitting industrial plant, takes advantage of the fact that peridotite igneous rocks (or material of similar chemical content: basalt, gabbro, dunite, amphibolites, artificially produced Ca, Mg oxides) which are abundant on and close to the Earth's surface, can absorb and contain CO₂ gases resultant from industrial activity. This chemical process occurs naturally, but has not been utilized to capture high concentrations of CO₂ emitted into the atmosphere. Calcium and magnesium oxides of the peridotite react with CO₂ to form stable carbonate minerals. The invention enhances and expedites this natural process for the remediation of industrial pollutants such as CO₂ from the oil, gas, coal, cement/concrete and like CO₂-emitting industries, and provides a resource for materials in construction (concrete), steel, aviation and agricultural and other industries.



1st Main Claim (EP2457638 B1)

[EN] 1. An installation for treating CO₂ from a CO₂-emitting industrial plant, the installation comprising a CO₂ filter, a duct or other chamber in which the CO₂ filter is installed, the duct or chamber having an inlet which, in use, receives a flow of CO₂-containing gases from the industrial plant and an outlet, whereby in use a flow of CO₂-containing gases passes through the duct or chamber, through the CO₂ filter and out via said outlet, wherein the CO₂ filter comprises slabs or other bodies or pieces, or gravel or another crushed form, of peridotite mafic igneous rock.

Assignees: GREENIDGE JEAN; GREENIDGE DARIUS

182. Family 98724160 (CN116639933 A)

[View in PatBase](#)

Title

[EN] PREPARATION METHOD OF PASTE FOR FILLING AND CURING CO₂

Abstract

[EN] The invention discloses a preparation method of a paste for filling and curing CO₂, which comprises the following steps: taking the following raw materials in parts by weight: 5-25 parts of cement, 5-25 parts of carbide slag, 25-45 parts of fly ash, 25-45 parts of coal gangue and pre-crushed coal gangue, mixing the raw materials, adding water according to the mass ratio of solid to water of 7:3, stirring at the stirring speed of 80-100r/min, introducing high-purity CO₂ into the stirred paste, and uniformly stirring to obtain the paste for filling and curing CO₂. The CO₂ is introduced, the air pressure is 0.1 MPa, the stirring rotating speed is 120-160r/min, and the stirring time is 1-2.5 hours. The paste with good flowing property, curing property and mechanical property is prepared, and the prepared paste can be filled into the mine goaf, so that the goaf is supported, ground surface settlement is prevented, the ecological environment is protected, solid waste is reasonably utilized, and carbon emission is reduced.

1st Main Claim

[MT] 1.A method for filling and curing CO₂The method for preparing the paste of the present invention, characterized in that it comprises the following steps: Taking raw materials in parts by weight: 5 to 25 parts cement, 5 to 25 parts electric slag, 25 to 45 parts fly ash, 25 to 45 parts coal gangue, pre-pulverized coal gangue, mixing raw materials, in a mass ratio of solids to water of 7:3, adding water and stirring. The stirring speed is 80~100r/min, Pass high purity CO into the stirred paste₂The mixture is stirred by means of a stirrer and the CO is passed in₂The air pressure is 0.1 MPa, the stirring speed is 120 to 160 r/min, the stirring time is 1 to 2.5 hours.

Assignees: INNER MONGOLIA JIAXIANGHENG ENVIRONMENTAL PROTECTION TECH CO LTD; OF ROCK AND SOIL MECH CHINESE ACADEMY OF SCIENCES INST; INST ROCK AND SOIL MECH CAS; OF ROCK AND SOIL MECHANICS CHINESE ACADEMY OF SCIENCES INST

183. Family 104392907 (CN221680983 U)

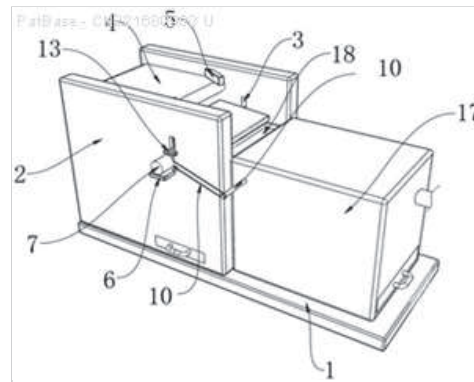
[View in PatBase](#)

Title

[EN] CO2 CARBONIZATION MAINTENANCE DEVICE SUITABLE FOR SOLID WASTE RECYCLED AGGREGATE

Abstract

[EN] The utility model relates to the technical field of environmental protection engineering, and discloses a CO2 carbonization maintenance device suitable for solid waste recycled aggregate, which comprises a bottom plate, the front side and the rear side of the left end of the top of the bottom plate are fixedly connected with limiting plates, and the right ends of the limiting plates are provided with square openings. Limiting blocks are fixedly connected to the top ends of the middles of the close sides of the two limiting plates, a supporting plate is fixedly connected to the front side of one limiting plate, a driving assembly is fixedly connected to the top of the supporting plate, a driving wheel is fixedly connected to the outer wall of the front end of the driving assembly, and the driving wheel is sleeved with a belt. According to the solid waste recycled aggregate discharging device, solid waste recycled aggregate is screened, the screening plate is hit to prevent blocking, the difference of the contact surfaces of the carbonized solid waste recycled aggregate is small, blocking is avoided when the solid waste recycled aggregate is discharged, and the residual solid waste recycled aggregate in the discharging box is cleaned.



1st Main Claim

[MT] 1. A CO2 carbonization device suitable for consolidating waste regenerated aggregate, comprising a base plate (1), characterized in that the top left end of the base plate (1) is fixedly connected to a limit plate (2) on both front and rear sides, the right end of the limit plate (2) being provided with a square opening (3), Two of said stop plates (2) are fixedly connected to a limit block (5) at their intermediate top ends on their adjacent sides, one of said stop plates (2) being fixedly connected to a support plate (6) at its front side, and a drive assembly being fixedly connected at its top, The front outer wall of the drive assembly is fixedly connected with a driving wheel (9), The outer sleeve of the driving wheel (9) is provided with a belt (10), the front and rear outer walls of the drive assembly are fixedly connected with a striking plate (11), and the inner wall of the stop plate (2) is slidably connected with a sliding plate (12), Both of said sliding plates (12) are fixedly connected on their distal sides with a connecting plate (13), the inner wall of said sliding plate (12) is slidably connected with a support post (14), and the top of said sliding plate (12) is fixedly connected with a spring one (15), The two sliding plates (12) are fixedly connected on their adjacent sides with a screening plate (16), and the top right end of the bottom plate (1) is fixedly connected with a carbonator body (17).

Assignees: SUZHOU XUHUA AUTOMATION EQUIPMENT CO LTD

184. Family 101511920 (CN117624681 A)

[View in PatBase](#)

Title

[EN] METHOD FOR PROCESSING POLYVINYL ALCOHOL (PVA) MATERIAL, STRUCTURE OF MODIFIED PVA FILM, CARBON DIOXIDE CAPTURE SYSTEM, AND METHOD FOR MANUFACTURING MODIFIED CEMENT

Abstract

[EN] The invention discloses a processing method of a polyvinyl alcohol (PVA) material, a structure of a modified PVA film, a carbon dioxide capture system and a manufacturing method of modified cement. The processing method of the polyvinyl alcohol (PVA) material comprises the following steps: providing a PVA material; carrying out modification treatment on the PVA material, namely soaking the PVA material in a solution containing a CO₂ trapping agent, so that the CO₂ trapping agent is fixed on the surface and the interior of the PVA material to form a modified PVA material; and preparing the modified PVA material into a solid adsorption piece.

1st Main Claim

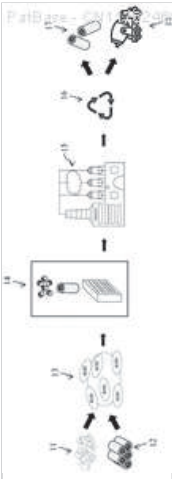
[MT] 1. A method of treating polyvinyl alcohol (PVA) material comprising:

Providing a PVA material;

The PVA material is subjected to a modification process, which includes soaking the PVA material in a carbon dioxide (CO₂) containing solution₂Capture the solution of the agent to make the aforementioned CO₂The capture agent is fixed on the surface and inside of the PVA material to form a modified PVA material; and

The upgraded PVA material is made into a solid adsorbent.

Assignees: SUMIKA TECHNOLOGY CO LTD; SUMIKA TECH CO LTD



185. Family 105423210 (CN118993640 A)

[View in PatBase](#)

Title

[EN] CO₂ CURING PREFABRICATED REGENERATED INVERTED FILTER LAYER AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention relates to a CO₂ curing prefabricated regenerated inverted filter and a preparation method thereof, and belongs to the technical field of carbon sequestration cementing material preparation. The recycled inverted filter layer is composed of recycled aggregate, recycled sand, a cementing material, water, a polycarboxylate superplasticizer, cellulose ether and sodium polyacrylate. According to the invention, industrial solid wastes such as blast furnace slag, ferrochrome slag and the like are fully utilized for firing a carbon sequestration cementing material which takes C₂SF (fluorine-containing spinel, similarly hereinafter) as a main component of a cementing material, and efficient, rapid and environment-friendly production is realized by utilizing CO₂ curing. In the production process, part of industrial solid waste is consumed, CO₂ in industrial tail gas is absorbed, a high-strength and high-durability recycled inverted filter concrete product can be obtained, and the recycled inverted filter concrete product is an environment-friendly and sustainable building material.

1st Main Claim

[MT] A CO₂Maintenance of a preformed regenerated reverse filter layer, characterized in that Including the following mass parts of raw materials: 50 to 80 parts of recycled aggregate, 5 to 15 parts of recycled sand, 35 to 65 parts of cement, 10 to 30 parts of water, 0.05 to 2 parts of polycarboxylic acid water reducer, 0 to 0.05 parts of cellulose ether and 0 to 0.02 parts of sodium polyacrylate.

Assignees: CCCC FIRST HARBOR ENGINEERING CO LTD; CCCC FIRST HARBOR ENG CO LTD; NO 4 ENG CO LTD OF CCCC FIRST HARBOR ENG CO LTD

186. Family 101330204 (US2024059951 AA)

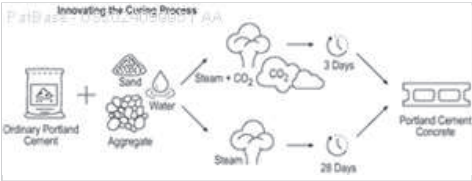
[View in PatBase](#)

Title

[EN] METHOD OF REACTING CO2 BY EMULSIFYING CONCRETE AND USE IN OILWELL CEMENTING

Abstract

[EN] A concrete emulsion comprising a cement, aggregate, water, and carbon dioxide is provided. The carbon dioxide may be liquid or super critical and is dispersed in the concrete emulsion composition. A method of producing a concrete emulsion composition is also provided. The method includes mixing a cement, aggregate, and water to form a hydrated concrete composition, and emulsifying the hydrated concrete composition with liquid or supercritical CO₂. An article comprising the concrete emulsion composition is provided. Further, a method of treating a wellbore comprising producing a concrete emulsion composition and pumping the concrete emulsion composition into a wellbore, and a method of manufacturing an article comprising producing a concrete emulsion composition and 3D printing the concrete emulsion composition are also provided.



1st Main Claim

[EN] 1. A concrete emulsion composition comprising:
a cement;
water;
aggregate; and
carbon dioxide, wherein the carbon dioxide is liquid or supercritical and dispersed in the concrete emulsion composition.

Assignees: ARAMCO SERVICES CO

187. Family 78544931 (KR20200042578 A)

[View in PatBase](#)

Title

[EN] SIS CO2 HIGHLEVEL MASTIC ASPHALT CONCRETE CONSTRUCTION MATERIALS AND THEIR CONSTRUCTION METHODS IMPROVED CO2 GENERATION REDUCTION AND CONSTRUCTION BY SIS

Abstract

[EN] The present invention relates to a waterproof performance-improved goose asphalt concrete composition for pavement and a construction method thereof. The composition contains: 10 to 20 parts by weight of styrene isoprene styrene; 5 to 15 parts by weight of petroleum resin; 500 to 2,000 parts by weight of aggregate; 30 to 150 parts by weight of fine powder aggregate; and 0.1 to 2 parts by weight of cellulose fiber, with respect to 100 parts by weight of asphalt. The waterproof performance-improved goose asphalt concrete composition for pavement of the present invention contains the fine powder aggregate having an improved aggregate particle size and SIS, and thus direct on-site formulation and construction are possible and transport construction can be facilitated. The composition has high cohesion and bonding forces, and thus is excellent in waterproofness, durability, and resistance to plastic deformation, aging, and/or peeling. The composition has a PG grade of 82 to 34, prevents infiltrating water and potholes, and facilitates concrete pouring at a low cost.

1st Main Claim

[MT] 1. Relative to 100 parts by weight of the asphalt, styrene isoprene styrene; petroleum resin 10 to 20 parts by weight 5 to 15 parts by weight 500 to 2,000 parts by weight of fine aggregate; 30 to 150 parts by weight of fine aggregate; fine powder; and 0.1 to 2% by weight of cellulose fibers and a tangle including a packaging asphalt concrete composition.

Assignees: KOREA NATIONAL UNIV OF TRANSPORTATION IND ACADEMIC COOPERATION FOUNDATION; GK TECH INST CO LTD; ACADEMIC COOPERATION FOUNDATION KOREA NATIONAL UNIV OF TRANSPORTATION IND

188. Family 49894376 (JP2011168436 A2)

[View in PatBase](#)

Title

[EN] CONCRETE KNEADING MATERIAL, CO2 ABSORPTION PRECAST CONCRETE AND METHOD OF PRODUCING THE SAME

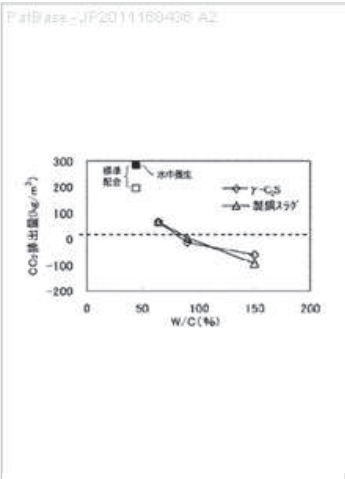
Abstract

[EN] PROBLEM TO BE SOLVED: To provide precast concrete in which CO₂emission is remarkably reduced by absorbing a large amount of CO₂in a curing process. SOLUTION: A concrete kneading material contains gamma-C₂S (symbol gamma), one or two kinds of steel making slag powder (symbol B) and portland cement (symbol C), wherein total quantity of (gamma) and (B) occupied in total quantity of (gamma), B and C is 25-90 mass percent. The method of producing CO₂absorption precast concrete is carried out by placing the concrete kneading material formulated to have 80-160 percent water/cement (W/C) ratio in a form and after removing it from the form, carbonation-curing the solidified body of the concrete under an atmosphere of 5-95 percent CO₂concentration to form a carbonation region in a part greater than or equal to 20 mm deep from the surface.

1st Main Claim

[MT] 1. As a component of the powder, γ -C₂S (γ symbol), slag powder (B sign) and one or two types of Portland cement (symbol C) and containing, γ above, B, γ accounts for the total content of C, 25-95 percent and the total mass of B, kneaded concrete mixing 80 to 250 percent W / C water-cement ratio.

Assignees: DENKI KAGAKU KOGYO KK; KAJIMA CORP; DENKA GROUP



189. Family 81390247 (CN111763786 A)

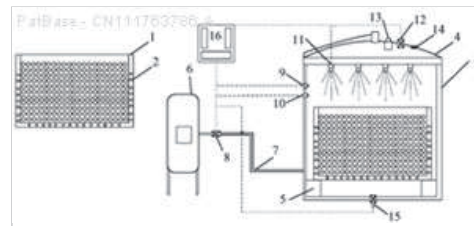
[View in PatBase](#)

Title

[EN] HIGH-TEMPERATURE STEEL SLAG CARBONATION DEEP STABILIZATION TREATMENT DEVICE AND METHOD

Abstract

[EN] The invention relates to a high-temperature steel slag carbonation deep stabilization treatment device and method. The device includes a steel slag tank (1), an air hole (2), a stabilizing tank (3), a tank door (4), a tank seat (5), a gas tank (6), an air pipe (7), a water spraying port (11), an exhaust valve (12), a safety valve (13), an explosion-proof valve (14) and a water discharge valve (15), wherein high-temperature steel slag is deeply stabilized with CO₂, and free CaO in the high-temperature steel slag is digested with water and other acid gases. The process flow is short, the degree of automation of the device is high, the production efficiency in the treatment process is high, the treated steel slag has good stability and can replace sand stone material in large quantities, and thus recycling of the steel slag is facilitated.



1st Main Claim

[MT] 1. A high-temperature steel slag carbonation depth stabilization treatment apparatus, characterized in that said high-temperature slag carbonation depth stabilization processing apparatus comprising: Slag tank (1), vent (2), a settling tank (3), the tank door (4), tank (6), the trachea (7), seat (5), gas tank (11), an exhaust valve (12), spout (13), explosion-proof safety valve valve (14) and drain valve (15); Slag tank (1) placed in the settling tank (3) at the bottom of the tank holder (5); Slag tank (1) the tank body is provided with holes (2); Air Tank (6) connected by pipes (7) settling tank (3) for the gas tank (6) from the settling tank (3) introduced into the bottom of the CO₂ gas; The tank door (4) provided in the settling tank (3) for closing the opening upper settling tank (3), the water jets (11) disposed in the tank door (4), for the high-temperature slag slag tank (1) in beating water; Exhaust valve (12), safety valve (13) and the explosion-proof valve (14) disposed in the tank door (4) External; Drain valve (15) is arranged at the bottom of settling tank (3).

Assignees: ENERGY SAVING AND ENVIRONMENTAL PROT CO LTD MCC GROUP; CENTRAL RES INST BUILDING AND CONSTR CO LTD MCC GROUP; CENTRAL RESEARCH INST OF BUILDING AND CONSTRUCTION CO LTD; ZHONGYE ENERGY SAVING ENVIRONMENTAL PROTECTION CO LTD

190. Family 76065185 (WO19221379 A1)

[View in PatBase](#)

Title

[EN] METHOD FOR PRODUCING CRYSTALLINE CALCITE USING MICROBIAL EXTRACELLULAR POLYMERIC SUBSTANCE, AND METHOD FOR REPAIRING FINE CRACKS USING THE MICROBIAL EXTRACELLULAR POLYMERIC SUBSTANCE

Abstract

[EN] The present invention pertains to: a method for producing calcite using a microbial extracellular polymeric substance (hereinafter EPS); and a method for repairing fine cracks using the microbial extracellular polymeric substance. According to the present invention, crystalline calcite can be precipitated in a short amount of time by a simple method by using a microbial extracellular polymeric substance, and dissolved carbon dioxide can be immobilized by means of an environmentally friendly method. Also, the present invention separates and uses only an extracellular polymeric substance without using microorganisms in microbial culture media, and is thus advantageous when applied in the field without having to consider microbial growth conditions or reaction time.

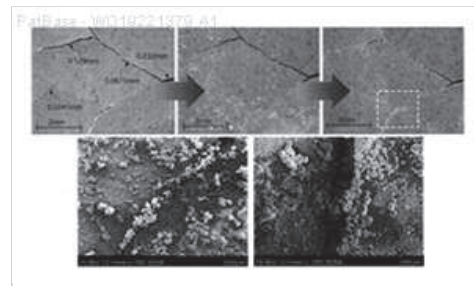
1st Main Claim

[MT] 1) culturing a microorganism wavelet decomposition;

2) to remove the microorganisms from the wavelet decomposition microorganism of the microbial culture solution, in vitro polymeric substance (EPS); and

3) solution to prepare a liquid culture medium of the microorganism culture medium the in vitro polymeric substance (EPS) by reacting calcium ions to form crystalline calcite, comprising the step of in vitro polymeric substance of microorganism culture solution using the method of manufacturing a crystalline calcite.

Assignees: UNIV NAT CHONNAM IND FOUND; FOUNDATION OF CHONNAM NATIONAL UNIV IND



191. Family 73733797 (JP2019038234 A2)

[View in PatBase](#)

Title

[EN] CO2 DISCHARGE REDUCTION METHOD IN PRODUCTION OF READY-MIXED CONCRETE

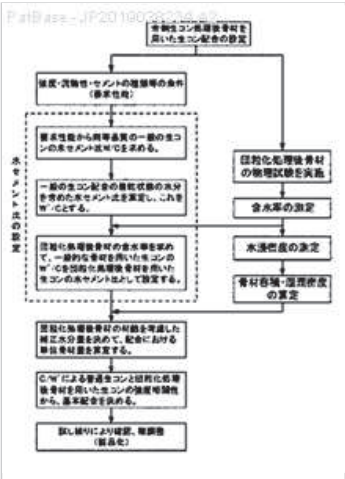
Abstract

[EN] To provide a COdischarge reduction method where, in the production of ready-mixed concrete, from ready-mixed concrete production to circulation and industrial waste treatment are taken into consideration, the disposal problem of surplus ready-mixed concrete is solved, and environmental load reduction can be realized.SOLUTION: When ready-mixed concrete is produced, as the alternative of an aggregate as a natural resource fed from a production district to a ready-mixed concrete factory, an aggregated processed product obtained by subjecting residual ready-mixed concrete in a non-solidified state to aggregation processing is cracked and used as an aggregate.SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1 in the case of producing a ready-mixed concrete plants, place of production it is supplied to the more natural resources as an alternative does not aggregate state of ready-mixed concrete was processed surplus crumb by crushing the crumb of bone material which is characterized in that produced using in the manufacture of ready-mixed concrete. The method reducing CO2 emissions.

Assignees: FUSOH MAT CO LTD



192. Family 98840648 (CN116693327 A)

[View in PatBase](#)

Title

[EN] METHOD FOR MINERALIZING AND CURING RAW MATERIAL BRICK BLANK BY USING CO2 AND LOW-CARBON CONCRETE PRODUCT

Abstract

[EN] The invention provides a method for mineralizing and curing a raw material brick blank by using CO2 and a low-carbon concrete product, and belongs to the technical field of mineral carbon sequestration, and the method comprises the following steps: pre-curing the raw material brick blank; feeding the pre-cured raw material brick blank into a CO2 atmosphere for mineralization curing, so that carbonate products are formed in pores and interface structures in the brick body after mineralization reaction; wherein the pressure of the CO2 mineralization maintenance is 0.1-5.0 MPa, and the total time of the CO2 mineralization maintenance is 1-48 hours. According to the method provided by the invention, the CO2 conversion utilization rate and the storage rate are both higher than 80 percent, and a low-carbon or zero-carbon concrete product can be effectively obtained.

1st Main Claim

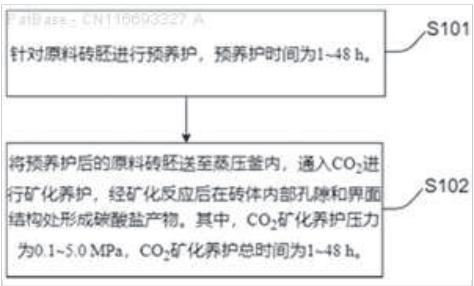
[MT] 1. A method of using CO₂A method of mineralizing raw brick embryos, characterized in that the method comprises:

Pre-care for raw brick embryos;

Pour pre-conditioned raw bricks into CO₂The atmosphere is mineralized and carbonate products are formed at the pores and interfacial structures inside the brick after the mineralization reaction;

Where CO₂Mineralization maintenance pressure is 0.1 to 5.0 MPa, CO₂The total time for mineralization maintenance is 1 to 48 hours.

Assignees: GUONENG JINJIE ENERGY CO LTD; CHN ENERGY NEW ENERGY TECH RESEARCH INST CO LTD; GUONENG GUOHUA BEIJING ELECTRIC POWER RES INST CO LTD



193. Family 48507449 (KR20110030123 A)

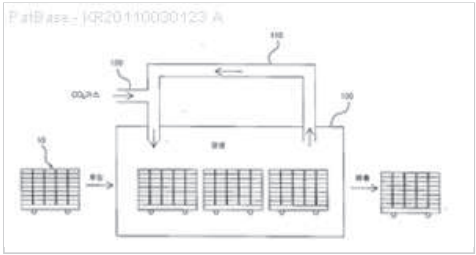
[View in PatBase](#)

Title

[EN] THE NEUTRALIZATION TREATMENT AND MANUFACTURING METHOD OF CONCRETE PRODUCT USING CARBON DIOXIDE GAS

Abstract

[EN] PURPOSE: A neutralizing method and manufacturing method for the secondary products of concrete using carbon dioxide are provided to reduce the pH of alkaline water eluted from the secondary products of the concrete by including a neutralizing process using carbon dioxide. CONSTITUTION: A chamber is prepared(100). Moisture is distributed on the surface of the secondary products of concrete(10), and the internal temperature of the secondary products is maintained at temperature between 50 and 60 degrees Celsius in the chamber. A secondary product of concrete is introduced into the chamber. Carbon dioxide gas is supplied into the chamber. The secondary product is in contact with the carbon dioxide gas in order to undergo a neutralizing process.



1st Main Claim

[MT] 1. Mixed water and mixing cement, aggregate, but a mixture of the material is a reinforcement inside the concrete which does not exist in order to modify the secondary product neutralization treatment method concrete secondary products,

water on the surface of concrete secondary products and are distributed so that the interior temperature is 50 ~ 60 °C formed in a chamber, the mixture is molded using the secondary products made of concrete in the concrete, to supply the carbon dioxide gas in the chamber is exposed to the carbon dioxide gas to the secondary product by such contact neutralization is characterized in that to occur neutralization of concrete secondary products processing method.

Assignees: KOREA INST CONSTRUCTION TECH; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY
KICT

194. Family 101578772 (CN117658584 A)

[View in PatBase](#)

Title

[EN] METHOD FOR REINFORCING SOLID WASTE FILLING MATERIAL THROUGH COOPERATION OF CO₂ NANOBUBBLES AND HYDROPHOBIC MODIFICATION AND APPLICATION

Abstract

[EN] The invention discloses a method for reinforcing a solid waste filling material through cooperation of CO₂ nanobubbles and hydrophobic modification and application of the solid waste filling material, and belongs to the technical field of high-carbon-sequestration strong-impermeability all-solid-waste filling materials. The method comprises the following steps: uniformly mixing coal mine solid waste with silicon dioxide nanoparticles and aluminum nanoparticles to obtain a solid material, adding sodium silicate into water, and then adding sodium hydroxide to obtain a strong alkali excitation solution; adding polydimethylsiloxane and a silane coupling agent into the strong base excitation solution, and emulsifying to obtain a strong base-hydrophobic modified composite solution; the preparation method comprises the following steps: adding xanthan gum, polyvinyl alcohol and sodium dodecyl benzene sulfonate into deionized water, mixing, introducing carbon dioxide through a diffuser, and dispersing and homogenizing carbon dioxide gas in a base solution to obtain a carbon dioxide nano-bubble fluid; and mixing and stirring the solid material, the strong alkali-hydrophobic modified composite solution and the carbon dioxide nano bubble fluid to generate the high-carbon-sequestration strong anti-permeability all-solid waste filling material. The device is simple in configuration, high in using effect and capable of effectively supporting the goaf and consuming a large amount of carbon dioxide.

1st Main Claim

[MT] 1.CO₂Process for the preparation of a nano-bubble synergistically hydrophobically modified reinforced solid waste filler material, characterized in that it comprises the following steps:

Step 1. Coal ore solid waste is homogeneously mixed with silica nanoparticles and aluminum nanoparticles to obtain solid material, wherein the mass ratio of coal ore solid waste, silica nanoparticles and aluminum nanoparticles is (12-100): (1-10): 1, The molar ratio of silicon, aluminum, and sodium in the solid material satisfies (2-8): (1-5):1;

Step 2, add sodium silicate to water, mix and stir to obtain a basic base solution, then add sodium hydroxide to the basic base solution, mix and stir to obtain a strong base excitation solution; in which the mass ratio of sodium silicate, sodium hydroxide and water is (1-60): (1-30):100;

Step 3, adding a polydimethylsiloxane and a silane coupling agent to the strong base excitation solution configured in Step 2. And an emulsification treatment to obtain a strong base-hydrophobically modified composite solution; in which the mass ratio of polydimethylsiloxane, silane coupling agent and strong base excitation solution is (1 to 25): (0.05 to 1.25): 375;

Step 4, add xanthan gum, polyvinyl alcohol, sodium dodecylbenzene sulfonate to deionized water to mix, mix and stir to obtain a base liquid; the mass ratio of xanthan gum, polyvinyl alcohol, sodium dodecylbenzene sulfonate and water is (1-80): (1-25): (1-50): 1000,

Step 5, carbon dioxide is passed through a diffuser into the base liquid obtained in Step 4, and the carbon dioxide gas is dispersed and homogenized in the base liquid using a carbon dioxide homogenization system to obtain a carbon dioxide nano-bubble fluid; the volume ratio of carbon dioxide gas to base liquid is (5 to 45): 100, Wherein the carbon dioxide gas is at atmospheric pressure;

Step 6, mixing the solid of the configuration of step 1, the strong base-hydrophobically modified composite solution of the configuration of step 3, and the carbon dioxide nano-bubble fluid of step 5, and stirring. This results in a high solid carbon strong barrier whole solid filler material; the mass ratio of solid, strong alkali-hydrophobically modified composite solution and carbon dioxide nano-bubble fluid is 6: (2.5 to 4.7): (1.3 to 2.8).

Assignees: CHINA UNIV OF MINING AND TECHNOLOGY; UNIV CHINA MINING

195. Family 108015158 (KR20250068465 A)

[View in PatBase](#)

Title
[EN] CEMENT COMPOSITION CONTAINING RED MUD TREATED BY MINERAL CARBONATION

Abstract
[MT] A cement composition including carbonated red mud, which is manufactured by reacting carbon dioxide, a main culprit of greenhouse gases, with red mud and includes a carbonate and an eco-friendly expanding agent, is disclosed, which reduces carbon dioxide emissions and prevents strength degradation and cracking when used as a building material. The disclosed cement composition including carbonated red mud may include portland cement; ground granulated blast furnace slag; carbonated red mud; an expanding agent; and an additive.

1st Main Claim
[MT] In cement compositions,
portland cement;
Ground granulated blast furnace slag;
Carbonated red mud;
Inflatable; and
A cement composition comprising carbonated red mud containing an additive.

Assignees: UNIV WOOSUK; INDUSTRIAL ACADEMIC COOPERATION GROUP WOOSUK UNIV

196. Family 93102921 (CN114956774 A)

[View in PatBase](#)

Title

[EN] METHOD FOR PREPARING BUILDING MATERIAL BY UTILIZING BULK SOLID WASTE TO SYNERGISTICALLY MINERALIZE CO₂

Abstract

[EN] The invention relates to the field of C04B28/00 of IPC classification, in particular to a method for preparing a building material by utilizing bulk solid waste to synergistically mineralize CO₂ and application. The invention relates to a method for preparing a building material by synergistically mineralizing CO₂ by using bulk solid wastes. The method at least comprises the following steps: mixing solid waste raw materials, carrying out mineralization reaction, carrying out hydrothermal reaction and carrying out block forming. According to the invention, through raw material ratio and material design, the activity of each element in the solid waste is brought into full play from the perspective of thermodynamics, and CO₂ can be efficiently utilized while the problem of treatment and disposal of a large amount of silicon-aluminum solid waste is solved by means of low carbon emission, so that a resource product with high cost performance is obtained.

1st Main Claim

[MT] 1. A method of making use of bulk solid-waste cooperative mineralization CO₂ for the preparation of building materials, characterized in that the steps comprise the preparation of solid-waste mixes, mineralization reactions, hydrothermal reactions and blocking formations; the order of the mineralization reactions is located before or after the blocking formation step; the solid-waste mixes comprise solid waste and water.

Assignees: JIANGSU JICUI FUNCTIONAL MATERIALS RES INST CO LTD

197. Family 3610587 (US4635724 A)

[View in PatBase](#)

Title

[EN] CO₂-ENHANCED HYDROCARBON RECOVERY WITH CORROSION-RESISTANT CEMENT

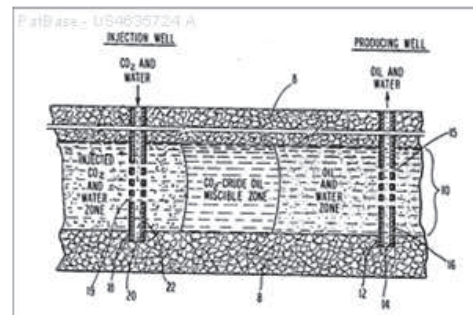
Abstract

[EN] In a hydrocarbon recovery system including CO₂ pressurization of an underground formation, a sealing cement comprised of Portland cement and Class C fly ash.

1st Main Claim

[EN] 1. In a system for producing a hydrocarbon fluid from a deposit of said fluid in an underground formation, carbon dioxide and water also being present in said formation, said system including at least one bore hole and a centrally disposed metal tube therein extending from ground level to said underground formation, the improvement consisting of a CO₂ -corrosion resistant cement surrounding said tube and occupying the annular space between said tube and said formation, said cement comprising a hardened cement slurry comprised of Portland cement and Class C fly ash in a weight proportion of from about 1:2 to 2:1.

Assignees: SCHLUMBERGER DOWELL INC; DOWELL SCHLUMBERGER INC



198. Family 85674181 (CN113021617 A)

[View in PatBase](#)

Title
[EN] SEAWATER AND SEA SAND CONCRETE AND FRP RIB LONG-TERM COOPERATIVE WORK METHOD CONSIDERING CO2 CURING

Abstract
[EN] The invention discloses a seawater and sea sand concrete and FRP rib long-term cooperative work method considering CO2 curing. According to the method, the seawater and sea sand concrete is subjected to carbonization curing, the pH value of concrete pore liquid is decreased, and therefore the problem of premature failure caused by high alkalinity of the concrete pore liquid to FRP ribs is solved. Meanwhile, the compressive strength of the concrete is improved. According to the method, cement hydration in the seawater and sea sand concrete is a series of dissolution and deposition reaction occurring among carbon dioxide, cement clinker and seawater, hydration of cement in the seawater and sea sand concrete under carbonization curing is predicted through a thermodynamic model, and the working environment around the FRP ribs in the seawater and sea sand concrete is obtained. The sealing of carbon dioxide gas and the long-term efficient cooperative work of the FRP ribs and the seawater and sea sand concrete are achieved.

1st Main Claim

[MT] A method taking into account the CO2seawater sea sand concrete curing FRP tendons and long-term work together, characterized in that the method comprises the steps of:

Step one, according to the structure and materials design requirements, determine the ratio of raw materials and the preparation of the preparation of concrete member FRP tendons;

Step 2, FRP tendons banding, formwork, pouring concrete, and prepared in the same proportions, side length or the radius greater than 2 times the thickness of the protective layer reinforcement diameter of +FRP seawater sea sand concrete specimen;

Step three, the new pouring concrete member FRP tendons sea sand containing seawater out of water, so that water loss rate of 20% to 40%;

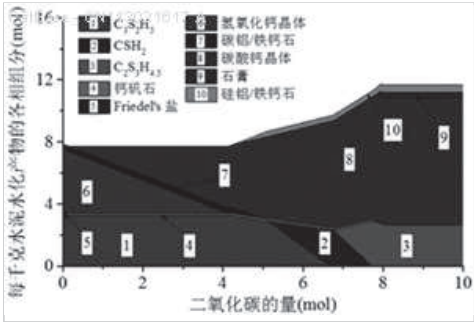
Step four, Chaimo and conservation of the member moves to the carbonized environment, for FRP tendons sea sea sand concrete member carbonization conservation;

Step five, when the members are fully carbonized, the FRP tendons sea sea sand concrete structures for water gardening;

Step six, using the dissolution/deposition reaction phase equilibrium thermodynamic model predictive carbonized conservation role under the sea sea sand concrete member FRP tendons cement hydration to give working surroundings - cement hydration products each solid-phase component and the concrete pore solution chemical component;

Step seven, with the thermodynamic database, based on the element of conservation cement hydration, calculated within the set carbonization curing conditions seawater sea sand cement concrete members each phase composition and pore solution each ion concentration, the sequestration of carbon dioxide gas and FRP tendons with seawater sea sand concrete long-term work together efficiently provide key theoretical basis.

Assignees: HARBIN INST TECHNOLOGY; UNIV XIAN ARCHITECTUR AND TECH; HARBIN INST OF TECHNOLOGY; XI AN UNIV OF ARCHITECTURE AND TECHNOLOGY



199. Family 104906673 (CN118791254 A)

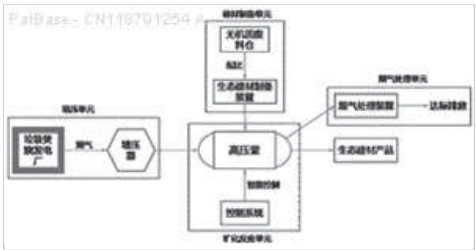
[View in PatBase](#)

Title

[EN] INTEGRATED METHOD AND SYSTEM FOR PREPARING ECOLOGICAL BUILDING MATERIALS FROM WASTE INCINERATION FLUE GAS CO2 SOLIDIFICATION COUPLING SOLID WASTE

Abstract

[EN] The invention discloses an integrated method for preparing an ecological building material from waste incineration flue gas CO2 curing coupling solid waste, which comprises the following steps: designing a matching group according to the chemical composition of the solid waste and the type of the ecological building material, obtaining a corresponding Si-Al-Ca-Fe matching ratio according to different matching ratios in the matching group, and obtaining a four-dimensional lattice diagram; the method comprises the following steps: determining the type of an ecological building material to be produced, finding a corresponding Si-Al-Ca-Fe ratio in a four-dimensional lattice diagram, selecting solid waste types, detecting the contents of Si, Al, Ca and Fe in each solid waste type, calculating the guided use amount of each solid waste in combination with the contents and the Si-Al-Ca-Fe ratio, preparing a primary product of the ecological building material, and performing mineralization reaction on the primary product of the ecological building material to prepare the corresponding ecological building material. According to the method, the primary product of the ecological building material can be efficiently prepared, the waste incineration flue gas is adopted for mineralizing the ecological building material product, part of CO2 is captured and solidified, the concentration of CO2 in the waste incineration flue gas is effectively reduced, and the effects of reducing carbon and reducing emission are achieved.



1st Main Claim

[MT] 1. A waste incineration flue gas CO2Curing coupled solid waste ecological building material integration method characterized by comprising the steps of:

- S10, designing a proportioning group according to the chemical composition of the solid waste and the kind of the ecological building material, then obtaining corresponding Si-Al-Ca-Fe proportioning according to the different proportioning in the proportioning group, and obtaining a four-dimensional lattice map consisting of a plurality of sets of Si-Al-Ca-Fe ratios;
- S20, determining the type of ecological building material to be produced, the corresponding Si-Al-Ca-Fe ratio being found in said four-dimensional lattice map according to the type of ecological building material;
- S30, selecting the solid waste species used to prepare the ecological building material according to the Si-Al-Ca-Fe ratio, detecting the content of Si, Al, Ca, Fe in each solid waste species, and calculating the instructed amount of each solid waste in combination with the content and the Si-Al-Ca-Fe ratio;
- S40, according to the various solid waste guidelines for preparing the ecological building materials starting products, using autoclave and pressurized waste incineration flue gas to mineralize the ecological building materials starting products, to produce corresponding ecological building materials.

Assignees: GUANGDONG GUANGYE INVEST GROUP CO LTD

200. Family 47930683 (US2010326328 AA)

[View in PatBase](#)

Extended Family Number: 42613795

Title

[EN] CO2-SEQUESTERING FORMED BUILDING MATERIALS

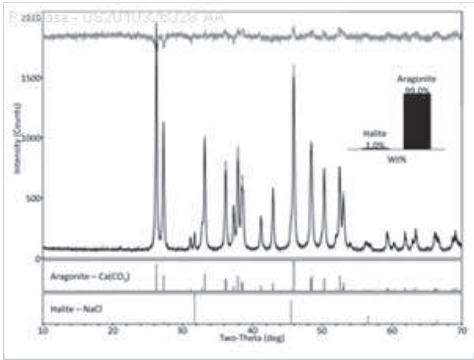
Abstract

[EN] CO2-sequestering formed building materials are provided. The building materials of the invention include a composition comprising a carbonate/bicarbonate component. Additional aspects of the invention include methods of making and using the CO2-sequestering formed building material.

1st Main Claim

[EN] **31.** A formed building material comprising a CO₂-sequestering component, wherein the formed building material comprises 5 percent (w/w) CO₂-sequestering component or more, and wherein the formed building material is selected from the group consisting of a) a brick having a compressive strength ranging from 5 to 100 MPa; b) a block having a compressive strength ranging from 5 to 100 MPa; c) a tile having a compressive strength ranging from 5 to 75 MPa; d) a cement board having a compressive strength ranging from 5 to 50 MPa; e) a drywall having a compressive strength ranging from 1 to 20 MPa; f) a conduit having a compressive strength ranging from 5 to 75 MPa; g) a beams having a compressive strength ranging from 35 to 150 MPa; h) a basin having a compressive strength ranging from 5 to 60 MPa; i) a column having a compressive strength ranging from 25 to 200 MPa; j) a fiber-cement siding having a compressive strength ranging from 2 to 25 MPa; and k) a slab having a compressive strength ranging from 10 to 100 MPa.

Assignees: YOUNGS ANDREW; CONSTANTZ BRENT R; HOLLAND TERENCE C; CALERA CORP



[View in PatBase](#)

[EN] CEMENT ADMIXTURE, CEMENT COMPOSITION AND METHOD FOR SUPPRESSING CARBONATION USING THE SAME

[EN] A cement admixture and a cement composition having a carbonation suppressing effect and a heat-of-hydration suppressing effect are provided. A cement admixture containing one or more non-hydraulic compounds selected from the group consisting of γ - $2\text{CaO} \cdot \text{SiO}_2$, α - $\text{CaO} \cdot \text{SiO}_2$ and calcium magnesium silicate, a cement composition containing said admixture, and a carbonation suppressing method by use of said cement admixture or cement composition. According to the present invention, a remarkable carbonation suppressing effect can be obtained particularly when used in portland blast-furnace slag cement. This leads to an effective use of steelmaking slag and the like, and the load of clinker can be reduced, so that a cement composition of a low environmental load type can be attained. Further, this is suitable for cements in conformity with the EN standards, which are used in civil engineering and building industries.

[EN] 1. A cement composition comprising a cement and a cement admixture **characterized by** comprising at least one or more non-hydraulic compounds selected from the group consisting of $\gamma\text{-}2\text{CaO}\cdot\text{SiO}_2$, $\alpha\text{-CaO}\cdot\text{SiO}_2$ and calcium magnesium silicate; wherein the content of the cement admixture is from 5 to 50 parts by weight in 100 parts by weight of the total amount of the cement and the cement admixture, and the content of $\gamma\text{-}2\text{CaO}\cdot\text{SiO}_2$ in the cement admixture is 35 weight- percent or more.

[illegible]

202. Family 68935694 (CN107814502 A)

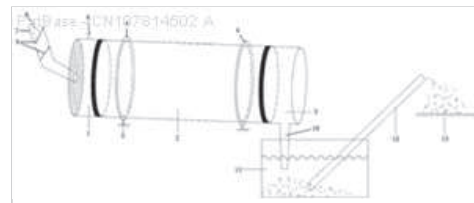
[View in PatBase](#)

Title

[EN] CARBONIZING DEVICE FOR SOLID WASTE RECYCLED AGGREGATES FOR CONCRETE

Abstract

[EN] The invention discloses a carbonizing device for solid waste recycled aggregates for concrete. The device comprises a loading bin, a drum type carbonizing bin and a storage bin, wherein the loading bin and the storage bin are arranged on two ends of the drum type carbonizing bin in a sealing way; a circumferential rack is arranged on an outer surface of the drum type carbonizing bin, and is meshed with a fixed motor transmission gear. A double-spiral turnover plate is arranged on an inner cylinder wall of the drum type carbonizing bin. The loading bin is provided with a carbon dioxide air inlet, and a feed hopper is arranged on the end part; a discharging leakage pipe is arranged on the bottom part of the storage bin. The feed hopper is sealed by a valve closed by automatic rebound, and a discharge hole is sealed by a water tank. The carbonizing device not only realizes continuous production of recycled aggregates carbonizing, but also realizes full seal of a carbonizing space, guarantees that no CO₂ gas is lost during a carbonizing process, and provides a way for industrial production of solid waste recycled aggregates carbonizing. Meanwhile, according to the carbonizing device, the recycled aggregates can fully absorb the CO₂ gas, and the mechanical strength of the recycled aggregates is greatly improved.



1st Main Claim

[MT] 1. solid waste recycled concrete aggregate for concrete carbonation device, including silos and silo to be carbonized, drum storage silos; Which is characterized by: Both ends of the drum-type carbonization bin circumferentially provided with rollers, to be silos and storage bins are equipped with the rumble carbonization cartridge adapted circular rail interface, until the silo storage silos and closed, respectively sleeved on both ends of the drum-type carbon cartridge;

Drum-type carbonization cartridge outer surface provided with a circumferential rack, a circumferential rack with a motor fixed to the drive gear; Drum-type carbonization cartridge cylinder wall is provided with a double helical stacker plate;

The silo is provided with carbon dioxide gas inlet end portion is provided with a feed hopper; The bottom of the storage bin is provided with a discharge drain pipe.

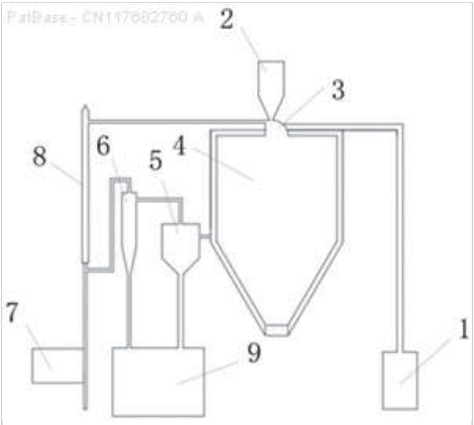
Assignees: CHINA UNIV OF MINING AND TECHNOLOGY; UNIV CHINA MINING

203. Family 101634144 (CN117682760 A)

[View in PatBase](#)

Title
[EN] CO2 SEALING CARRIER, PREPARATION METHOD AND DEVICE

Abstract
[EN] The invention discloses a CO2 storage carrier, a preparation method and a device. The CO2 storage carrier is prepared from the following components in percentage by mass: 30.10 to 40.45 percent of quartz, 8.75 to 14.3 percent of borax, 5.13 to 7.20 percent of calcium oxide, 5.50 to 7.52 percent of magnesium oxide, 1.87 to 3.47 percent of sodium carbonate, 0.12 to 0.53 percent of sodium sulfate, 0.23 to 0.82 percent of sodium phosphate, 0.06 to 0.33 percent of stabilizing dispersant, 0.02 to 0.13 percent of surfactant and 35 to 45 percent of water. The preparation method comprises the following steps: (1) preparing slurry; (2) preparing a CO2 sequestration carrier precursor; and (3) preparing the CO2 sequestration carrier. The CO2 sequestration carrier provided by the invention is internally wrapped with carbon dioxide gas, so that carbon sequestration can be realized, and a carbon neutralization distant view target can be assisted to be realized early.



1st Main Claim
[MT] A CO₂A sequestering carrier characterized in that it comprises, by mass percentage, the following components:

- Quartz: 30.10 to 40.45%
- borax: 8.75-14.3%
- Calcium oxide: 5.13-7.20%
- Magnesium oxide: 5.50-7.52%
- Sodium carbonate: 1.87-3.47%
- sulfuric acid sodium: 0.12 to 0.53%
- phosphorus sodium acid: 0.23 to 0.82%
- Stable dispersant: 0.06 to 0.33%
- Surfactant: 0.02 to 0.13%
- Water: 35 to 45 per cent.

Assignees: CHINA BUILDING MAT ACADEMY; CHINA BUILDING MAT GROUP CO LTD; CHINA BUILDING MAT ACADEMY CO LTD; CHINA NAT BUILDING MATERIAL GROUP CO LTD

204. Family 48738529 (ES2356877 AA)

[View in PatBase](#)

Title

[EN] CONSTRUCTION MATERIAL, METHOD OF OBTAINING SUCH MATERIAL, ELABORATED CONSTRUCTION ELEMENT USING SUCH MATERIAL AND USE OF MATERIAL AS A CO2 SUM TO IMMOBILIZE CARBON LONG TERM. (MACHINE-TRANSLATION BY GOOGLE TRANSLATE, NOT LEGALLY BINDING)

Abstract

[EN] Construction material, procedure for obtaining said material, constructive element made using said material and use of material as co2 sink to immobilize carbon in the long term. Used both in civil construction and construction, it includes the preparation of construction materials, preferably bituminous mixtures and hydraulic mortars of cement or gypsum, based on vegetable aggregates such as sawdust, wood shavings and/or fibers, and straw, by means of of a method that includes a heat treatment of aggregate heating. Aggregates can be obtained from wood from industrial waste from logging or agriculture companies, as well as from renewable forest plantations. (Machine-translation by Google Translate, not legally binding)

1st Main Claim

[MT] 1. Construction material which is selected from hydraulic mortar and asphalt mixture comprising at least one binder, characterized That it further comprises vegetable aggregates are selected from sawdust, shavings, wood fibers and straw.

Assignees: HORBIOPAT S L

[View in PatBase](#)

[EN] CARBONATION HARDENING BODY AND MANUFACTURING METHOD THEREOF

[EN] To provide a carbonation hardening body capable of largely reducing a total amount of carbon dioxide exhausted and having large strength, by absorbing a large amount of carbon dioxide in an aging process. SOLUTION: A carbonation hardening body obtained by carbonating a hardening body of a hydraulic composition containing (A) a powdery hydraulic material containing C2S and C2AS and containing pulverized calcined material that satisfies the following conditions (1) and (2), (B) water, and (C) an aggregate containing cement hydrate-containing aggregate. (1) When the fired product does not contain C4AF, an amount of C2AS is 10 to 2,000 pts.mass with respect to 100 pts. mass of C2S, and when the fired product contains C4AF, a total amount of C2AS and C4AF with respect to 100 pts.mass of C2S is 10 to 2,000 pts.mass, and a ratio of C4AF in the total 100 mass percent of C2AS and C4AF is 70 percent by mass or less, and (2) the fired product does not contain C3A or contains C3A in an amount of 20 pts.mass or less relative to 100 pts.mass of C2S. SELECTED DRAWING: None

[illegible]

Assignees: TAIHEIYO CEMENT CORP

206. Family 105098513 (JP2024155544 A2)

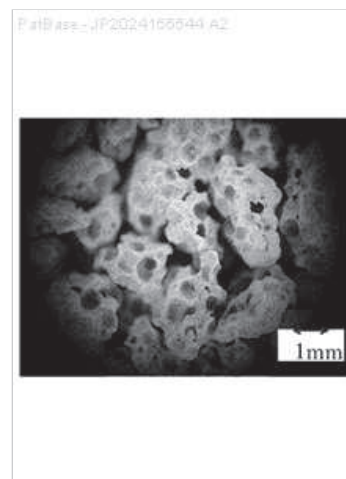
[View in PatBase](#)

Title

[EN] PRODUCTION METHOD OF LIGHT-WEIGHT CELLULAR CONCRETE USED WITH CARBONATION TREATED LIGHT-WEIGHT CELLULAR CONCRETE POWDER

Abstract

[EN] To realize light-weight cellular concrete that can be taken as interior wall materials even if an ALC recycling amount is large while maintaining panel strength of the light-weight cellular concrete used as a wall material, also does not require a special measuring apparatus, facilitates process control, is hardly affected by fluctuation of a recycled raw material amount to compression strength even if recycled raw materials are used with 25 mass percent or more in internal percentage solids without requiring a special firing facility, has a small contraction coefficient and can be stably held. SOLUTION: A production method of light-weight cellular concrete is characterized by coarsely grinding light-weight cellular concrete wastes to a diameter of 1.2 mm or less, and adding recycled raw materials for light-weight cellular concrete containing carbonation treated calcium carbonate with 20 degrees centigrade to 80 degrees centigrade from 2 mass percent to 25 mass percent of the whole mass of light-weight cellular concrete materials in internal percentage solids. SELECTED DRAWING: Figure 1



1st Main Claim

[MT] 1. A method for producing a recycled raw material for lightweight cellular concrete containing calcium carbonate, wherein lightweight cellular concrete waste is roughly crushed to 1.2 mm diameter or less and subjected to a carbonating treatment with 20 degrees Centigrade 80 degrees Centigrade.

Assignees: CLION CO LTD

207. Family 108198614 (CN120058330 A)

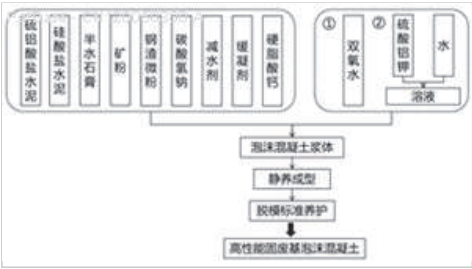
[View in PatBase](#)

Title

[MT] A HIGH-PERFORMANCE SOLID WASTE-BASED FOAMED CONCRETE BASED ON O₂-CO₂ COMPOSITE CHEMICAL FOAMING AND ITS PREPARATION METHOD AND APPLICATION

Abstract

[MT] [0001] The present invention discloses a high-performance solid waste-based foamed concrete based on O₂ - CO₂ composite chemical foaming, and a preparation method and application thereof, and belongs to the technical field of foamed concrete. The high-performance solid waste-based foamed concrete provided by the present invention is made of raw materials including the following mass fractions: 20-42 parts of solid waste-based sulphoaluminate cement, 15-60 parts of hemihydrate gypsum, 6-15 parts of silicate cement, 15-25 parts of mineral powder, 1-3 parts of steel slag powder, 1-2 parts of hydrogen peroxide, 2-4 parts of sodium bicarbonate, 3-6 parts of potassium aluminum sulfate, 0.2-0.4 parts of retarder, 0.02-0.2 parts of water reducer, 0.2-0.6 parts of calcium stearate, and a water-cement ratio of 0.25-0.4; wherein, hydrogen peroxide decomposes to provide O₂, and sodium bicarbonate and potassium aluminum sulfate react to provide CO₂. The present invention prepares a foamed concrete material with both high compressive strength and low dry density, and can simultaneously consume solid waste in a high proportion.



1st Main Claim

[MT] 1. A high-performance solid waste-based foamed concrete based on O₂ -CO₂ composite chemical foaming, characterized in that it is made of the following raw materials in parts by mass:

20-42 parts of solid waste-based sulphoaluminate cement, 15-60 parts of hemihydrate gypsum, 6-15 parts of Portland cement, 15-25 parts of mineral powder, 1-3 parts of steel slag powder, 1-2 parts of hydrogen peroxide, 2-4 parts of sodium bicarbonate, 3-6 parts of potassium aluminum sulfate, 0.2-0.4 parts of retarder, 0.02-0.2 parts of water reducer, 0.2-0.6 parts of calcium stearate, and a water-cement ratio of 0.25-0.4;

Among them, hydrogen peroxide decomposes to provide O₂, and sodium bicarbonate and potassium aluminum sulfate react to provide CO₂;

The method for preparing high-performance solid waste-based foamed concrete based on O₂ -CO₂ composite chemical foaming comprises the following steps:

S1. Premix solid waste-based sulphoaluminate cement, hemihydrate gypsum, silicate cement, mineral powder, steel slag powder and sodium bicarbonate; then add retarder, water reducer and calcium stearate, stir and mix to obtain a mixture;

S2, adding water to the mixture of step S1, stirring at a speed of 400-800 r/min for 1-10 min;

S3, adjust the stirring speed to 50-150 r/min, then add hydrogen peroxide, and stir at a speed of 400-800 r/min for 20-40 seconds after the addition is completed;

S4. Add potassium aluminum sulfate aqueous solution to the slurry in step S3, stir at a speed of 400-800 r/min for 20-40 s, pour into a mold and let it stand for shaping, and perform curing after demoulding to obtain the slurry.

Assignees: SHANDONG UNIV

208. Family 47894173 (AR073172 AA)

[View in PatBase](#)

Extended Family Number: 42613795

Title

[MT] AN AGGREGATE WHO UNDERSTANDS A SYNTHETIC COMPONENT THAT CO₂ KIDNAPS, A STRUCTURE THAT INCLUDES/UNDERSTANDS THE AGGREGATE, AND A METHOD AND A SYSTEM TO PRODUCE THE AGGREGATE

Abstract

[MT] The aggregate understands a synthetic component that kidnaps CO₂ and has a Mohs hardness of 3 or but. The method to produce the aggregate includes/understands: (i) to make precipitate a composition of compound of carbonate that kidnaps CO₂ from water that contains divalentes cations to form precipitating, and (II) to process the composition of compound of carbonate that kidnaps CO₂ under conditions that produce the aggregate with at least 3 a Mohs hardness of Mohs. The system to produce the aggregate includes/understands: (i) an entrance for water that contains divalentes cations; (II) a precipitation station of composed of carbonate that puts under the water to conditions of precipitation of composed of carbonate and produces a compound composition of precipitated carbonate; and (III) an aggregate producer to produce an aggregate of at least 3 a Mohs hardness of Mohs from the hasty composition of composed of carbonate. The resulting aggregate has use in a variety of different applications, for example, in the production of mortars and concretes, as well as asphalt and other construction equipments. The aggregates serve to kidnap CO₂ of an initial gaseous current that contains CO₂, for example, stably storing CO₂ in the constructed surroundings.

Assignees: CALERA CORP

209. Family 64527180 (KR20160150622 A)

[View in PatBase](#)

Title

[EN] A COMPOSITE OF LOW GRADE LIME FROM FLUIDIZE-BED BOILER WITH CO₂ EMISSION REDUCING AND REMOVAL OF SULFUR OXIDES IN EXHAUSTED GAS AND IMPROVEMENT OF HIGH BASICITY EFFICIENCY IN SMELTING PROCESS AND MANUFACTURING METHOD THEREOF

Abstract

[EN] The present invention relates to a low grade quicklime composition derived from fluidized-bed boilers having functions of reducing carbon dioxide emission, desulfurizing sintered exhaust gas, and increasing efficiency in basicity in a smelting process which is intended to remove sulfur oxides contained in sintered gas from the smelting process using fluidized-bed boiler fly ash having high content of quicklime, to increase efficiency in basicity in a sintering furnace during the smelting process, and also to reducing carbon dioxide emission generated after the sintering process. The present invention further relates to a production method thereof. According to the present invention, it is possible to effectively remove sulfur oxides contained in exhaust gas released after the sintering process and also to increase efficiency in basicity in the sintering furnace, thereby enhancing durability of the sintering furnace. In addition, carbon dioxide emission from the sintering process decreases by replacing limestone used in the sintering process. Moreover, by using the composition for removing sulfur oxides, desulfurizing efficiency for sulfur oxides in the sintered exhaust gas can be enhanced with ease without additional processing devices.

1st Main Claim

[MT] 1. fluidized bed Awards boiler fly ash 40 to 90 weight percent; and basic materials for 10 to 60 weight percent; and, as mentioned above the surface of the boiler fly ash non-fluidized bed Awards 2000 to 4,000 Cm^2/g featuring smelter to be fair, even in base enhancing the efficiency of desulfurization and hungry sintering carbon dioxide emission reduction features that occur in the fluidized bed Awards boiler graces quicklime composition.

Assignees: JUNG KU IL

210. Family 64578397 (CN106277885 A)

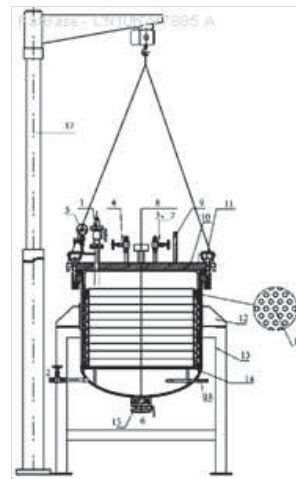
[View in PatBase](#)

Title

[EN] DEVICE AND METHOD FOR STRENGTHENING RECYCLED AGGREGATE BY MEANS OF CO₂

Abstract

[EN] The invention relates to a device and method for strengthening recycled aggregate by means of CO₂. The device comprises a reaction kettle with a kettle cover, a plurality of layers of stacked material frames are arranged in the reaction kettle, a gas inlet connected with a carbon dioxide steel cylinder is formed in the side of the reaction kettle, a pressurizing opening is formed in the kettle cover and connected with the carbon dioxide steel cylinder through a booster pump, and the kettle cover is further provided with an exhaust port and a vacuum opening connected with a vacuum pump. The device is simple in structure, convenient to install and maintain, convenient to clean and high in universality. By means of reaction of CO₂ and recycled aggregate, the recycled aggregate is strengthened, basic properties of the recycled aggregate are improved, the water absorption rate and porosity of the recycled aggregate are reduced, the aperture is reduced, carbonization time is shortened, carbonization depth is increased, the treatment effect is improved, the yield is increased, and the equipment utilization rate is increased.



1st Main Claim

[MT] 1. a using CO₂ Strengthened regeneration aggregate of device, its features is: including with kettle cover of reaction Kettle, reaction Kettle within has multilayer overlay in with of material box, reaction Kettle side Department set has and carbon dioxide cylinders phase connection of intake mouth, by said Kettle cover Shang has pressure mouth, pressure mouth by booster pump and by said carbon dioxide cylinders phase connection, by said Kettle cover Shang also has exhaust mouth and vacuum pump phase connection of vacuum mouth.

Assignees: UNIV FUZHOU; FUZHOU UNIV

211. Family 63443880 (KR20160104208 A)

[View in PatBase](#)

Title

[EN] A COMPOSITE OF LOW GRADE LIME FROM FLUIDIZE-BED BOILER WITH CO₂ EMISSION REDUCING AND REMOVAL OF SULFUR OXIDES IN EXHAUSTED GAS AND IMPROVEMENT OF HIGH BASICITY EFFICIENCY IN SMELTING PROCESS AND MANUFACTURING METHOD THEREOF

Abstract

[EN] The present invention relates to a low grade quicklime composition generated from a fluidic layer boiler, and to a method for producing the same. The low grade quicklime composition has functions in removing sulfur oxide contained in sintered gas during a refining process by using a fluidic layer boiler scattering material having a large content of quicklime, improving basicity efficiency in a sintering furnace during a refining process, improving basicity efficiency during a refining process for reducing the discharging amount of carbon dioxide generated after sintering, desulfurizing sintered exhaust gas, and reducing the discharge of carbon dioxide. According to the present invention, sulfur oxide included in exhaust gas discharged as a result of a sintering process is effectively removed, and basicity efficiency in a sintering furnace is improved. Accordingly, durability of the sintering furnace is improved, and quicklime used during the sintering process is replaced, so the discharging amount of carbon dioxide generated during the sintering process is reduced. Moreover, by using the low grade quicklime composition for removing sulfur oxide according to the present invention, an effect in desulfurizing sulfur oxide in sintered exhaust gas can be easily improved without using a separate treating device.

1st Main Claim

[MT] 1. The present invention is 40 to 90 percent by weight of the fluidized bed boiler fly ash; Basic material 10 to 60 percent by weight low-grade calcium oxide composition produced in a fluidized bed boiler of the basicity and the desulfurization efficiency and reducing carbon dioxide emissions from the flue gas of the sintering function refining process comprising the

Assignees: JUNG KU IL

212. Family 103819116 (WO24158901 A1)

[View in PatBase](#)

Title

[EN] SYNTHESIS OF CEMENT FROM ALTERNATIVE RAW MATERIALS AND FUELS THAT REDUCES OR ELIMINATES CO₂ EMISSIONS

Abstract

[EN] Methods for making a cement clinker include providing a source of calcium oxide, and wherein the source of calcium oxide has at least one of calcium sulfate and calcium sulfite; and heating the source of calcium oxide to decompose the source of calcium oxide, wherein the heating includes generating heat by using a low-carbon or carbon-free fuel.

1st Main Claim

[EN] 1. A method of making a cement clinker, the method comprising: providing a source of calcium oxide, and wherein the source of calcium oxide comprises at least one of calcium sulfate and calcium sulfite; heating the source of calcium oxide to decompose the source of calcium oxide, wherein the heating comprises generating heat by using a low-carbon or carbon-free fuel.

Assignees: ATAKAN VAHIT

213. Family 87059295 (PL435762 A1)

[View in PatBase](#)

Title

[EN] USE OF BASALT VOLCANIC TUFF OF EACH FRACTION EXPRESSED IN MILLIMETERS FROM THE TARGOWICA AND TARGOWICA WSCHOD BAZALT DEPOSIT, TOWN OF TARGOWICA, ZABKOWICKI POVIAT, DOLNOSLASKIE VOIVODESHIP, POLAND AS A NATURAL ADDITIVE IN FOR PRODUCTION OF CEMENT, CONCRETE AND CONCRETE PREFABRICATION TO REDUCE CO2 EMISSIONS OF CEMENT AND CONCRETE AND AS A SUBSTITUTE FOR FLY ASH FROM COAL COMBUSTION AND BLAST FURNACE SLAG FROM STEEL PRODUCTION REDUCING THE CLINKER CONTENT IN CEMENT

Abstract

[MT] The subject of the notification is the use of volcanic basalt tuff of each fraction expressed in millimeters from the Targowica basalt deposit and Targowica Wschod, Targowica, area Zabkowicki, voivodeship Dolnoslaskie, Poland as a natural additive in the production of cement, concrete and concrete prefabrication, reducing CO2 emissions of cement and concrete, and as a substitute for fly ash from coal combustion and blast furnace slag from steel production, reducing the content of clinker in cement. An additional component for cement and concrete, containing natural volcanic basalt rock, known as volcanic tuff, is characterized by the fact that volcanic basalt tuff is mined in opencast mines and pre-crushed to fractions from 0 mm to 800 mm containing natural components such as SiO₂, Al₂O₃, Fe₂O₃, CaO, MgO, TiO₂, Na₂O + K₂O then transported and added via conveyors directly to the cement mill in a fraction of 0 mm to 90 mm in a cement plant reduces the clinker content in the cement by 30 percent and this reduces CO2 emissions of Portland puculan cement by 30 percent and enables the production of new cement marked with the letter P as cement with natural puculana in the cement brand symbol.

Assignees: STARZYK KRZYSZTOF KS DORADZTWO BIZNESOWE

214. Family 59613996 (KR20150071919 A)

[View in PatBase](#)

Title

[EN] CONCRETE REPAIRING MATERIAL AGAINST SALT DAMAGE AND CARBONATION WITH CONTROLLABLE CURING TIME

Abstract

[EN] The present invention includes a concrete repairing material containing magnesium phosphate cement consisting of ammonium phosphate and magnesium oxide and a retarder for delaying solidification of magnesia and phosphate cement curing time. Mortar for concrete repairing according to the present invention contains a magnesium phosphate cement consisting of ammonium phosphate and magnesium oxide and a retarder for delaying the magnesia and phosphate cement curing time. A ratio of ammonium phosphate and magnesium oxide is 70 percent or more.

1st Main Claim

[MT] 1. Magnesium ammonium phosphate and the phosphate cement consisting of magnesium oxide, the magnesia phosphate concrete repair material comprising a retarder for delaying solidification and curing time of the cement.

Assignees: SAM JIN BUILD AND TRADE CO LTD; LEE YONG JAE; DONGYANG STRUCTURAL ENGINEERING AND REMODELING CO LTD; YOON SANG CHUN

215. Family 65652797 (CN106630839 A)

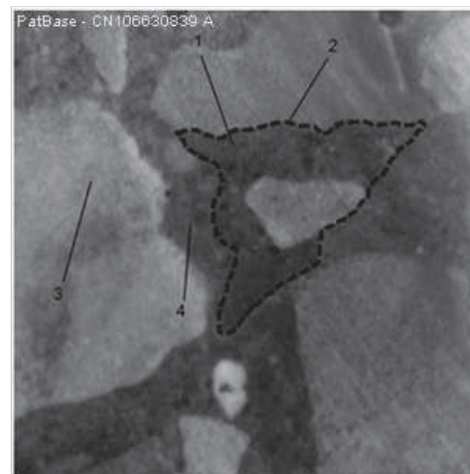
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Title

[EN] RECYCLED AGGREGATE FOR DIFFERENTIATING NEW AND OLD MORTAR IN CARBONIZED CONCRETE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention provides a preparation method of a recycled coarse aggregate. The method comprises the following steps of uniformly mixing cement, pulverized fuel ash, silica fume, river sand, gravel and iron oxide red, adding a water reducing agent uniformly dispersed in water into an obtained first mixture, agitating an obtained second mixture, carrying out standard curing on a made concrete test piece, and then disintegrating the concrete test piece, so as to obtain the recycled coarse aggregate, wherein the recycled coarse aggregate is prepared from the following materials in percentages by weight: 5.4 to 16.1 percent of the water, 11.8 to 38.3 percent of the cement, 0 to 3.9 percent of the pulverized fuel ash, 0 to 4.2 percent of the silica fume, 28.0 to 57.8 percent of the river sand, 0 to 46.6 percent of the gravel, 0.07 to 0.38 percent of the iron oxide red and 0.04 to 0.38 percent of the water reducing agent. The invention also provides the recycled coarse aggregate for differentiating new and old mortar in carbonized concrete, which is made through the method. The new and old mortar in the carbonized concrete can be conveniently differentiated according to the color of the recycled coarse aggregate; meanwhile, through accurately controlling the addition amount of the oxide iron red, the strength of the recycled coarse aggregate is guaranteed and the pore structure and the carbonization condition of the old mortar are guaranteed not to be influenced by the added iron oxide red; the new and old motor in the concrete is convenient to research independently.



1st Main Claim

[MT] 1. A method for preparing recycled coarse aggregate, characterized in that the preparation method comprises the following steps:

- 1) the cement, fly ash, silica fume, river sand, gravel and red iron oxide mixed;
- 2) The superplasticizer uniformly dispersed in water, was poured into the step 1) mixing the resultant mixture, stirring to obtain a concrete test piece;
- 3) The concrete specimens after standard curing, crushing get recycled coarse aggregate;

Step 1) and step 2), the weight percentage ratio of each material: Water 5.4% to 16.1%, 11.8% ~ 38.3% of cement, fly ash, silica fume 0% ~ 3.9% 0% ~ 4.2%, 28.0% ~ 57.8% river sand, gravel 0% to 46.6%, oxide iron red 0.07% to 0.38%, water reducing agent, 0.04% to 0.38%.

Assignees: UNIV SOUTHEAST; SOUTHEAST UNIV

216. Family 93016653 (KR20220118760 A)

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Title

[EN] METHOD AND COMPUTER PROGRAM FOR PROVIDING OPTIMAL MIXTURE OF AIR ENTRAINED FLY ASH BLENDED CONCRETE CONSIDERING CARBONATION DURABILITY AND FROST DURABILITY

Abstract

[EN] According to the present invention, a program provides information on an air-infused fly ash mixed concrete composition which has the most inexpensive manufacturing costs and is eco-friendly due to small carbon dioxide generation in consideration of carbonation durability and frost durability considering the total costs and a climate change if inputted is information on a composition element mixture range of concrete, a composition element ratio range, compression strength-frost-workability, and carbonation durability, thereby having an advantage of designing air-infused fly ash mixed concrete with low costs and low carbon dioxide without profession knowledge about concrete.



1st Main Claim

[MT] 1. An optimal design method of an airborne fly ash mixed concrete composition taking into account carbonation and cryolysis, wherein when a computer executes an optimal design program of an airborne fly ash mixed concrete composition, the program includes cement (kg/m³), fly ash (kg/m³), Water (kg/m³), coarse aggregate (kg/m³) and ganglia (kg/m³) A component blending range input window capable of inputting a lower limit value (lower limit) and an upper limit value (upper limit) of a component (component) including a water/binder ratio, fly ash/binder ratio, water/solids ratio, A component ratio range input window through which a lower limit value (lower limit) and an upper limit value (upper limit) of a component ratio including an aggregate/a binder ratio, and a sand ratio can be input; a design compression strength value of 28 day of age (MPa) an input window, Compression strength including design slump value (mm) input window, and air entrainment amount (%) input window-frost-workability input window; service life value (year), environmental temperature value (°C.), relative humidity value (%), carbon dioxide concentration (%), cladding depth value (mm), A carbonation durability condition input window; cement capable of inputting a carbonation durability restriction condition including a kind of a representative concentration path (Representative Concentration Pathways, RCP) that is a climate change scenario (kg/m³), fly ash (kg/m³), Water (kg/m³), Granuclear material (kg/m³), coarse aggregate (kg/m³), sensitizer (kg/m³), and an aerating agent ((kg/m³) A method for producing a fly ash mixed concrete composition, comprising: a first step of providing a concrete composition content output window for outputting an optimum content of a fly ash mixed concrete composition comprising a); a calculation execution button; When the component compounding range input window, the component ratio range input window, the compression strength-frost-workability input window, and the carbonation durability condition input window are all input and the calculation execution button is selected and calculation is executed, Calculates a total cost at which the program is an objective function, and uses the input value to provide cement, fly ash, water, which satisfies the compressive strength limiting conditions, workability limiting conditions, carbonation durability limiting conditions, frost durability limiting conditions, absolute volume limiting conditions, component blending range limiting conditions, Fine aggregate, and coarse aggregate contents and water reducer and air entrainer contents, wherein said cement, fly ash, water, fine aggregate, and coarse aggregate contents and water reducer and air entrainer contents use a genetic algorithm (genetic algorithm) whereby said objective function has a minimum and said compressive strength limiting conditions, workability limiting conditions, And a second step; of calculating optimum content values satisfying carbonation durability limiting conditions, frost durability limiting conditions, absolute volume limiting conditions, component compounding range limiting conditions, and component ratio limiting conditions and outputting the optimum content values to an output window of the concrete composition.

Assignees: KNU IND COOPERATION FOUND; KNU IND COOPERATION FOUNDATION

217. Family 12849276 (JP11131804 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR SUPPRESSING CARBONATION OF LIGHTWEIGHT CONCRETE

Abstract

[EN] PROBLEM TO BE SOLVED: To provide a method for suppressing carbonation of lightweight concrete having satisfactory working property with a light weight and excellent in appearance and strength by mixing a lightweight aggregate dried with a percentage of water absorption of a prescribed value or less, cement, a water reducing agent and water. SOLUTION: A lightweight aggregate dried in absolute dry condition or with a percentage of water absorption of 50 percent or less, cement, a water reducing agent and water are mixed together to suppress carbonation. As the cement, alumina cement, general Portland cement, fly ash cement or the like is used, and as the water reducing agent, polycarboxylic acid is used. As the lightweight aggregate, natural lightweight aggregate is used, and an artificial lightweight aggregate may be used together. The specific gravity of the lightweight aggregate is set to less than 1, and the ratio of water to cement is preferably set to 50 percent or less, particularly, 20-50 percent. Other admixtures may be blended. The materials are put in a mixer followed by kneading. proportioning water and the water reducing agent are put thereto to perform a main kneading, and the resulting mixture is placed in a form. Thus, carbonation is suppressed to improve the durability, and the working property can be enhanced with a light weight.

1st Main Claim

[MT] 1. lightweight aggregate, cement, a method for inhibiting carbonation of lightweight concrete made by mixing water-reducing agent and water, as a lightweight aggregate, wherein the drying rate of less than 50 percent of absolute dry or water Carbonation of concrete ways to reduce weight and a lightweight aggregate that has been used.

Assignees: FUJITA CORP

218. Family 91525387 (US2022153647 AA)

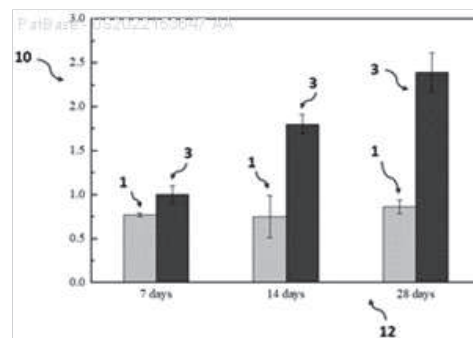
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Title

[EN] CARBONATION OF REACTIVE MAGNESIA CEMENT (RMC)-BASED SYSTEMS

Abstract

[EN] Herein discloses a method of carbonating reactive magnesia cement, which includes: (i) providing an aqueous suspension including a carbon dioxide-producing bacteria; (ii) mixing the aqueous suspension with a precursor which the carbon dioxide-producing bacteria generates carbon dioxide from for a duration to form an aqueous mixture sufficient for substantially carbonating the reactive magnesia cement; (iii) mixing the aqueous mixture with the reactive magnesia cement to form a blend; wherein a nutrient is provided in the aqueous suspension of step (i) or in the reactive magnesia cement of step (iii) to sustain the carbon dioxide-producing bacteria in the reactive magnesia cement; and (iv) curing the blend to carbonate the reactive magnesia cement. A reactive magnesia cement composite formed by the method is also disclosed.



1st Main Claim

[EN] **1.** A method of carbonating reactive magnesia cement, the method comprising:
 (i) providing an aqueous suspension comprising a carbon dioxide-producing bacteria;
 (ii) mixing the aqueous suspension with a precursor which the carbon dioxide-producing bacteria generates carbon dioxide from for a duration to form an aqueous mixture sufficient for substantially carbonating the reactive magnesia cement;
 (iii) mixing the aqueous mixture with the reactive magnesia cement to form a blend;
 wherein a nutrient is provided in the aqueous suspension of step (i) or in the reactive magnesia cement of step (iii) to sustain the carbon dioxide-producing bacteria in the reactive magnesia cement; and
 (iv) curing the blend to carbonate the reactive magnesia cement.

Assignees: NANYANG TECHNOLOGICAL UNIV; UNIV NANYANG TECH

219. Family 52218216 (US2012276316 AA)

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Title

[EN] METAL CARBOXYLATE CLAYS, DERIVATIVES OF METAL CARBOXYLATE CLAYS, METHODS FOR MAKING THE SAME, AND COMPOSITIONS CONTAINING THE SAME

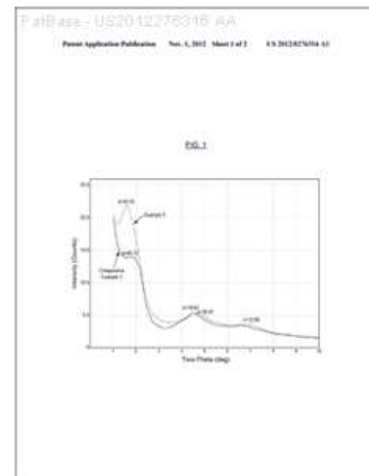
Abstract

[EN] Zinc carboxylate clays and zinc carboxylate organoclays, methods for their preparation, and compositions containing the same are disclosed. The methods comprise either mixing a zinc clay composition with a carboxylic acid, or mixing a carboxylic acid with a zinc ammonia complex solution, then combining the resulting zinc carboxylate salt with a slurry or suspension of a cation-exchangeable clay, to prepare the zinc carboxylate clay. These clays can be further intercalated with quaternary ammonium salts to make zinc carboxylate organoclays. The present clays may be used in compositions and/or as additives in rubber and plastic formulations and products and in catalyst formulations.

1st Main Claim

[EN] 1. A method for preparing a zinc carboxylate clay, comprising: a) mixing (i) a carboxylic acid or an ammonium salt of the carboxylic acid with (ii) a zinc-containing cation exchangeable clay to form a zinc clay composition; b) milling the zinc clay composition; c) heating the zinc clay composition under conditions sufficient to intercalate the carboxylic acid into the zinc-containing cation exchangeable clay and form the zinc carboxylate clay, and optionally, to precipitate the zinc carboxylate clay and/or remove substantially all ammonia in the zinc clay composition; and d) optionally jet-milling the zinc carboxylate clay.

Assignees: NIP RAYMOND LEE; NIP RAYMOND L



220. Family 66175035 (CN106882934 A)

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Title

[EN] CARBONIZING INHIBITOR AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention provides a carbonizing inhibitor and a preparation method thereof and relates to the technical field of concrete. The carbonizing inhibitor comprises modified carbon oxide which is hydrophobically modified and has an alkyl chain. The modified calcium oxide is prepared from calcium oxide which is (95-99) to (5-1) and polyisocyanate. The carbon inhibitor can provide a continuous, effective and excellent anti-carbonizing effect so as to inhibit gradual carbonization induced by reaction of Ca(OH)_2 in concrete and carbon dioxide in air under the action of water. Meanwhile, the carbonizing inhibitor is environmental-friendly and free of environmental pollution, and preventing damage to physical health of employees. The preparation method of the carbonizing inhibitor comprises the following step of mixing calcium oxide with polyisocyanate in a weight ratio of (95-99) to (5-1). The carbonizing inhibitor can be simply and conveniently prepared, the preparation time is shortened, the preparation efficiency is increased, and therefore, the economical benefit is increased.

1st Main Claim

[MT] 1. A carbonizing inhibitor, characterized in that it comprises calcium oxide through hydrophobic surface modification and having alkyl chain modification, the modified calcium oxide is mainly composed of calcium oxide weight ratio of 95 ~ 99:5 ~ 1 of said calcium oxide reacts with polyisocyanate.

Assignees: XINJIANG KENENG WATERPROOF PROT TECH CO LTD

221. Family 68745108 (KR101833493 B1)

[View in PatBase](#)

Title

[EN] METHOD FOR EXTRACTING CALCIUM FROM SLAG USING FABRICATION FOR CALCIUM CARBONATE THIN FILM AND MINERAL CARBONATION METHOD

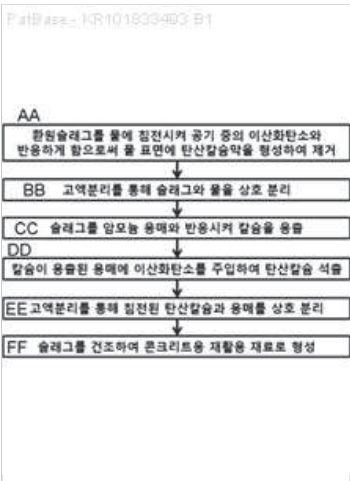
Abstract

[EN] The present invention relates to a mineral carbonation method and a slag recycling method using reduced slag as a starting material. In the present invention, free lime is removed from the reduced slag by performing pretreatment for reacting free lime surrounding the surface of the reduced slag with carbon dioxide in the atmosphere to form a calcium carbonate thin film on the surface of an aqueous solution. Since the free lime is removed, the solvent extraction efficiency for extracting calcium from the reduced slag by using an ammonium solution can be remarkably improved. Furthermore, the reduced slag can be recycled as building and civil engineering materials by removing the free lime.

1st Main Claim

[MT] 1. (A) of the battery cells in which the slag to water reducing agent to settle to the reaction tank, the reduction of carbon dioxide into the free lime within slag by allowed to react with the calcium carbonate in the water surface after the formation of the film at the surface of the calcium carbonate; (b) the step of removing a film reduction through the solid-liquid separation, mutually separated slag and water; (c) by introducing the reducing agent in a solvent to the slag from the reducing slag; and (d) extracting the calcium is calcium extracted by injecting a carbon dioxide in solvent precipitated calcium carbonate, comprising the steps of: characterized in that it comprises a mineral acid.

Assignees: KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES KIGAM; KOREA INST GEOSCIENCE AND MINERAL RESOURCES KIGAM; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES



222. Family 49398145 (KR20110091160 A)

[View in PatBase](#)

Title

[EN] METHOD FOR REMOVING CHLORIDE IN MUNICIPAL SOLID WASTE INCINERATION BOTTOM ASH VIA WASHING AND CARBONATION PROCESS



Abstract

[EN] PURPOSE: A method for eliminating chlorides through living waste incineration bottom ash cleaning and carbonizing processes is provided to overcome problems caused by the chlorides contained in the living waste incineration bottom ash. CONSTITUTION: In a cleaning process, living waste incineration bottom ash is mixed and stirred with distilled water, in which the pH thereof is between 5 and 7, to eliminate soluble chlorides. Carbon dioxide gas is introduced into the living waste incineration bottom ash, insoluble chlorides are carbonized. In the stirring process, the ratio of liquid to solid in the living waste incineration bottom ash is between 2 and 10. The ratio of liquid to solid in the living waste incineration bottom ash through the cleaning process is between 5 and 10.

1st Main Claim

[MT] 1. Domestic waste incineration flooring comprising the following steps: removing the chloride (PH 5-7 of life flooring incineration of waste by stirring distilled water and mixed with the water washing treatment to remove the soluble chloride: and (b) water washing treatmentby injecting the CO2 gas to a flooring for carbonation of the sparingly soluble salt.

Assignees: KOREA INST GEOSCIENCE AND MINERA; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES

223. Family 55806392 (KR101364035 B1)

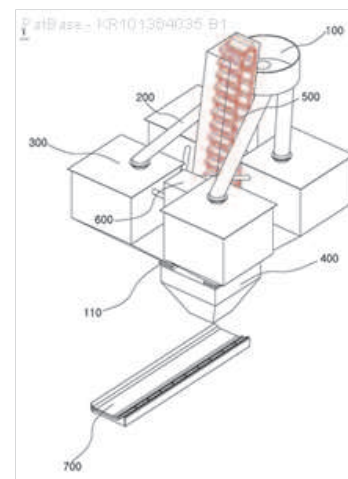
[View in PatBase](#)

Title

[EN] THE APPARATUS TO REDUCE A POTENTIAL FOR CARBONATION OF RECYCLED AGGREGATE WITH DRY ICE

Abstract

[EN] An existing apparatus for reducing pH concentration of recycled aggregate and construction waste soil through dry ice has a Z shape at the bottom, can perform a pH reduction process only one time, has difficulty in mass production without a continuous process, and needs additional equipment in the continuous process, thereby increasing installation costs. In order to resolve problems that dry ice is not mixed well with recycled aggregate and construction waste soil and pH reduction rate of the recycled aggregate and construction waste is remarkably reduced, an apparatus for reducing pH concentration comprises: a rotary hopper (100); a sealed distributor (200), a pH mixer module (300) with the wide upper part and the narrow lower part, a polygonal aggregate container (400), a bucket elevator (500) for vertical transfer of aggregate, a dry ice generator (600), a horizontal transfer conveyor (700), and a micom part (800). The apparatus enables mass production of pH-reduced recycled aggregate and construction waste soil through a continuous process including vertical movement and distribution; distributes the recycled aggregate and construction waste soil to reduce pH concentration by the pH mixer module with the wide upper part and the narrow lower part, which has an empty space; reduces pH concentration of the recycled aggregate and the construction waste soil by stirring reactants for neutralization several times to pH 8.6-9.8 or less, thereby improving pH reduction rate to 80 percent.



1st Main Claim

[MT] 1. Is less than or equal to the maximum 100mm in size was recycled aggregate and construction waste toseek while it is receiving a microcomputer for receiving space is rotated under the control of the hermetic distributor is discharged through the discharge groove toward the PH-to position the agitator module construction waste toseek the recycled aggregates, and a hopper (100) discharging the rotatable connected to one side of the rotatable hopper constructed in the sealed structure it is discharged from the hopper, recycled aggregate rotatable, construction waste toseek the hahyeop image type may pass toward the PH agitator module consisting of a plurality of distribution and hermetic sealing divider 200 consists of a structure in Gwangha hermetic distributor is connected to the top of one side of the sliding door is formed at the bottom of the aggregate receiving sleeve connected with one side of the polygon, and hermetic construction waste, recycled aggregate injected through the dispenser with dry ice from the TOSEOK, CO2 dry ice is injected into the internal temperature of 20 to 50 degrees centigrade and atmospheric pressure 1-5 through PH after reduced in accordance with the control signal of the microcomputer sliding door is open for discharging the aggregate receiving sleeve polygon hahyeop image type and PH agitator module 300-N hahyeop image side so that PH 1 is connected with the agitator module is formed in a polygonal shape, a stirrer module of the image lights hahyeop type PH that is discharged through the sliding doors into the recycled aggregate, reduced ph to accommodate the construction waste toseek, polygon polygonal aggregate aggregate receiving sleeve of the receiving sleeve 400 and the bottom portion and the top portion of the rotatable hopper to a linear-gradient and sealed structure under the control of the microcomputer formed, housed in a housing with a polygonal recycled aggregate, recycled aggregate waste toseek of construction at the top of the continuously through rotatable hopper to bucket The bucket elevator carrying the aggregate and elevator)(500) vertical transfer hahyeop image type PH bucket, the upper end of the stirrer hahyeop image positioned on one side of the inner top of PH toward the agitator module type produced by injecting dry ice and dry ice generating unit 600 positioned at the bottom of the aggregate receiving sleeve polygon is discharged, recycled aggregate PH reduction and construction, construction waste, recycled aggregate toseek toseek storage tank and transferred to a waste transport conveyor 700, a rotating horizontal hahyeop image-hopper, PH, polygonal aggregate receiving sleeve, aggregate agitator module for transferring the bucket elevator bucket periosteal vertical, horizontal transfer conveyor dry ice generation unit is connected with each device, and controls the overall operation of the aggregate receiving sleeve from the flat state in accordance with the number of sides of the polygon having N-hahyeop image lights hahyeop agitator module of one of the PH-PH after agitator module formed as an empty space, the empty space is formed as image lights hahyeop type PH reduction agitator module, construction waste, recycled aggregate PH to distribute the toseek recycled aggregate by stirring the primary, car to PH 8.6 ~ 9.8, construction waste toseek reducing or controlling the microcomputer unit 800 is composed of a continuous process, characterized in that recycled aggregate and construction waste toseek PH-reduction apparatus.

Assignees: DAE GIL IND CO LTD; DAEGIL ENVIRONMENTAL IND CO LTD

224. Family 107947263 (KR20250065480 A)

[View in PatBase](#)

Title

[EN] NON-DEMOLDING FORMWORK STRENGTH ENHANCEMENT METHOD
CONCRETE POURING METHOD NON-DEMOLDING FORMWORK
MANUFACTURING SYSTEM NON-DEMOLDING FORMWORK AND STRUCTURES
COMPRISING THE SAME USING ACCELERATED CARBONATION

Abstract

[MT] A method for enhancing the strength of a sloped formwork using accelerated carbonation, a concrete pouring method, a sloped formwork manufacturing system, a sloped formwork, and a structure including the same are disclosed. The method for enhancing the strength of a sloped formwork using accelerated carbonation may include a first step of manufacturing a sloped formwork by 3D printing a first material composition including concrete; and a second step of curing the sloped formwork in a chamber that receives a curing gas including carbon dioxide gas.

1st Main Claim

[MT] A first step of manufacturing a slope-shaped formwork by 3D printing a first material composition including concrete; and
A second step of curing the above-mentioned slope-shaped formwork in a chamber containing a curing gas including carbon dioxide gas;
Method for improving the strength of slope-type formwork using accelerated carbonation.

Assignees: UIF UNIV IND FOUNDATION YONSEI UNIV; ACADEMIC COOPERATION FOUNDATION YONSEI UNIV IND



225. Family 65429124 (KR101724341 B1)

[View in PatBase](#)

Title

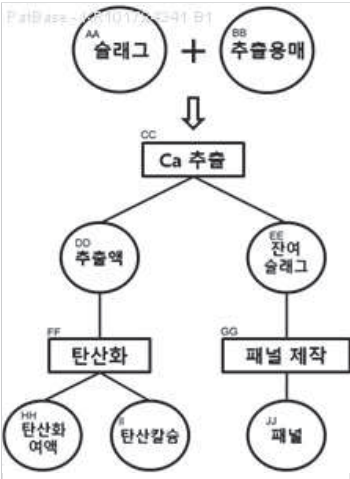
[EN] METHOD OF MINERAL CARBONATION AND PANEL PRODUCTIN FROM SLAG

Abstract

[EN] The present invention relates to a method for producing panel for architecture and mineral carbonation by recycling slag. According to the present invention, reduction in carbon dioxide is possible through a synthesis of calcium carbonate by extracting calcium from slag and then binding the calcium with carbon dioxide thereafter. Additionally, when calcium-removed residual slag is mixed with materials for panel for architecture, physical properties such as bending strength and compression strength increase.

1st Main Claim

[MT] 1. (a) steel, which is a byproduct of steelmaking slag to the slag solvents to extract calcium from the stage; (B) liquid separation via calcium-containing solvents and solids above the remaining slag remain mutually separates phase; And (c) above, using the residual slag construction panel manufacturing step; and, as mentioned above, the manufacture of panels for the construction of the above residual slag washing steps and, above, the remaining slag and cement and sand and additives are mixed with a mutual thing, the steps and the bibim bibim mixture water steps to the water, and bibim bibim mixture extruding curing step by including features that are made up of slag using mineral carbonic acid and method for manufacturing the panels for construction.



Assignees: KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES KIGAM; KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES

226. Family 31186868 (JP2004269282 A2)

[View in PatBase](#)

Title

[EN] COMPOSITION FOR HARDENED MATERIAL, INORGANIC HARDENED MATERIAL, AND HARDENED MATERIAL HARDENED BY CARBONATION

Abstract

[EN] PROBLEM TO BE SOLVED: To provide a composition for a hardened material, which is suitably used for obtaining a moisture control material having high moisture absorption-desorption performance, capable of being prepared by short time curing treatment, and excellent in mechanical physical properties and structure stability; and to provide an inorganic hardened material and a hardened material hardened by carbonation. SOLUTION: The composition for the hardened material is characterized in that a hydrous magnesium silicate mineral (preferably, the median diameter is 5-50 micro m, and the content is 30-80 weight percent), obtained by firing attapulgite and/or sepiolite at 150-800 degrees centigrade, and a gas-hardenable material and/or a hydraulic material (preferably, the material is calcium silicate having an aspect ratio of 10-25) are contained (further preferably, a pulp fiber having a degree of beating of 50-200 is blended in an amount of 2-10 weight percent). The inorganic hardened material and the hardened material hardened by carbonation are each derived from the composition for the hardened material.

1st Main Claim

[MT] 1. hydrous magnesium silicate minerals obtained by baking at 150 ~ 800 °C the sepiolite and / or attapulgite, and a cured composition comprises a hydraulic material and / or air-hardening material.

Assignees: SEKISUI CHEMICAL CO LTD; SEKISUI CHEM CO LTD

227. Family 97500902 (US2023167032 AA)

[View in PatBase](#)

Title

[EN] COMPOSITIONS AND METHODS FOR IMPROVED CARBONATION CURING OF CONCRETE

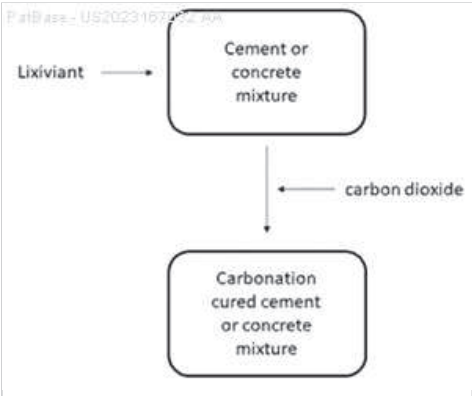
Abstract

[EN] Compositions and methods for carbonation curing of cement and/or concrete are provided, where a lixiviant species that solubilizes calcium from oxides and silicates provided with the cement or concrete is included in the curing cement or concrete mixture. Reaction of solubilized calcium with carbon dioxide results in the formation of insoluble calcium carbonate that is incorporated into the structure of the cured cement or concrete, and simultaneously regenerates the lixiviant species. Rapid reaction of carbon dioxide within the curing cement or concrete further generates a concentration gradient that accelerates uptake of additional carbon dioxide, for example from ambient air. This incorporation of environmental carbon also causes the cured cement or concrete to be used for long term carbon sequestration.

1st Main Claim

[EN] 1. A method of carbonation curing concrete, comprising:
adding a lixiviant to a concrete mixture comprising a calcium to generate a lixiviant concrete mixture: and
exposing the lixiviant concrete mixture to carbon dioxide.

Assignees: LIXIVIA INC



228. Family 64692587 (US2018134897 AA)

[View in PatBase](#)

Title (EP3118161 B1)

[EN] HIGH SOLIDS PCC WITH DEPOLYMERIZED CARBOXYLATED CELLULOSE

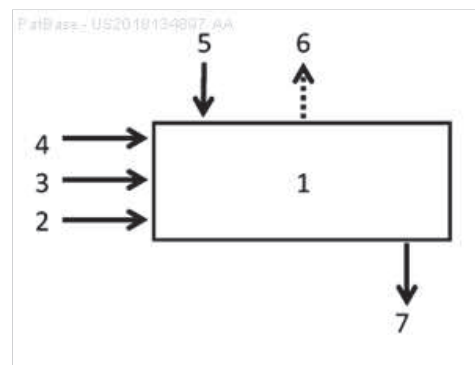
Abstract

[EN] The present invention relates to a process for producing an aqueous suspension of precipitated calcium carbonate, wherein a depolymerized carboxylated cellulose is added during lime slaking. Furthermore, the present invention relates to an aqueous suspension of calcium carbonate and a precipitated calcium carbonate obtained by said process as well as the use thereof.

1st Main Claim (EP3118161 B1)

[EN] 1. A process for producing an aqueous suspension of precipitated calcium carbonate comprising the steps of:

- i) providing a calcium oxide containing material,
- ii) providing at least one depolymerized carboxylated cellulose having a molecular weight M_w in the range from 10 000 to 40 000 g/mol,
- iii) preparing a milk of lime by mixing water, the calcium oxide containing material of step i), and the at least one depolymerized carboxylated cellulose of step ii) to obtain a milk of lime, wherein the calcium oxide containing material and the water are mixed in a weight ratio from 1:1 to 1:12, and
- iv) carbonating the milk of lime obtained in step iii) to form an aqueous suspension of precipitated calcium carbonate.



Assignees: OMYA INT AG

229. Family 56400695 (KR20140057230 A)

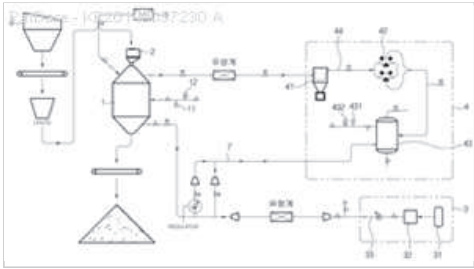
[View in PatBase](#)

Title

[EN] APPARATUS FOR CARBONATION TREATMENT OF RECYCLED AGGREGATE BY INTEGRATED PROCESSING UNIT OF SPREADER AND SILOS

Abstract

[EN] The present invention relates to an apparatus for carbonation treatment of recycled aggregate using a spreader-silo integrated composite facility and, more particularly, to an apparatus for carbonation treatment of recycled aggregate using a spreader-silo integrated composite facility, which is capable of efficiently managing the pH of recycled aggregate through carbon dioxide-based carbonation treatment of the recycled aggregate which is produced by using construction waste such as waste concrete; and capable of improving the 0.08 mm size of the recycled aggregate by at least 1 percent by using the spreader-silo integrated composite facility. The apparatus for carbonation treatment of recycled aggregate using a spreader-silo integrated composite facility according to the present invention comprises a silo which stores selected recycled aggregate having a size of 40 mm or less; a spreader which is configured to be integrated on the silo to hit and crush the thick recycled aggregate contained in the recycled aggregate, prior to being put in the silo; a carbon dioxide supply unit which is connected to one lower side of the silo to supply carbon dioxide into the silo; and a carbon dioxide recovery unit which is connected to one upper side of the silo to recover carbon dioxide discharged from the silo.



1st Main Claim

[MT] 1. Screening recycled aggregate having a size of less than 40mm silo for storing; the silo (1) on top of the (1) configured integrally with the silo (1) before being added to the recycled aggregate, recycled aggregate contained in bold the to blow the shredded; the silo (1) of the spreader (2) and is connected to the lower side for supplying carbon dioxide to the interior of the silo (1) supply (3) and carbon dioxide; the silo (1) connected to the upper side of the silo (1) to recover the carbon dioxide discharged from the carbon dioxide recovery unit (4) is characterized in that it comprises a spreader and silos, recycled aggregate due to the carbonation of a one-piece composite facility processing unit.

Assignees: SAMYOUNG PLANT CO LTD

230. Family 68082930 (WO18003612 A1)

[View in PatBase](#)

Title

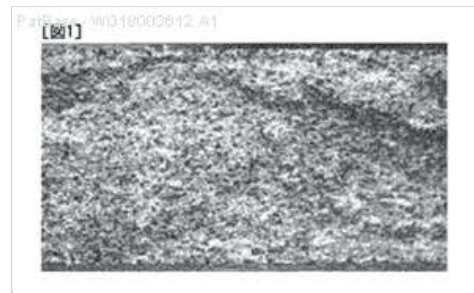
[EN] FIBER-REINFORCED CARBONATED CEMENT MOLDED PRODUCT AND METHOD FOR PRODUCING SAME

Abstract

[EN] Provided is a fiber-reinforced carbonated cement molded product comprising a cement component, inorganic needles, and fibers, the inorganic needles each having a length of 1 mm or less and an aspect ratio of 20 or more.

1st Main Claim

[MT] Cement component, inorganic needle-like, and fiber-reinforced cement molded product comprises fibers carbonation, the inorganic needle-like material having a length of 1mm or less, the aspect ratio is 20 or more, fiber-reinforced cement molded product carbonation



Assignees: DENKA CO LTD; KURARAY CO

231. Family 54120178 (US2015087751 AA)

[View in PatBase](#)

Title (EP2791077 B1)

[EN] DRY MIX FORMULATIONS CONTAINING CARBOXYLATED STYRENE-BUTADIENE REDISPERSIBLE POLYMER POWDERS AND ALUMINA RICH CONTAINING CEMENTS

Abstract

[EN] Dry mix formulations containing a redispersible polymer powder (RDP) made of a low carboxylation, large particle size water-insoluble film-forming styrene butadiene polymer having at least one ethylenically unsaturated dicarboxylic acid monomer, and a high alumina content cement such as a calcium aluminate cement (CAC) or a calcium sulfoaluminate cement (CSA) provides cement compositions having unexpectedly superior water immersion shear strength and set time for a cement containing tile adhesive (CBTA or CTA), superior adhesion properties in water proofing mortars or mortar applications, and superior flexural and compressive strength in grout applications.

1st Main Claim (EP2791077 B1)

[EN] 1. A cement containing dry mix composition comprising:

- a) 0 percent by weight to 50 percent by weight of ordinary Portland cement, based upon the weight of the dry mix composition;
- b) a water-redispersible polymer powder (RDP) comprising a carboxylated water-insoluble film-forming styrene-butadiene polymer and a colloidal stabilizer, and
- c) a cement,

wherein

- 1) said cement comprises from 0.5 percent by weight to 8 percent by weight of a calcium aluminate cement, based on the total weight of the dry mix composition, the calcium aluminate cement has an alumina (Al_2O_3) content of greater than 30 percent by weight, based upon the weight of the calcium aluminate cement, the amount of ordinary Portland cement is from 25 percent by weight to 45 percent by weight, based upon the total weight of the dry mix composition, and calcium sulfate is employed in an amount of from 40 percent by weight to 60 percent by weight, based upon the weight of the calcium aluminate cement, or
- 2) said cement comprises from 30 percent by weight to 50 percent by weight of a calcium sulfoaluminate cement, based on the total weight of the dry mix composition, and the amount of ordinary Portland cement is from 0 percent by weight to 50 percent by weight, based upon the total weight of the dry mix composition, or
- 3) said cement comprises from 0.5 percent by weight to 8 percent by weight of a calcium aluminate cement, based on the total weight of the dry mix composition, the calcium aluminate cement has an alumina (Al_2O_3) content of greater than 55 percent by weight, based upon the weight of the calcium aluminate cement, and the amount of ordinary Portland cement is from 25 percent by weight to 45 percent by weight, based upon the total weight of the dry mix composition.

Assignees: DOW GLOBAL TECHNOLOGIES LLC; SCHARLEMANN SONJA; DONG STEVEN SC; HONG LIANG; DOMBROWSKI JUERGEN; ZHANG LIANG; PERELLO MARGARITA M; KUEHN HARTMUT; KEENAN SEAN SM; KIM HABERMEHL LINDA H; DOW GLOBAL TECHNOLOGIES INC; KEENAN SEAN M; DONG CHENGBIN; PERELLO MARGARITA; KIM HABERMEHL LINDA

232. Family 6012259 (JP52140536 A2)

[View in PatBase](#)

Title

[EN] PRODUCTION METHOD OF MOLDED ARTICLE FROM CONVERTER SLAG WITH CARBONATION ACCELERATOR

Abstract

[MT] 1, the name of the invention claim 1 [Source: converter slag as a raw material, carbonate method of manufacturing a molded article using a 2 percent of the Huh converter slag coarse powder was mixed with Portland cement or de-ash, or stone, converter slag, sugars, or phenols, the fine powder of an aqueous solution or ethanol - corresponds to any one of a wet state, was added in an amount, were uniformly mixed to increase the molding pressure molding those containing carbon dioxide gas in a high humidity atmosphere gas in contact with the molded article characterized by reacting Production method. 3

1st Main Claim

[MT] 1, the name of the invention carbonated converter slag as a raw material, using a method of manufacturing a molded article of 2 wherein the percent huh converter slag coarse powder was mixed with Portland cement or de-ash, or stone, converter slag, sugars, or phenols, the fine powder of an aqueous solution or ethanol - corresponds to any one of was added in an amount in a wet state, were uniformly mixed to increase the molding pressure molding those containing carbon dioxide gas in a high humidity atmosphere gas in contact with the molded article characterized by reacting Production method. 3

Assignees: KAWATETSU KOGYO KK

233. Family 96760248 (JP2023051449 A2)

[View in PatBase](#)

Title

[EN] CARBONATION HARDENING BODY AND MANUFACTURING METHOD THEREOF

Abstract

[EN] To provide a carbonation hardening body capable of absorbing more abundant carbon dioxide in an aging process to immobilize, as a result, capable of reducing a total amount of carbon dioxide being exhausted, and having excellent strength, and its manufacturing method. SOLUTION: A carbonation hardening body obtained by carbonating a hardening body of a hydraulic composition containing (A) a hydraulic powder material containing clinker powder and gypsum, wherein the clinker powder has a hydraulic modulus (H.M.) of 1.1 to 2.2 and a silicic acid modulus (SM) of 1.9 to 6.0, an iron ratio (IM) of 0.9 to 4.0, and a content of the gypsum is 1.0 to 6.0 mass percent in terms of SO₃, and (B) a clinker aggregate containing C₂S and C₂AS, wherein an amount of the C₂AS is 5 to 100 pts.mass relative to 100 pts.mass of the C₂S, and a clinker aggregate that does not contain C₃A or contains the C₃A in an amount of 20 pts.mass or less relative to 100 pts.mass of the C₂S, and (C) water. SELECTED DRAWING: None

1st Main Claim

[MT] 1. A hydraulic powder material comprising (a) a clinker powder and gypsum, wherein the clinker powder is a clinker powder having a hydraulic hardness (H. M.) of 1.1-2.2, a silicate ratio (S. M.) of 1.9-6.0, and an iron ratio (I. M.) of 0.9-4.0, and the content of the gypsum is so₃(B) a hydraulic powder material having a mass of 1.0 to 6.0 in terms of mass percent; and (B) C₂S and C₂A clinker aggregate comprising as, wherein C₂The above C is based on S100 parts by mass₂The amount of as is 5100 parts by mass and C₃A is not included or C above₃A is C above₂(B) a clinker aggregate containing 100 parts by mass of a mixture of 100 parts by mass or less of the aggregate, and (C) water.

Assignees: TAIHEIYO CEMENT CORP

234. Family 99756081 (JP2023163710 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR PRODUCING HYDRAULIC CURED BODY AND CEMENT COMPOSITION FOR CARBONATION CURING

Abstract

[EN] To provide a method for producing a hydraulic cured body excellent in workability, low in carbon dioxide gas discharge in production, having a carbon dioxide fixing property and good in strength, and a cement composition for carbonation curing. SOLUTION: A method for producing a hydraulic cured body includes curing and carbonating a cement composition that contains water, a mixed cement containing a blast furnace slag fine powder and cement, calcium hydroxide, and a setting retarding agent to produce the hydraulic cured body. The cement composition contains 10 pts.mass or more and 70 pts.mass or less of the calcium hydroxide relative to 100 pts.mass of the total amount of the blast furnace slag fine powder, the cement and the calcium hydroxide, 30 pts.mass or more and 1,400 pts.mass or less of the calcium hydroxide relative to 100 pts.mass of the blast furnace slag fine powder, 270 kg/m³ or more and 600 kg/m³ or less in total of the blast furnace slag fine powder, the cement and the calcium hydroxide, and 25 pts.mass or more and 65 pts.mass or less of the water relative to 100 pts.mass of the total amount of the blast furnace slag fine powder, the cement and the calcium hydroxide. SELECTED DRAWING: None

1st Main Claim

[MT] 1. A method for producing a cement composition comprising water, a mixed cement comprising a blast furnace slag fine powder and a cement, calcium hydroxide, and a setting retarder, A method for producing a hydraulic cured body comprising curing and carbonating to produce a hydraulic cured body, wherein the cement composition comprises calcium hydroxide, 10 parts by mass or more and 70 parts by mass or less relative to 100 parts by mass of the total amount of the blast furnace slag fine powder, the cement, and the calcium hydroxide, 30 parts by mass or more and 1400 parts by mass or less relative to 100 parts by mass of the blast furnace slag fine powder, and the total amount of the blast furnace slag fine powder, the cement, and the calcium hydroxide is 270 kg/m³ or more and 600 kg/m³ or more and 65 parts by mass or less of the water based on 100 parts by mass of the total amount of the blast furnace slag fine powder, the cement, and the calcium hydroxide.

Assignees: KAJIMA CORP

235. Family 10515802 (JP2008195544 A2)

[View in PatBase](#)

Title

[EN] STEEL-REINFORCED HYDRAULICALLY HARDENED BODY EXCELLENT IN CARBONATION RESISTANCE

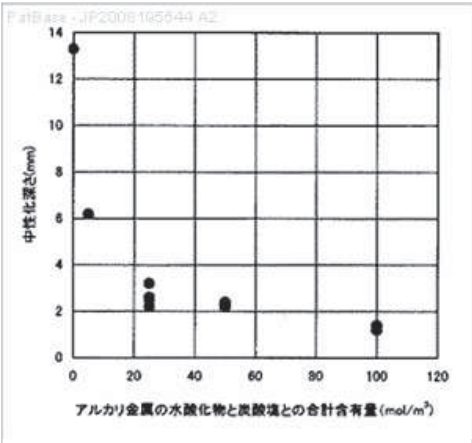
Abstract

[EN] PROBLEM TO BE SOLVED: To provide an excellent carbonation resistance iron-reinforced hydraulically hardened body which suppresses the corrosion of its inside reinforcing bars even in an environment in which the carbonation of e.g., concrete easily proceeds, such as an environment in which dryness/wetness repeats and is capable of being utilized as a structural member having long-term durability.
SOLUTION: The hydraulically hardened body of the present invention provided in order to solve the problem is a hydraulically hardened body having reinforcing bars in its inside, wherein the hydraulically hardened body is characterized by being prepared by mixing a fine blast furnace slag powder, steelmaking slag, at least any one member selected from an alkali metal hydroxide and an alkali metal carbonate, and water and hardening the obtained mixture. It is desirable in this case that the total of the content of the alkali metal hydroxide and that of the alkali metal carbonate is not smaller than 5 mol/m³hydraulically hardened body.

1st Main Claim

[MT] A hardened body hydration with rebar inside the 1. , water-cured sum, blast furnace slag and steel slag fine powder and, further, of the carbonate of alkali metal hydroxide, an alkali metal superior to the mosquito body hydration hardening of having to 耐中 characterized in that it is curing the mixture was mixed with water, and either one or two of, obtained, the rebar.

Assignees: JFE STEEL KK; JFE HOLDINGS INC; KAWASAKI STEEL CO; KOBE STEEL LTD; NISSHIN STEEL CO LTD

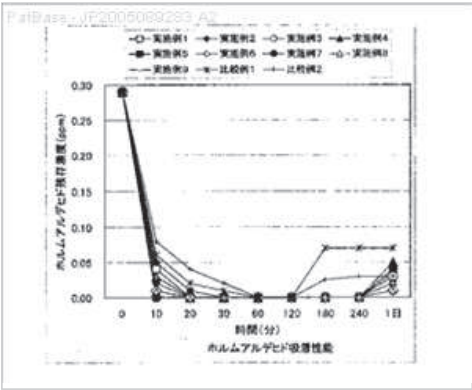


236. Family 31891725 (JP2005089283 A2)

[View in PatBase](#)

Title
[EN] CARBONATED HARDENED BODY

Abstract
[EN] PROBLEM TO BE SOLVED: To provide a carbonated hardened body exhibiting sufficient strength in spite of holding a large quantity of porous materials and having excellent moisture absorption and releasing property or the adsorption property and the decomposition property to a volatile chemical substance or malodor. SOLUTION: The carbonated hardened body comprises calcium carbonate and amorphous silica, contains greater than or equal to 6 weight percent amorphous silica and has 25-300 m²/g nitrogen adsorption specific surface area determined by a specific relation and greater than or equal to 200 m specific strength. The carbonated hardened body comprises calcium carbonate and amorphous silica, contains greater than or equal to 6 weight percent amorphous silica and has 2-20 percent weight change of the material which is determined by a specific relation under a condition of 50-90 percent relative humidity and greater than or equal to 200 m specific strength. The carbonated hardened body comprises calcium carbonate, amorphous silica and attapulgite, contains 6-40 weight percent amorphous silica or, the carbonated hardened body is obtained by carbonating an inorganic material comprising 10-80 weight percent porous material (preferably attapulgite) and 20-90 weight percent wollastonite.



1st Main Claim
[MT] 1. made of amorphous silica and calcium carbonate content of 6 wt percent amorphous silica, the following formula (1) 25 ~ 300m² obtained by nitrogen adsorption specific surface area of / g, cured of carbonation and a strength ratio of at least 200m. (Nitrogen adsorption specific surface area after the alkali treatment) x (weight of sample after alkali treatment) / (weight of sample before alkali treatment) expression · · (1)

Assignees: SEKISUI CHEMICAL CO LTD; SEKISUI CHEM CO LTD

237. Family 107812539 (IN202541034107 A)

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Title

[EN] METHOD FOR ENHANCING GEOPOLYMER CEMENT PERFORMANCE THROUGH THERMAL, MECHANICAL, AND MECHANO-CARBONATION TREATMENTS

Abstract

[EN] This invention reveals a new method for enhanced geopolymer cement properties by pre-treatment techniques including thermal, mechanical and mechano-carbonation treatments. The optimized mix design consists of GGBS, Mexican ash, NaOH, Na₂SiO₃, and MgO, whereby a pre-treatment process improves reactivity and microstructural density. Aluminosilicate dissolution is greatly aided by thermal treatment at 200 degrees centigrade for 4 hours, while the prolonged ball-milling for 3 hours gives rise to a refinement in size and an enhancement of compressive strength to 33.26 MPa. A following step of mechano-carbonation then densifies, affording the highest compressive strength, measured at 43.5 MPa, and a flexural strength of 6.4 MPa, which is coupled with a highly reduced water absorption of 3 percent. The ambient curing period of 14 days promotes optimal performance. The invention presents an environmentally safe, high-strength geopolymer cement alternative to conventional cement with a corresponding reduction in carbon emissions. This technique will greatly enhance durability and mechanical performances, therefore is suitable for structural applications in harsh environments and for sustainable construction projects.

1st Main Claim

[EN] 1. A method of developing high-performance geopolymer cement contains 65 percent GGBS, 15 percent Mexican ash, 3 percent sodium hydroxide, 19 percent sodium silicate, and 3 percent magnesium oxide when activated with an alkaline activator and 10 added with a water-to-solid ratio of 0.4. The incorporation of different treatment processes into the geopolymer cement composition are: Direct mixing and ambient curing (Controlled Sample), pre-heating at 200 degrees centigrade for 4 hours (Thermally Treated Sample), ball milling for 3 hours (Mechanically Treated Sample) and ball milling in a CO₂-rich environment 3-hours (Mechanically Treated Sample):

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[EN] CARBONATION HARDENING BODY AND MANUFACTURING METHOD THEREOF

[EN] To provide a carbonation hardening body capable of largely reducing a total amount of carbon dioxide exhausted, excellent in dimension stability and strength, and easy to reuse as a cement clinker raw material.SOLUTION: A carbonation hardening body obtained by carbonizing a hardened body of a hydraulic composition comprising: (A) a powdery hydraulic material containing C2S and C2AS and containing pulverized calcined material that satisfies the following conditions (1) to (2), (B) water, and (C) limestone aggregate. (1) When the fired product does not contain C4AF, an amount of C2AS is 10 to 2,000 pts.mass relative to 100 pts.mass of C2S, and when the fired product contains C4AF, a total amount of C2AS and C4AF relative to 100 pts.mass of C2S is 10 to 2,000 pts.mass, and a ratio of C4AF in the total 100 mass percent of C2AS and C4AF is 70 mass percent or less, and (2) the fired product does not contain C3A or contains C3A in an amount of 20 pts.mass or less relative to 100 pts.mass of C2S.SELECTED DRAWING: None

[illegible]

Assignees: TAIHEIYO CEMENT CORP

239. Family 46224030 (TH12617 A)

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Title

[MT] Types of mineral fillers and pigments with Carbonation material.

Abstract

[MT] The addition of minerals, pigments and similar materials with Carbonation will be described, which is a substance that is characterized by having a) the form of the particle-ROM ribbon Zeke Cabral. or the form of spherical particles, which basically b) the slope factor between 1.1 and 1.4 c) the ratio $R = \text{percent of particles} < 1 \text{ and micro; } m = 8 \text{ to } 19 \text{ percent of particles} < 0.2 \text{ and micro; } m$ and d) The average particle diameter of between 0.4 and Statistical 1.5 and micro; m using these materials in the paper industry as a filler for paper and as a pigment for coating.

240. Family 1373756 (US3794503 A)

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Title

[EN] HOLLOW SPHERES CONSISTING OF ALKALI METAL SILICATE AND A POLYSALT

Abstract

[EN] ABSTRACT OF THE DISCLOSURE

The invention relates to a process for the manufacture of an economical filler of low bulk density that is especially useful for incorporation in unsaturated polyester systems and which does not react with the components of the unsaturated polyester system. Solutions of sodium silicate and inorganic polysalts are mixed, spray dried, and the product from the spray drier is then further dried to a water content below about 7 percent.

1st Main Claim

[EN] 1. Hollow spheres, the shells of which consist of:(a) an inorganic polysalt selected from the group consisting of borate salts of alkali metal and ammonium cations and phosphate salts of alkali metal and ammonium cations; (b) an alkali metal silicate selected from the group consisting of sodium silicate having an SiO₂/Na₂O mol ratio of 1.5 to 4.0/1.0, and potassium silicate harving an SiO₂/K₂O mol ratio of 1.5 to 4.2/1.0; the ratio of polysalt solids to alkali metal silicate solids being between 0.02:1.0 and 3.0:1.0; and (c) up to 25 percent water on a weight basis; said spheres being filled essentially with air.

Assignees: PHILADELPHIA QUARTZ CO; PQ CORP

