

1. Family 34142918 (WO07082505 A2)

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Title

[EN] CO2 UTILIZATION, ABSORPTION, CONSUMPTION

Abstract

[EN] The invention relates to a method for treating especially hydrates originating from technical processes, which react with CO₂ (carbon dioxide). The invention allows a permanent absorption and consumption of CO₂ which contributes to a climatic improvement.

Assignees: CODE GMBH COMMERCIAL DEVELOPME; OSING DIRK A

2. Family 45059417 (WO10110563 A2)

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Title

[EN] METHOD FOR MANUFACTURING RECYCLED AGGREGATES USING RAPID CARBONATION REACTION

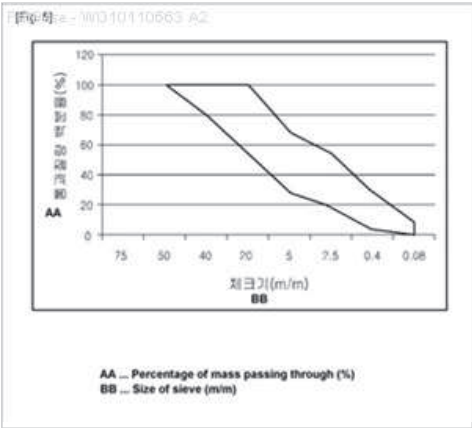
Abstract

[EN] The present invention relates to a method for manufacturing recycled aggregates, wherein said recycled aggregates are manufactured using a reaction of rapid carbonation to achieve significantly reduced absorption and increased density, which satisfy the quality standards of recycled aggregates. As opposed to conventional strong alkaline recycled aggregates, the recycled aggregates of the present invention have a low pH level, and thus minimize alkali-aggregate reactions and drying shrinkage when used in concrete, and minimize the influences on soil, on a marine environment, and on an ecosystem.

1st Main Claim

[MT] Stage piling 0.01~5mm size of concrete for recycled coarse aggregate, fine aggregate or 0.01~40mm size the size of the concrete for recycled aggregate of any one or a mixture of two or more of the cycle within a closed chamber, and then, while stirring at a temperature of less than 5 degrees centigrade, 2 to 7 atmospheres pressure in the -10~100 in 60 percent of the concentration of carbon dioxide and carbon dioxide and is supplied to the direct contact with 5-30 minutes by producing fine aggregate is the water content of the carbonation reaction is maintained to 1-3 percent by dry aggregate attached to promote carbonation reaction or that was included in the mortar containing 70 percent or more by $CA(OH)_2$, PH is 7.5, $CACO_3$) to produce a recycled aggregate, characterized in that a method of manufacturing a recycled aggregate promote carbonation reaction.

Assignees: KOREA INST CONSTRUCTION TECH; JIN BO KYUNG; LEE JONG CHAN; JUN CHAN SOO; LEE SAE HYUN; SHIM JONG WOO; SONG TAE HYEON; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY KICT

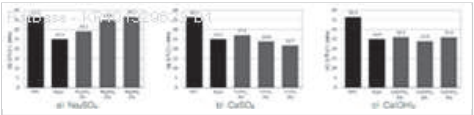


3. Family 55157528 (KR101329623 B1)

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Title

[EN] DEAL WITH CARBON DIOXIDE FOR PLENTY OF RECYCLING AGGREGATE AND ENVIRONMENT-FRIENDLY BLOCK FOR SHORE PROTECTION BINDER COMPOSITION



Abstract

[EN] The present invention relates to an environment-friendly revetment block combining composite containing recycled aggregate. More desirably, the amount of cement can be reduced as to a revetment block constructed in order to prevent loss or collapse of a revetment of a river or a slope of a road and to achieve ecological stability. When the reduced amount of cement is replaced with slag fine particles etc, concrete crack can be prevented by low alkali. The composite has better chemical resistance than the cement because of reduction of calcium hydroxide (Ca(OH)₂) due to Pozzolanic reaction and can increase strength due to the reduction of internal expansion of the concrete. And at the same time, water tightness can be increased by that pore radius decreases as the slag replacement ratio increases. The composite is composed by adding calcined kaolin, which is slag powder, in order to decrease generation of calcium hydroxide or calcium silicate generated by that water and cement clinker are reacting with each other, and by mixing OPC 35-60 wt percent, the calcined kaolin 10-50 wt percent, coal glauconite 0.5-3.0 wt percent, CFA (calcium per aluminat) 1.0-5.0 wt percent and carbon dioxide 9.9 wt percent in order to suppress heavy metals by reducing the amount of cement. [Reference numerals] (AA,BB,CC) Pressurization intensity for three days (MPa)

1st Main Claim

[MT] 1. The reaction with water and cement clinker and calcium hydroxide produced in order to reduce the generation of calcium silicate slag powder calcined kaolin was added, and can be suppressed by reducing the amount of cement in order that the heavy metals 35~60% by weight, calcined kaolin OPC coal Glauber's 3.0% by weight and 10 to 50% by weight calcium aluminate (CFA ferry 9.9 wt%, 1.0 to 5.0% by weight carbon dioxide, characterized in that the constituting a mixturerecycled aggregate treated with carbon dioxide (CO₂) the composition containing green revetment block.

Assignees: HANAKTEC CO LTD

4. Family 64817997 (WO17188469 A1)

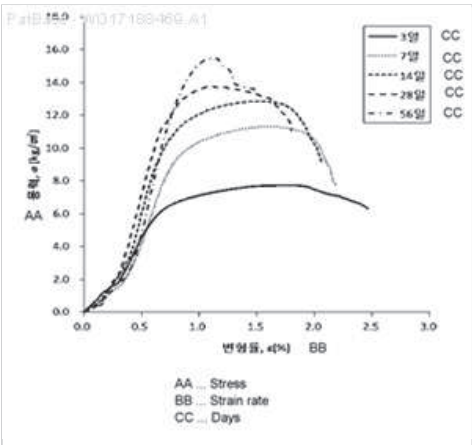
[View in PatBase](#)

Title

[EN] FLUID MIXTURE COMPOSITION USING CARBON DIOXIDE-COLLECTING BY-PRODUCTS

Abstract

[EN] The present invention relates to a fluid mixture composition using carbon dioxide-collecting by-products and, particularly, to a fluid mixture composition, which uses carbon dioxide-collecting by-products and is for expressing early strength, reducing the amount of solidifying agent, improving freezing and melting characteristics, improving abrasion resistance, and improving fluidity and material separation characteristics by adding, as an additive to the fluid mixture composition, an absorption solution having calcium carbonate (CaCO3) generated therein by using an absorption solution having calcium hydroxide (Ca(OH)2) and an alkaline mixing agent, which are mixed, so as to collect carbon dioxide, during the preparation of a fluid mixture composition using all types of industrial by-products, which can be used as a main aggregate of a solid product and are generated in various forms such as: in situ inferior soil, which cannot be utilized as high-quality soil and should be inevitably discarded; coal ash, which is a by-product of coal-fired power generation; slag, which is a by-product of the steel-making industry; a pulverized product of plain concrete; and dredged soil.



1st Main Claim

[MT] This unavoidable disposal is impossible to take advantage of good quality by marking the site failure, coal-fired power plant by-product of the steel industry, fly ash, slag, there is a by-product of the dredged, concrete is generated in various forms, such as fine solids all available form of major industrial by-products, target intensity reaches 99% by percent and a function required according to the date-by-product carbon dioxide collector so as to give a mixture of 1 to 99% by weight percent of 10~95 percent weight percent, from 5 to 90, consisting of a mixture of fire and industrial by-products compared to the mixture was added to 100 weight percent industrial by-products by blending the additive 5% percent carbon dioxide characterized in that it comprises a mixed composition fluidity using collecting byproducts.

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

5. Family 99424699 (US2024043324 AA)

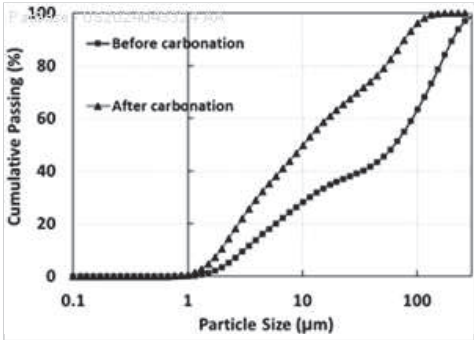
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Title (EP4508020 A1)

[EN] PROCESS FOR PRODUCTION OF HYDRAULIC-CARBONATING BINDER SYSTEMS THROUGH MECHANOCHEMICAL ACTIVATION OF MINERALS

Abstract (EP4508020 A1)

[EN] Described herein are processes for synthesizing hydraulic-carbonating binder systems through mechanochemical process, including providing a blend of material stream one of aluminosilicate or calcium aluminosilicate mineral material and material stream two of alkaline-rich mineral material; and simultaneously fractioning the blended minerals while contacting the blended minerals with a CO₂-containing in the mechanochemical reactor. This binder system is useful for cementation functions in concrete. The precipitated carbonation products are mainly calcium carbonates (CaCO₃), magnesium carbonates (MgCO₃), and amorphous alumina-silica gel. The developed binder system is activated through hydration and/or concurrent hydration-carbonation reactions in concrete and it can be utilized in the form of slurry or dried powder for a wide range of precast and cast-in-place or ready-mix concrete applications. The binder system reacts with cement in concrete to form carbonate/calcium-silicate-hydrate (C-S-H) composite phases that result in enhanced mechanical properties.



1st Main Claim (EP4508020 A1)

[EN] 1. A mechanochemical process for making a binder system, comprising: providing a mixture of aluminosilicate material and alkaline-rich mineral material; wherein the alkaline-rich mineral material is at least partially carbonated; simultaneously fractioning the mixture, while contacting the mixture with a CO₂- containing gas; thereby making a binder system; wherein the binder system, after simultaneously fractioning the mixture, while contacting the mixture with a CCh-containing gas, comprises less than 85 percent by weight (w/w) carbonates.

Assignees: CARBONBUILT; CARBONBUILT INC

6. Family 94269685 (US2022356115 AA)

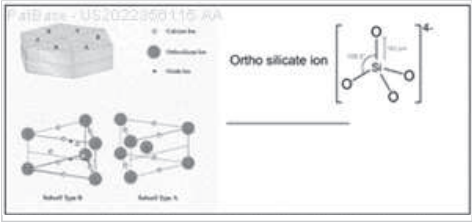
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Title
[EN] CO2 IMPREGNATED CONCRETE

Abstract
[EN] Concrete made using the protocol described herein converts more of the available calcium hydroxide (Ca(OH)₂) into calcium carbonate (CaCO₃) and distributes it more thoroughly throughout the concrete mixture by converting it into calcium bicarbonate (Ca(HCO₃)₂) by adjusting the pH of the hydrating liquid and then deliberately adjusting the pH of the hydrating liquid again when precipitation of the CaCO₃ from the hydration liquid is desired to more uniformly coat the materials used in a concrete mix. This process creates more CaCO₃ in concrete than current methods on the market and that has been demonstrated to increase the structural and chemical properties of the concrete.

1st Main Claim
[EN] **1.** A method of increasing the strength and integrity of concrete, comprising:
adding a high-surface-area polymer to a hydrating mixture of concrete; and
allowing the high-surface-area polymer to integrate within a crystalline structure of the concrete.

Assignees: RICHARDSON ROBERT GEORGE



7. Family 49555253 (US2013112115 AA)

[View in PatBase](#)

Title (EP2500328 A1)

[EN] CO₂-CAPTURING BINDER, PRODUCTION METHOD THEREOF BASED ON THE SELECTION, PURIFICATION AND OPTIMISATION OF CARBIDE LIME, AND AGGLOMERATES HAVING AN ENVIRONMENTAL ACTIVITY

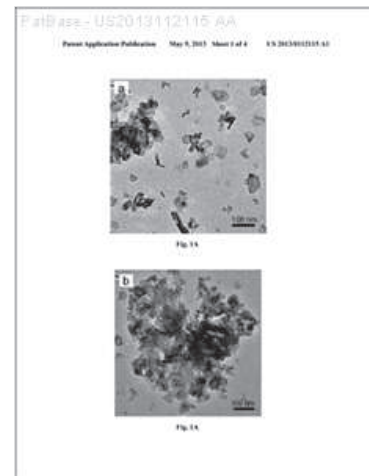
Abstract (EP2500328 A1)

[EN] The invention relates to CO₂ capturing binder with an amortized environmental cost, the method of manufacture thereof by means of selecting, purifying and optimizing the carbide lime paste for use as a cementing material, and aggregates for the manufacture of lime paints and slurries, stuccos, mortars and concretes having multiple applications in the construction industry, in architectural restoration, in public works and land conditioning, object of the present invention. It is basically characterized in that the raw material is the residue in the form of sludge generated in the industrial manufacture of acetylene (C₂H₂) from calcium carbide (CaC₂) the fundamental component of which is calcium hydroxide (Ca(OH)₂) in highly reactive nanometric formations treated in a specific manner according to the invention.

1st Main Claim (EP2500328 A1)

[EN] 1. A CO₂ capturing binder **characterized in that** it comprises calcium hydroxide (Ca(OH)₂) in a proportion greater than 75 percent by weight with respect to the total weight of the components, in primary nanometric formations having a size greater than 100 nm, with a specific surface area less than 30 m²/g obtained after selecting, purifying and optimizing class B carbide lime residues from the manufacture of acetylene from calcium carbide.

Assignees: TRENZAMETAL S L; GEOSILEX TRENZA METAL S L; SOTILLO MIGUEL ANGEL BERMEJO; NAVARRO CARLOS RODRIGUEZ; ELERT KERSTIN; AGUDO ENCARNACION RUIZ; RODRIGUEZ NAVARRO CARLOS; BERMEJO SOTILLO MIGUEL ANGEL; RUIZ AGUDO ENCARNACION



8. Family 93011473 (US2022267208 AA)

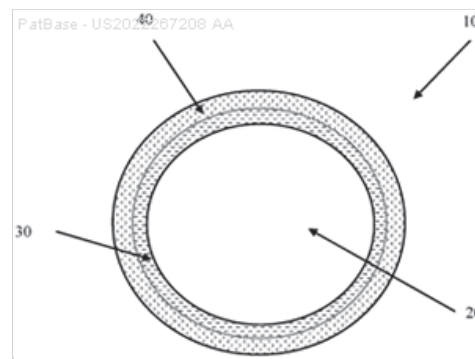
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Title (EP4294773 A1)

[EN] PRODUCTION OF SUPPLEMENTARY CEMENTITIOUS MATERIALS THROUGH WET CARBONATION METHOD

Abstract (EP4294773 A1)

[EN] A method of making a supplementary cementitious material is described that includes: forming a slurry comprising water and a carbonatable material powder, wherein a weight ratio of water to the carbonatable material powder is at least 1; and flowing a gas comprising carbon dioxide into the slurry for 0.5 to 24 hours while maintaining the slurry at a temperature of 1 degrees centigrade to 99 degrees centigrade to form a carbonated slurry comprising CaCO_3 and amorphous silica. A method of forming cement or concrete using the supplemental cementitious material is also described.



1st Main Claim (EP4294773 A1)

[EN] 1. A method of making a supplementary cementitious material comprising: forming a slurry comprising water and a carbonatable material powder, wherein a weight ratio of water to the carbonatable material powder in the slurry is at least 1; and flowing a gas comprising carbon dioxide into the slurry for 0.5 to 24 hours while maintaining the slurry at a temperature of 1 degrees C to 99 degrees C to form a carbonated slurry comprising CaCO_3 and amorphous silica.

Assignees: SOLIDIA TECHNOLOGIES INC; SOLIDIA TECH INC

9. Family 54938658 (KR20130109616 A)

[View in PatBase](#)

Title

[EN] THE MANUFACTURING METHOD OF HIGH QUALITY RECYCLING AGGREGATE USING A NEUTRALIZATION REACTION OF CALCIUM HYDROXIDE AND CARBON DIOXIDE

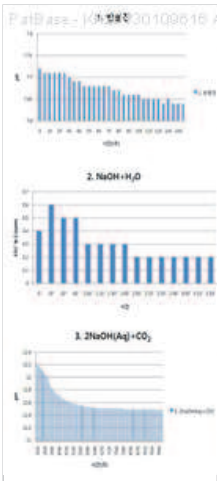
Abstract

[EN] PURPOSE: A method for manufacturing high-quality recycled aggregates is provide to produce high quality recycled aggregates by reacting sodium carbonate and calcium hydroxide such that calcium carbonate is precipitated, and thereby porousifying the aggregates and cement paste interfaces. CONSTITUTION: A method for manufacturing high quality recycled aggregates comprises the steps of: manufacturing a sodium hydroxide aqueous solution by dissolving sodium hydroxide in washing water; manufacturing a sodium carbonate aqueous solution by dissolving carbon dioxide in the sodium hydroxide aqueous solution; washing recycled aggregates with the sodium carbonate aqueous solution; and separating cement paste by grinding the recycled aggregates with low speed wet-triturating apparatus using sulfuric water as processing water. [Reference numerals] (1) Before reaction; (AA,CC) Time (sec); (BB) Time

1st Main Claim

[MT] 1. By putting the waste concrete by screening the crushed recycled aggregate foreign matter to produce by size, a) washing water to dissolve the sodium hydroxide (NaOH) aqueous solution of sodium hydroxide; b) preparing an aqueous solution of sodium hydroxide of the step a), carbon dioxide (CO₂), sodium carbonate (Na₂CO₃)solution was prepared by dissolving the; c) the recycled aggregate with aqueous sodium carbonate solution of step b); and d) cleaning the recycled aggregate, sulfuric acid to the process of step c) by using the slow wet grinding by grinding device comprises the steps of separating a cement paste is characterized in that it comprises a method for the production of high-quality recycled aggregate.

Assignees: NAT UNIV KONGJU IND ACAD COOP



10. Family 98698162 (US2023265019 AA)

[View in PatBase](#)

Title

[EN] METHODS AND SYSTEMS FOR BIOMASS-DERIVED CO₂ SEQUESTRATION IN CONCRETES AND AGGREGATES

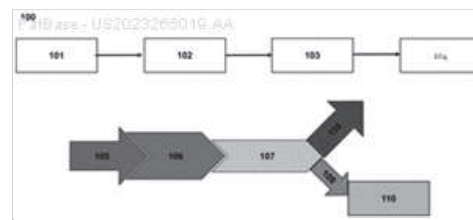
Abstract

[EN] Provided herein are integrated biomass combustion-carbonation gas conditioning systems to directly sequester carbon dioxide from biomass-derived CO₂-containing flue gas. The CO₂ is sequestered by mineral carbonation in concrete materials within a carbonation reactor. The mineral carbonation processes sequester CO₂ in concrete materials, aqueous slurries, or aggregates without any additional carbon enrichment process. Contacting a CO₂-containing gas stream from a biomass combustion apparatus with concrete, aggregate, or alkaline solutions, causes a carbonation reaction in which carbonation products such as calcium carbonate (CaCO₃) and alumina silica gel are formed. The carbonation reactions set forth herein are useful for strengthening concrete and concrete components. Certain processes herein condition the biomass-derived flue gas. The conditioning includes condensing the gas to remove acidic gas, and to remove particulates and water. The conditioning includes adjusting the temperature, relative humidity, and gas flow rate of the biomass-derived flue gas without any carbon capture step before entering the carbonation reactor. The permanent storage of CO₂ in concrete materials reduces carbon emissions from biomass combustion systems. The process does so, in certain embodiments, at low temperatures, ambient pressure, and even under dilute CO₂ concentrations in CO₂-containing flue gas streams. For example, the CO₂ concentration in a CO₂-containing flue gas stream from a biomass combustion system may be lower than 20 volume percent (vol percent) and be used to produce low-carbon concrete materials.

1st Main Claim

[EN] **1.** A process for sequestering carbon dioxide from a biomass combustion apparatus, comprising providing a CO₂-containing flue gas from a biomass combustion apparatus having a biomass discharge outlet; conditioning the CO₂-containing flue gas to provide a conditioned gas; wherein the conditioning comprises: removing a member selected from the group consisting of particulate matter, acidic gas, alkali chlorides, alkali sulfates, and combinations thereof; and adjusting the temperature, relative humidity, flow rate, or a combination thereof, of the CO₂-containing flue gas; wherein the conditioned gas has a different temperature, relative humidity, flow rate, or a combination thereof, than the CO₂-containing flue gas at the biomass discharge outlet; and wherein the conditioned gas has the same concentration of CO₂ as the CO₂-containing flue gas at the biomass discharge outlet; contacting, in a carbonation chamber, the conditioned gas with a component selected from the group consisting of a green body, concrete, an aqueous solution of alkaline solids, an aqueous solution of aggregates, or a combination thereof; and precipitating calcium carbonate at ambient pressure and temperatures ranging from, and including, 20 degrees centigrade to 100 degrees centigrade

Assignees: CARBONBUILT



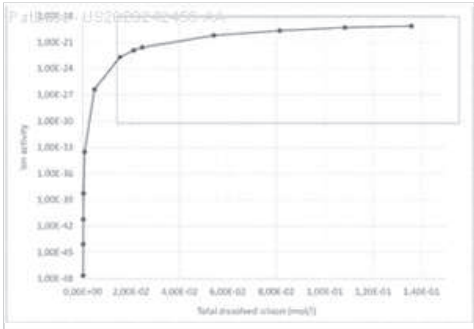
11. Family 88932789 (US2023242456 AA)

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Title (EP4164997 A1)
[EN] CONTROLLING CARBONATION

Abstract (EP4164997 A1)

[EN] The disclosure relates to a method for controlling carbonation synthesis of silicon and/or aluminium carbonate minerals, wherein the concentration of dissolved silicon and/or aluminium in a mix to be cured is adjusted to at least 1 mmol/l before curing the mix with gas comprising carbon dioxide (CO₂) having a partial pressure of CO₂ of at least 0.15 bar. In some embodiments of the disclosure an alkaline substance is added to the raw material to provide the mix where the total concentration of dissolved silicon and/or aluminium of at least 1 mmol/l. The disclosure also relates to a product obtainable by the methods of the disclosure as well as to the use of the product as building material, preferably for producing concrete-like products, more preferably for elements, most preferably for pre-casted elements and to the use of the method in construction industry or for production of elements and/or pre-casted elements.



1st Main Claim (EP4164997 A1)

[EN] 1. A method for controlling carbonation synthesis of silicon and/or aluminium carbonate minerals, characterized in that the method comprises providing a mix comprising raw material comprising silicon and/or aluminium; adjusting total concentration of dissolved silicon and/or aluminium in the mix to be cured to at least 1 mmol/l; and curing the mix with gas comprising carbon dioxide (CO₂) having a partial pressure of CO₂ of at least 0.15 bar, wherein the mix further comprises added water and aggregate and/or binder.

Assignees: TEKNOLOGIAN TUTKIMUSKESKUS VTT OY; CARBONAIDE OY

12. Family 44331452 (KR100919304 B1)

[View in PatBase](#)

Title

[EN] RECYCLED AGGREGATES FOR CONCRETE USING REACTION OF RAPID CARBONATION

Abstract

[EN] PURPOSE: Recycled aggregate for concrete using environment-friendly rapid carbonation reaction is provided to show similar dry shrinkage to that of common concrete made of natural aggregates. CONSTITUTION: Recycled aggregates for concrete have 3.1-8 percent of absorption rate. The recycled aggregates for concrete have absolute density of 2.2~2.49 g/cm3. The recycled aggregates for concrete have pH of 11-12.5 and the size of 5-25mm. A method for producing high-density neutral recycled aggregates for concrete comprises the step of performing rapid carbonation reaction through which aggregate reacts to carbon dioxide in a closed chamber in order to neutralize Ca(OH)2 in mortar included in recycled aggregate more than 70 percent. Owing to the production method, the absorption rate of the produced recycled aggregate is dropped to 1.5-3.0 percent, and absolute density is increased to 2.5~4.0g/cm3, and pH is decreased to 7.5-10.

1st Main Claim

[MT] 1. The dry density, 3.1~8% water absorption, a PH of 11~12.5 stage piling 2.2~2.49 g/cm3, the size of the concrete for recycled aggregate,

the aggregate to react with the carbon dioxide in the reaction chamber using recycled aggregate attached to promote carbonation reaction or Ca(oh) included in the mortar containing more than 70% by neutralization increases the

absorption rate of the recycled aggregate produced by the weldability and 2.5~4.0g / is raised in the dry density is lowered to polishing composition has a PH of 7.5 to promote carbonation reaction using high density neutral concrete for recycled aggregate.

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



13. Family 17847401 (DE19622292 A1)

[View in PatBase](#)

Title

[EN] HIGH PURITY CALCIUM CARBONATE RECOVERY

Abstract

[EN] A method of recovering limestone, for prodn. of high purity aggregate in cement mfr. or high purity flux in iron prodn., from calcite-contg. quartz sand (e.g. flotation residues from limestone purification) involves: (a) slurring the CaCO₃-contg. starting material in water; (b) passing CO₂ through the slurry at below 30 deg C; (c) subjecting the treated slurry to phase separation; and (d) treating the liq. phase by heating to above 30 (pref. about 50) deg C or by pptn. with Ca(OH)₂, produced from kiln dust by slaking with water, and separating the purified pptd. CaCO₃ solids. Pref. the CO₂ is cooled blast furnace gas or cement kiln offgas and is used at 2-4 bars pressure. After CO₂ treatment and before heating the soln., pref. silicate solids are separated and further processed to silica gel or for use in the glass industry. After separation of the purified pptd. solids, the remaining water is pref. cooled and recirculated.

1st Main Claim

[MT] 1 Method for the extraction of limestone for the production of highly pure additives in the cement and iron production from kalzithaltigen quartz sands, such as in flotation for cleaning of limestone remaining residues, characterized in that the CaCO₃-containing starting material is suspended in water, that CO₂ at temperatures below 30 DEGREES C passed through the slurry, is that the treated slurry phase separation is subjected to and that the liquid phase heated up to temperatures over 30 DEGREES C or 2 of furnace dust by removing water produced Ca (OH) like, whereupon the precipitated as CaCO₃, cleaned solids are separated.

Assignees: HOLDERBANK FINANC GLARUS

14. Family 105101521 (WO24227160 A1)

[View in PatBase](#)

Title

[EN] COMPOSITIONS AND METHODS OF MAKING CEMENTITIOUS BINDERS WITH LOW CO2 FOOTPRINT

Abstract

[EN] A cementitious material with a reduced carbon dioxide (CO2) footprint is disclosed, comprising lime containing CaO, Ca(OH)2, or their combinations, and a pozzolanic material such as metakaolin, calcined clay, volcanic tuffs, calcined shale, municipal solid waste incineration ash, silica fume, fly ash, bottom ash, ground pumice, biomass ash, halloysite, 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/residue, zinc slag, lead slag, silicates, aluminosilicate, or their combinations. The lime and pozzolanic material are subjected to milling processes to achieve the desired properties of the cementitious material with a low CO2 footprint.

1st Main Claim

[EN] 1. A cementitious material with a low CO2 footprint comprising: a lime comprising CaO, Ca(OH)2, or combinations thereof, and a pozzolanic material comprising metakaolin, calcined clay, volcanic tuffs, calcined shale, municipal solid waste incineration ash, silica fume, fly ash, bottom ash, ground pumice, biomass ash, halloysite, 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, aircooled slag, copper slag, Solvay slag phosphorous slag, bauxite slag/residue, zinc slag, lead slag, silicates, aluminosilicate, or combinations thereof; wherein the lime and the pozzolanic material are milled.

Assignees: SAVARY ROUZBEH; EMINOV SANAN; C CRETE TECH LLC

15. Family 98404940 (US2023242444 AA)

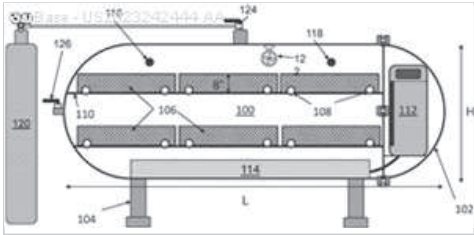
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Title (EP4469416 A2)
[EN] RECYCLED CONCRETE AGGREGATES CARBONATION TREATMENT

Abstract (EP4469416 A2)
[EN] A method of treating recycled concrete aggregates (RCA) that includes constructing a chamber configured to form a hermetic seal, loading the RCA into the chamber, hermetically sealing the chamber, pressurizing the interior of the chamber with carbon dioxide gas, monitoring a pressure and a relative humidity in the interior of the chamber, and controlling the pressure and the relative humidity until a predetermined condition is met.

1st Main Claim (EP4469416 A2)
[EN] 1. A method of treating recycled concrete aggregates (RCA), the method comprising: constructing a chamber configured to form a hermetic seal; loading the RCA into the chamber; hermetically sealing the chamber; pressurizing the interior of the chamber with carbon dioxide gas; monitoring a pressure and a relative humidity in the interior of the chamber; and controlling the pressure and the relative humidity until a predetermined condition is met.

Assignees: NUTECH VENTURES; HAWKINS CONSTRUCTION CO; HAWKINS CONSTRUCTION INC



16. Family 51418017 (KR101140561 B1)

[View in PatBase](#)

Title
[EN] HIGH FLOWING-LOW HEATING CONCRETE COMPOSITION FOR CARBON DIOXIDE REDUCTION

Abstract
[EN] PURPOSE: A carbon dioxide reduction type high-flowable ultra-low heat concrete composition is provided to lower emission rate of carbon dioxide during production process and enhance intensity, fluidity, and low exothermicity. CONSTITUTION: A carbon dioxide reduction type high-flowable ultra-low heat concrete composition comprises 400-520kg/m of binder, 130-150kg/m of water, 850-940 kg/m of fine aggregate, 800-900kg/m of coarse aggregate, and 4-10kg/m of superplasticizer. The binder comprises 50-83 parts by weight of ground granulated blast-furnace slag, 5-38 parts by weight of fly ash, and 10-25 parts by weight of alkali activator, and 1-5 parts by weight of sulfate powder. The binder is premixed in a container fixed type high speed mixer with 2,000-2,200rpm for 120-150 seconds. A fine aggregate percentage(S/a) is 25-40 percent and a replacement rate(W/B) is 48.6-54 percent. 0.8-2 parts by weight of the high ranged water reducing admixture is mixed based on 100.0 parts by weight of the binder.

1st Main Claim
[MT] 1. Blast furnace slag 50~83 5~38 parts by weight of fly ash, 10 to 25 parts by weight of the alkali stimulant, and sulfate powder composition is from 1 to 5 parts by weight in 120 to 150 seconds in the container fixed(R) high speed mixer (b) pre-mixing and 2,000~2,200rpm 400~520kg/ 130~150kg/ binder;; fine aggregate (s) the water (W) m³ / m³ / m³ 800~900kg/ 850~940kg/; coarse aggregate (G); and 4~10kg/ superplasticizer (S.P) m³ / m³; it is configured to include, 25~40%, aggregate rate of (S/A) binder ratio is, the superplasticizer is a 48.6~54% (S.P) with respect to 100 parts by weight of the binder (B), 0.8~2 parts by weight incorporated carbon dioxide, it characterized in that the reduced fluidity concrete composition ultra-low heat generation.

Assignees: LOTTE ENGINEERING AND AMP CONSTRUCTION CO LTD; ASIA CEMENT CO LTD

17. Family 98351037 (US11713279 BA)

[View in PatBase](#)

Title

[EN] DECARBONIZATION OF CONCRETE THROUGH CEMENT REPLACEMENT OF CALCIUM CARBIDE RESIDUE AND ACCELERATED CARBONATION CURING

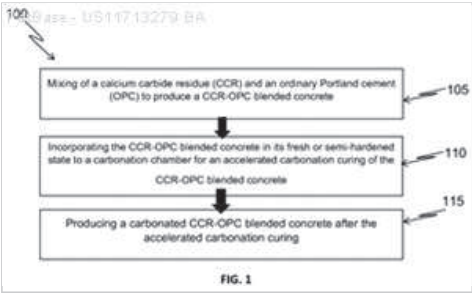
Abstract

[EN] A system and a method for concrete production is disclosed. In some implementations, the method comprises the steps of mixing of a calcium carbide residue (CCR) and ordinary Portland cement (OPC) to produce a CCR-OPC blended concrete, incorporating the CCR-OPC blended concrete in its fresh or semi-hardened state to a carbonation chamber for accelerated carbonation curing, and producing a carbonated CCR-OPC blended concrete after the accelerated carbonation curing. The CCR-OPC blended concrete is exposed to a carbon dioxide (CO₂) gas to promote a plurality of properties. The system includes a blending module and a carbonation chamber. The blending module mixes CCR and OPC to produce a CCR-OPC blended concrete, and the carbonation chamber performs accelerated carbonation curing of the CCR-OPC blended concrete in its fresh or semi-hardened state to produce a carbonated CCR-OPC blended concrete.

1st Main Claim

[EN] 1. A method for a concrete production, comprising:
mixing of a calcium carbide residue (CCR) and ordinary Portland cement (OPC) to produce CCR-OPC blended concrete;
incorporating the CCR-OPC blended concrete in its fresh or semi-hardened state to a carbonation chamber for accelerated carbonation curing of the semi-hardened CCR-OPC blended concrete; and
producing carbonated CCR-OPC blended concrete after the accelerated carbonation curing.

Assignees: UNITED ARAB EMIRATES UNIV; UNIV UNITED ARAB EMIRATES



18. Family 43956774 (US2011165400 AA)

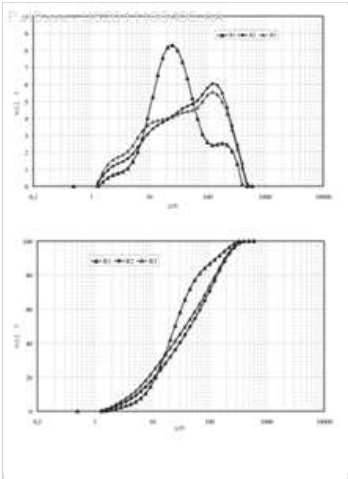
[View in PatBase](#)

Title (EP2276714 B1)

[EN] METHOD OF PRODUCING A MAINLY CARBONATE BONDED ARTICLE BY CARBONATION OF ALKALINE MATERIALS

Abstract

[EN] A method of producing a mainly carbonate bonded article includes a step of providing an alkaline granular material having one or more alkaline earth metal silicate phases. The method includes a step of compacting the granular material to obtain a compact of the granular material. The porosity of the compact is smaller than or equal to 37 percent by volume. The intrinsic permeability of the compact is at least 1·10⁻¹² cm². The method also includes a reacting step arranged to form at least 5 percent by weight of carbonates (CO₃²⁻), by reacting the granular material with carbon dioxide in the presence of water, thus transforming the compact into the article. In the reacting step, the compact, being unsaturated with moisture at the beginning of the reacting step, is brought in an atmosphere having carbon dioxide. The atmosphere is at a temperature of at least 70 degrees centigrade and at a pressure of at least 0.5 MPa. The pressure is also higher than the saturated vapor pressure of water at the temperature. As a result, at least a portion of the carbonates are formed by reaction of the one or more alkaline earth metal silicate phases. Articles are also obtained by the method.

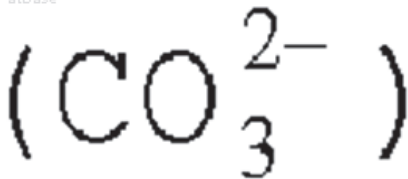


1st Main Claim (EP2276714 B1)

[EN] 1. A method of producing a mainly carbonate bonded article for use as a construction material by carbonation, the method comprising the steps of:

- - providing a granular material having a pH higher than or equal to 8.3, the granular material comprising at least one alkaline earth metal silicate phase, wherein the granular material comprises a fine fraction consisting of all the particles of the granular material having a size smaller than or equal to 500 micrometres, the fine fraction amounting to at least 50 percent by weight of the granular material, and wherein at least 10 percent by volume of the fine fraction has a particle size smaller than or equal to 50 micrometres,
- - compacting the granular material with a compaction pressure of at least 5 MPa to obtain a compact of the granular material, wherein the granulometry of the granular material is so selected and the compacting step is so arranged that the porosity of the compact is smaller than or equal to 37 percent by volume and the intrinsic permeability of the compact is at least 1·10⁻¹² cm², and
- - reacting the granular material in said compact with carbon dioxide in the presence of water to form at least 5 percent by weight

PatBase



of carbonates CO₃²⁻

thus transforming the compact into the mainly carbonate bonded article, in which reacting step the compact, being unsaturated with moisture at the beginning of the reacting step, is put in an atmosphere comprising said carbon dioxide, wherein said atmosphere is at a temperature of at least 70 degrees centigrade and at a pressure of at least 0.5 MPa so that said alkaline earth metal silicate phase contributes to the formation of said carbonates, said pressure being higher than the saturated vapour pressure of water at said temperature, wherein the granular material is free of material having hydraulic binding properties or comprises at most such an amount thereof that the compressive strength of the mainly carbonate bonded article is more than two times the strength of a same compact treated in a nitrogen atmosphere which is free of carbon dioxide under same conditions as in the reacting step.

Assignees: CARBSTONE INNOVATION NV; NIELSEN PETER; QUAGHEBEUR MIEKE; LAENEN BEN; KARBSTOUN INNOVEHJSHN NV

19. Family 93389538 (US2024067565 AA)

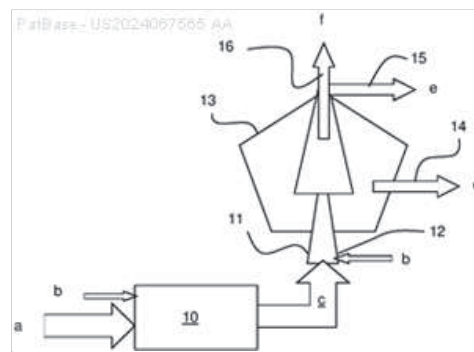
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Title (EP4308516 B1)

[EN] METHOD AND DEVICE FOR CARBONATION

Abstract

[EN] A method for converting a starting material containing at least 40 wt.-% percent of calcium silicon (hydr)oxide phases and calcium aluminum (hydr)oxide phases into an SiO₂ rich SCM and a calcium carbonate additive includes the steps: providing the starting material with a D₉₀ of less than or equal to 1 mm, mixing the starting material with water or adjusting the water content to provide a starting material slurry having a solid:liquid weight ratio from 2:1 to 1:100, passing the starting material slurry together with carbon dioxide into a gravity separation reactor, subjecting the starting material slurry and carbon dioxide to centrifugal motion inside the reactor, and removing a heavy slurry from a first outlet of the reactor, removing a light slurry of lower density particles from a second outlet of the reactor, and removing liquid at a third outlet of the reactor.



1st Main Claim (EP4308516 B1)

[EN] 1. Method for converting a starting material containing at least 40 wt.-% percent of calcium silicon (hydr)oxide phases and calcium aluminium (hydr)oxide phases into an SiO₂ rich supplementary cementitious material and a calcium carbonate additive comprising the steps

- - providing the starting material with a D₉₀ of less than or equal to 1 mm
- - mixing the starting material with water or adjusting the water content to provide a starting material slurry having a solid:liquid ratio from 2:1 to 1:100
- - passing the starting material slurry into a gravity separation reactor together with carbon dioxide
- - subjecting the starting material slurry and carbon dioxide to centrifugal motion inside the reactor and
- - removing a heavy slurry of higher density particles comprising the calcium carbonate additive formed by reaction of carbon dioxide with calcium ions dissolved or leached from the starting material from a first outlet of the reactor, removing a light slurry of lower density particles comprising the undissolved SiO₂ rich remains of the starting material from a second outlet of the reactor, and removing liquid from a third outlet of the reactor.

Assignees: HEIDELBERG MAT AG; HEIDELBERGCEMENT AG; HCONNECT 2 GMBH

20. Family 51958851 (KR20120103906 A)

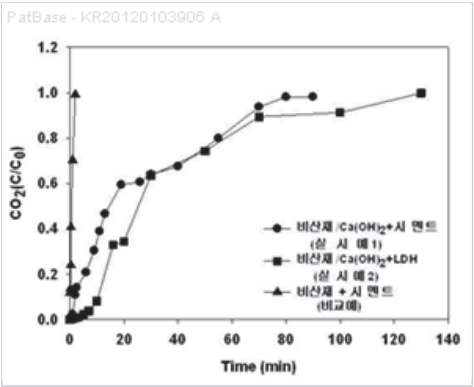
[View in PatBase](#)

Title

[EN] CARBON DIOXIDE ABSORBENT USING RECYCLED WASTE AND CONCRETE INCLUDING THE SAME

Abstract

[EN] PURPOSE: Carbon dioxide absorbent using recycled waste materials and concrete including the same are provided to be cost effectively prepared by mixing an industrial byproduct with an additive selected from a group including minerals, cement, and the combination of the same. CONSTITUTION: Carbon dioxide absorbent using recycled waste materials includes tailing or an industrial byproduct and an additive. The surface of the tailing or industrial byproduct is reformed based on a basic solution. The additive is selected from a group including minerals, cement, and the combination of the same. The weight ratio of the tailing or the industrial byproduct and the additive is 9:1 to 6:4. The tailing or the industrial byproduct is fly ash, waste tire, blast furnace slag, collected dust, or the combination of the same. [Reference numerals] (AA) Fly ash/Ca(OH)₂ + cement (example 1); (BB) Fly ash/Ca(OH)₂ + LDH (example 2); (CC) Fly ash + cement (comparative example); (DD) Time(min)



1st Main Claim

[MT] 1. In modifying the surface using a basic solution tailings (鑛尾) or industrial by-products; and, minerals, cement, and an additive selected from the group consisting of a combination of the carbon dioxide absorbent comprising the:

Assignees: KOREA INST CONSTRUCTION TECH; UNIV SEJONG IND ACAD COOP GR; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY KICT

21. Family 87170535 (US2023129157 AA)

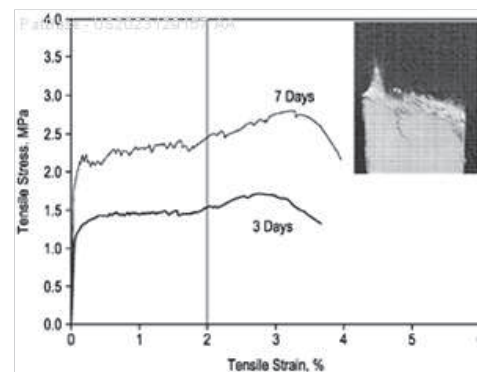
[View in PatBase](#)

Title

[EN] SEQUESTERING CARBON DIOXIDE INTO PRECURSORS OF BENDABLE ENGINEERED CEMENTITIOUS COMPOSITES

Abstract

[EN] Methods of preparing engineered cementitious composite precursors include carbonating a fly ash comprising >about 25 percent by weight of calcium oxide (CaO) and having a water content of >about 12 percent to <about 18 percent by weight of water by exposing the fly ash to a first gas stream comprising carbon dioxide to form a carbonated fly ash. A steel slag is also carbonated that comprises >about 40 percent by weight of calcium oxide (CaO) and having a water content of >about 12 percent to <about 18 percent by weight of water by exposing the steel slag to a second gas stream comprising carbon dioxide to form a carbonated steel slag. The carbonated fly ash and the carbonated steel slag are suitable for use as engineered cementitious composite precursors in a bendable engineered cementitious composite composition that further comprises Portland cement, a polymeric fiber, and a superplasticizer.



1st Main Claim

[EN] 1. A method of preparing engineered cementitious composite precursors comprising: carbonating a fly ash comprising greater than or equal to about 25 percent by weight of calcium oxide (CaO) and having a water content of greater than or equal to about 12 percent to less than or equal to about 18 percent by weight of water by exposing the fly ash to a first gas stream comprising carbon dioxide, so that the fly ash has greater than or equal to about 4 percent by weight of carbon dioxide uptake on a dry basis to form a carbonated fly ash; and carbonating a steel slag comprising greater than or equal to about 40 percent by weight of calcium oxide (CaO) and having a water content of greater than or equal to about 12 percent to less than or equal to about 18 percent by weight of water by exposing the steel slag to a second gas stream comprising carbon dioxide, so that the steel slag has greater than or equal to about 5 percent by weight of carbon dioxide uptake on a dry basis to form a carbonated steel slag; wherein the carbonated fly ash and the carbonated steel slag are suitable for use as engineered cementitious composite precursors in an engineered cementitious composite composition that further comprises Portland cement, a polymeric fiber, and a superplasticizer.

Assignees: THE UNIV OF MICHIGAN; UNIV MICHIGAN REGENTS

22. Family 97604125 (US2023174424 AA)

[View in PatBase](#)

Title

[EN] METHOD FOR SEQUESTERING CO2 FROM FLUE GAS AND PREPARING MICROFIBER-REINFORCED CEMENT

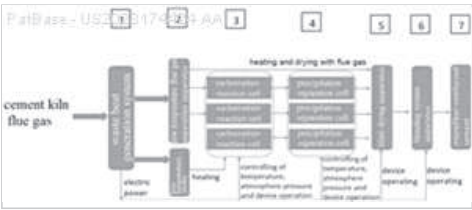
Abstract

[EN] A method for sequestating carbon dioxide from flue gas by using a cement clinker. The products of this method can also be used to prepare microfiber-reinforced cement. The method of the present disclosure is capable of capturing and storing carbon dioxide in flue gas, such as cement kiln flue gas.

1st Main Claim

[EN] 1. A method for sequestrating carbon dioxide from a flue gas, the method comprising: reacting the flue gas with a cement clinker thereby sequestering at least a portion of the carbon dioxide from the flue gas in the cement clinker.

Assignees: UNIV HONG KONG POLYTECHNIC; HONG KONG POLYTECHNIC UNIV



23. Family 45027408 (US2010251937 AA)

[View in PatBase](#)

Title (EP2362928 A2)

[EN] CAPTURED CO₂ FROM ATMOSPHERIC, INDUSTRIAL AND VEHICLE COMBUSTION WASTE

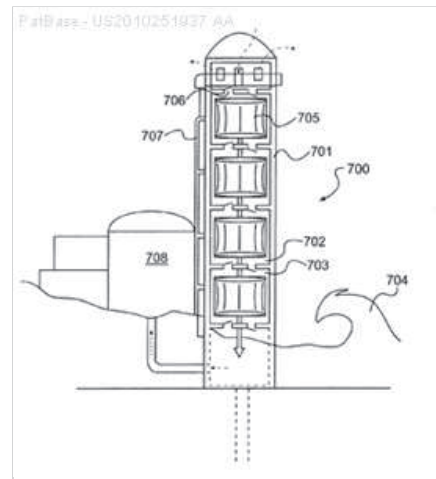
Abstract (EP2362928 A2)

[EN] A CO₂ control device and method for capturing CO₂ from fluid flow, including: a flow-through apparatus and an CO₂ absorbing filter treated with an alkaline material which is housed within the flow-through apparatus. The flow-through apparatus receives fluid flow and the CO₂ from the fluid flow is absorbed by the CO₂ absorbing filter. The absorbed CO₂ is converted into CaCO₃ which is combined with volcanic ash to form a useful cement material.

1st Main Claim (EP2362928 A2)

[EN] 1. A CO₂ control device for capturing CO₂ from fluid flow, comprising: a flow-through apparatus; and a CO₂ absorbing filter treated with an alkaline material and housed within the flow-through apparatus; wherein the flow-through apparatus receives the fluid flow; and wherein CO₂ from said fluid flow is absorbed by the CO₂ absorbing filter.

Assignees: MURRAY KENNETH D; MURRAY KATHERINE A

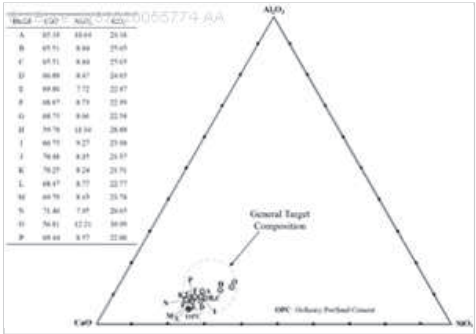


24. Family 71310026 (US2020055774 AA)

[View in PatBase](#)

Title (EP3601189 A1)
[EN] CARBONATION-ACTIVATED CLINKER BINDER FROM INCINERATION RESIDUES

Abstract (EP3601189 A1)
[EN] A process for synthesis of a waste-derived CO₂-activated clinker, which comprises firing nodules at temperatures between 1000 - 1 100 degrees centigrade for a time sufficient to obtain CO₂-reactive clinker phases within the nodules, cooling the clinker nodules, and reducing to powder to obtain a clinker powder; wherein the nodules are agglomerates of a stoichiometric mix of uniformly-sized powders of municipal solid waste (MSW) incineration residues; wherein the stoichiometric mix respects the primary compositional requisite of containing Ca, Al, and Si in their oxide forms within the ranges of 35 - 45 weight percent CaO, 2 - 8 weight percent Al₂O₃, and 12 - 20 weight percent SiO₂; wherein the final stoichiometric mix has a total-sulfur content of 1 to 10 weight percent, total- carbon content of 2 to 20 weight percent, and a total-chlorine content of 2 to 15 weight percent.



1st Main Claim (EP3601189 A1)
[EN] 1. A process for synthesis of a waste-derived CO₂-activated clinker, which comprises firing nodules at temperatures between 1000 - 1 100 degrees centigrade for a time sufficient to obtain CO₂-reactive clinker phases within the nodules, cooling the clinker nodules, and reducing to powder to obtain a clinker powder; wherein the nodules are agglomerates of a stoichiometric mix of uniformly-sized powders of municipal solid waste (MSW) incineration residues; wherein the stoichiometric mix respects the primary compositional requisite of containing the elements Ca, Al, and Si expressed in their oxide forms within the ranges of 35 - 45 weight percent CaO, 2 - 8 weight percent Al₂O₃, and 12 - 20 weight percent SiO₂; wherein the remaining portion of the stoichiometric mix optionally comprise oxides or compounds of Mg, Fe, Na, K, P, S, C, and Cl; wherein the final stoichiometric mix has a total-sulfur content of 1 to 10 weight percent, total- carbon content of 2 to 20 weight percent, and a total-chlorine content of 2 to 15 weight percent.

Assignees: AL GHOULEH ZAID; REVERSEEFFECT TECH INC

25. Family 49959514 (WO11145080 A1)

[View in PatBase](#)

Title (EP2571805 A1)

[EN] A PROCESS FOR THE PRODUCTION OF HYDROGEN, THE SEQUESTRATION OF CARBON DIOXIDE AND THE PRODUCTION OF BUILDING MATERIALS STARTING FROM SLAGS AND/OR INDUSTRIAL ASHES

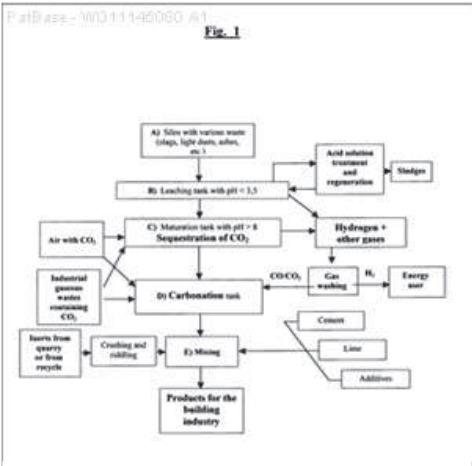
Abstract (EP2571805 A1)

[EN] The present invention refers to a process for the production of hydrogen and the contemporaneous sequestration of carbon dioxide starting from slags and/or industrial ashes. In particular, said process allows to produce a gas substantially composed of hydrogen and, at the same time, allows to prepare materials having the characteristics of being avid carbon dioxide sequestrators and of being advantageously usable as inert materials for preparing hydraulic mixtures with lime and/or cement.

1st Main Claim (EP2571805 A1)

[EN] 1. A process for the production of hydrogen and the sequestration of carbon dioxide starting from slags and/or industrial ashes, comprising: at least one phase b), preceding the following phase c), of acidic leaching/maturation, in which said slags and/or industrial ashes and/or a mixture thereof are subjected, in a sealed reaction environment, to a treatment in an acid solution having a pH < 3,5, during which a gas substantially composed of hydrogen is produced and from the slags and/or ashes the hazardous metals are extracted under the form of soluble salts of nitrogen and/or sulphur, and/or chlorine and/or phosphorus and/or fluorine and/or acetic acid; and at least one phase c), following the above phase b), of alkaline leaching/maturation, in which said slags and/or industrial ashes and/or a mixture thereof previously treated in above phase b) are subjected, in a sealed reaction environment and in the presence of CO₂, to a treatment in an alkaline solution having a pH > 8, during which a gas substantially composed of hydrogen is produced and the CC>2 present in the environment is sequestered.

Assignees: I U S P A A S; ASI U S P A; BARBARESE ENRICO; PLESCIA PAOLO; PINNA MAURIZIO



26. Family 98597837 (US2023257276 AA)

[View in PatBase](#)

Title

[EN] SINGLE-STEP LOW-TEMPERATURE CALCIUM CARBONATE PRODUCTION THROUGH CARBON DIOXIDE SEQUESTRATION OF MINERAL MATERIALS TO MAKE CONCRETE

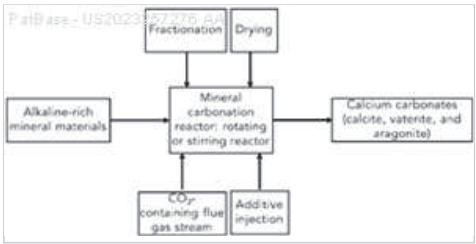
Abstract

[EN] The disclosure herein sets forth processes and compositions for producing carbonated materials comprising calcium carbonates through a mechanochemical process. The present disclosure concerns the production of calcium carbonate by sequestering CO₂. Certain processes herein include providing alkaline-rich mineral materials that include carbonatable solid wastes such as lime kiln dust, cement kiln dust, and coal combustion residues, and simultaneously fractionating the alkaline-rich mineral materials, while contacting the alkaline-rich mineral materials with a CO₂-containing gas in carbonation reactor at low temperature and ambient pressure. In some embodiments, the alkaline-rich mineral materials are partially carbonated before being used in the processes disclosed herein. After contacting the alkaline-rich mineral materials with a CO₂-containing gas in carbonation reactor at low temperature and ambient pressure, solid calcium carbonate is produced. In aqueous reactors, the solid calcium carbonate is filtered from a solution in which it precipitated, and the remaining solution includes hydroxide as well as alkaline metal ions. The solution filtered from the solid calcium carbonate can be sequentially contacted with a CO₂-containing gas stream to precipitate additional calcium carbonate. The carbonated materials formed from these processes can be used in the form of a slurry, as a moist powder, as a dried powder, as a reactive filler or as a supplementary cementitious material in a mixture that is used to make concrete.

1st Main Claim

[EN] 1. A mechanochemical process for making calcium carbonate, comprising: providing alkaline-rich mineral materials that are at least partially carbonated; simultaneously fractionating the alkaline-rich mineral materials, while contacting the alkaline-rich mineral materials with a CO₂-containing gas; wherein the contacting occurs at ambient pressure and temperatures ranging from 20 degrees centigrade to 80 degrees centigrade; thereby making calcium carbonate.

Assignees: CARBONBUILT



27. Family 97402402 (US2024294434 AA)

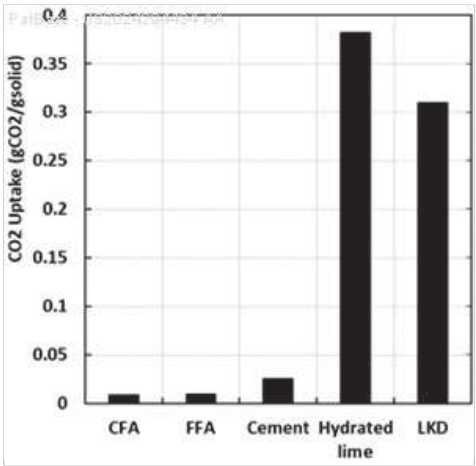
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Title (EP4433435 A1)

[EN] METHODS AND COMPOSITIONS FOR LOW-CARBON CONCRETE PRODUCTION USING CARBON DIOXIDE AND SOLID WASTE STREAMS

Abstract (EP4433435 A1)

[EN] Set forth herein are methods for producing low-carbon concrete components comprising a cementitious mixture of industrial solid wastes such as coal combustion residues, lime, kiln dust, and gypsum. These cementitious mixtures are a substantial replacement for Portland cement-based concrete mixtures. The methods herein include mixing materials, pressing, and shaping the mixed materials into a structural concrete component, and exposing the structural component to carbon dioxide. The CO₂ may be sourced from CO₂ emission sources (e.g., waste CO₂-containing gas stream, dilute flue gas stream, a concentrated CO₂ gas stream, a commercially available CO₂ source, liquefied CO₂, or from the atmosphere) to harden and thereby form structural concrete components. In some examples, the finished concrete components (e.g., concrete block) are compliant with industry-standard requirements for use in construction applications and feature significantly lower carbon intensity compared to traditional cement-based concrete components.



1st Main Claim (EP4433435 A1)

[EN] 1. A process of producing a concrete component, comprising: forming, or having formed, a cementitious mixture comprising industrial solid wastes; shaping, or having shaped, the cementitious mixture into a structural component; and exposing, or having exposed, the structural component to CO₂ and H₂O; wherein the cementitious mixture comprises: (a) gypsum, (b) an aluminosilicate material, and (c) an alkaline material; wherein the cementitious mixture has: a sulfate-to-alumina [SO₃/Al₂O₃] ratio by mass of 0.05 < [SO₃/Al₂O₃] < 3; and alkaline material to aluminosilicate ratio by mass of 0.01 to 1.

Assignees: CARBONBUILT

28. Family 79118842 (EP3656750 A2)

[View in PatBase](#)

Title

[EN] USE OF CARBON DIOXIDE FROM AND FOR CEMENT

Abstract

[EN] Method of utilizing carbon dioxide containing gas arising as waste or by-product in one or more of the following industrial processes:- cement clinker production such as rotary kilns and/or calciner stages, oxyfuel kiln lines, or from separate calcination devices or indirect calcination of the calcium carbonate,- carbon capture technologies, such as amine-based CO₂scrubber and membrane-based gas separation,for providing a useful carbonation product by one or more of the following production steps:- carbonation of concrete demolition waste, especially recycled concrete fines, for the production of SCM or calcite and active silica,- carbonation of industrial materials, e.g. fly ashes, slags and other, for the production of SCM or calcite and active silica,- carbonation of natural materials, e.g. olivine, serpentine, talc, MgO-containing minerals, and other, for the production of SCM or calcite and active silica, and- carbonation hardening of binders,wherein the production step is selected based on the amount of carbon dioxide in the carbon dioxide containing gas, the additional substances present in the carbon dioxide containing gas and a temperature and pressure of the carbon dioxide containing gas.

1st Main Claim

[EN] 1. Method of utilizing carbon dioxide containing gas arising as waste or by-product in one or more of the following industrial processes:

- - cement clinker production such as rotary kilns and/or calciner stages, oxyfuel kiln lines, or from separate calcination devices or indirect calcination of the calcium carbonate,
- - carbon capture technologies, such as amine-based CO₂ scrubber and membrane-based gas separation,

for providing a useful carbonation product by one or more of the following production steps:

- - carbonation of concrete demolition waste, especially recycled concrete fines, for the production of SCM or calcite and active silica,
- - carbonation of industrial alkaline waste materials, e.g. fly ashes, slags and other, for the production of SCM or calcite and active silica,
- - carbonation of natural materials, e.g. olivine, serpentine, talc, MgO-containing minerals, and other, for the production of SCM or calcite and active silica, and
- - carbonation hardening of binders,

wherein the production step is selected based on the amount of carbon dioxide in the carbon dioxide containing gas, the additional substances present in the carbon dioxide containing gas and a temperature and pressure of the carbon dioxide containing gas.

Assignees: HEIDELBERGCEMENT AG

29. Family 98933080 (US2025144565 AA)

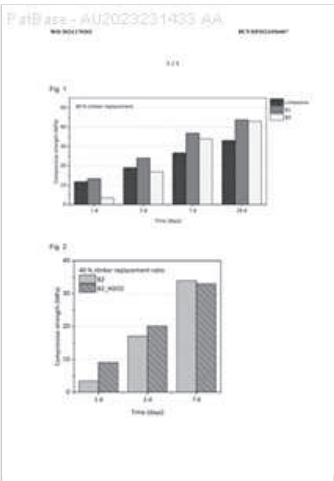
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Title (EP4241873 A1)
[EN] REMOVING HEAVY METALS FROM CEMENT PLANT OFF-GAS FOR CARBON CAPTURE

Abstract (EP4241873 A1)
[EN] Carbon capture method for an industrial plant off-gas wherein mercury and/or other heavy metals are removed from the off-gas by contacting the off-gas with an at least partially hydrated cement paste as sorbent in a scrubber before a concentration step of the off-gas to concentrate CO₂, wherein the at least partially hydrated cement paste is simultaneously carbonated and loaded with the mercury and/or other heavy metals during contacting with the off-gas and is used as supplementary cementitious material in composite cement as well as use of at least partially hydrated cement paste as sorbent in a scrubber before a concentration step of the off-gas to concentrate CO₂.

1st Main Claim (EP4241873 A1)
[EN] 1. Carbon capture method for an industrial plant off-gas wherein mercury and/or other heavy metals are removed from the off-gas by contacting the off-gas with an at least partially hydrated cement paste as sorbent in a scrubber before a concentration step of the off-gas to concentrate CO₂, wherein the at least partially hydrated cement paste is simultaneously carbonated and loaded with the mercury and/or other heavy metals during contacting with the off-gas and is used as supplementary cementitious material in composite cement.

Assignees: HEIDELBERG MAT AG; HSUSTAINABILITY GMBH; HCONNECT 2 GMBH



30. Family 95543171 (US2024383807 AA)

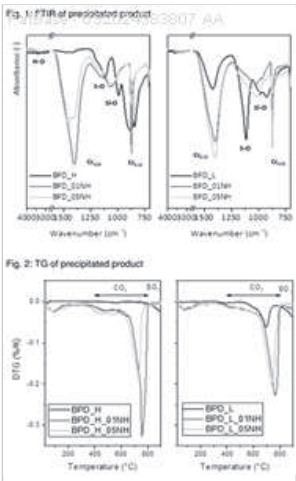
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Title (EP4119518 A1)
[EN] CARBONATION OF CALCIUM SULFATE CONTAINING MATERIALS

Abstract (EP4119518 A1)
[EN] Method for sequestering carbon dioxide comprising providing a starting material comprising calcium ions, sulfate and/or sulfite ions, and alkali metal ions with a molar ratio $\text{Alk}:\text{SO}_3 > 2.00$, reacting the starting material with carbon dioxide to obtain a carbonated product comprising calcium carbonate and alkali sulfate as well as use of the obtained product as set regulator or accelerator for cement and/or as minor or main cement component.

1st Main Claim (EP4119518 A1)
[EN] 1. Method for sequestering carbon dioxide comprising

- - providing a starting material comprising calcium ions, sulfate and/or sulfite ions, and alkali metal ions with a molar ratio $\text{S Alk}:\text{SSO}_3$ greater than or equal to 2.00,
- - reacting the starting material with carbon dioxide, and
- - obtaining a carbonated product comprising calcium carbonate and alkali sulfate.



Assignees: HEIDELBERG MAT AG; HEIDELBERGCEMENT AG; HCONNECT 2 GMBH; HEIDELBERGMATERIALS AG

31. Family 91222161 (CN114426419 A)

[View in PatBase](#)

Title

[EN] METHOD FOR SEALING CARBON DIOXIDE IN INORGANIC SOLID WASTE CERAMSITE MINERALIZED CONCRETE

Abstract

[EN] The invention relates to a method for sealing carbon dioxide by inorganic solid waste ceramsite mineralized concrete, which comprises the following steps: preparing inorganic solid waste ceramsite filter balls; preparing an aminated ceramsite filter ball; after the aminated ceramsite filter ball fully absorbs carbon dioxide, a filter ball adsorbing saturated carbon dioxide is obtained; and uniformly mixing and stirring the saturated carbon dioxide adsorption filter balls and cement mortar concrete to prepare a mineralized lightweight concrete test piece. Inorganic solid waste ceramsite filter balls are treated by an amino acid salt solution and/or amino ionic liquid, then are introduced into a high-concentration CO₂ environment such as factory chimney gas and the like to adsorb saturated CO₂, and then are directly added into concrete as an additive; and the escaped CO₂ rapidly mineralizes and maintains the cementing material and is converted into the main component calcium carbonate of the concrete, and the CO₂ is converted and sealed.

1st Main Claim

[MT] 1. A method for sequestering carbon dioxide by inorganic solid waste ceramic ceramics, characterized in that

Comprising the steps of step (1) preparing inorganic solid waste ceramic filter spheres;

Step (2) preparing aminated ceramic filter spheres obtained by impregnating said inorganic solid waste ceramic filter spheres of step (1) with an amino acid salt solution and/or an amine ionic liquid;

Step (3) sufficiently absorbing carbon dioxide by said aminated ceramic particulate filter spheres to obtain adsorbed saturated carbon dioxide filter spheres;

Step (4) Mixing and stirring the adsorbent saturated carbon dioxide filter balls prepared in step (3) with cementitious mortar concrete into mineralized lightweight concrete coupons.

Assignees: BEIJING JINXIU NEW TECH DEVELOPMENT CO LTD

32. Family 64991529 (CN106431493 A)

[View in PatBase](#)

Title

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

Abstract

[EN] The invention discloses a method for improving the physical property and the mechanical property of a recycled aggregate by a carbon dioxide (CO₂) maintaining method, which is suitable for recycled aggregate concrete and high-performance recycled aggregate concrete. The invention also provides a manufacturing method of the recycled aggregate structure concrete. The manufacturing method of the concrete comprises the steps: putting the recycled aggregate into a maintaining box capable of bearing a certain pressure, and introducing CO₂ gas and maintaining for a certain time so as to reduce the water absorption rate of the recycled aggregate and increase the crush index of the recycled aggregate, wherein the used CO₂ is tail gas discharged by thermal power or cement production; and uniformly stirring cement, the maintained recycled aggregate, sand or gravel or fine recycled aggregate and other mineral additive according to a certain mixing proportion, conveying or pumping the materials to a construction site and pouring to obtain the recycled aggregate structure concrete manufactured by the method and a concrete structure.

1st Main Claim

[MT] 1. the invention according to the recycled aggregate contains a lot of calcium hydroxide and its principles easily reacts with carbon dioxide to form calcium carbonate, is based on an existing method of recycled aggregate concrete manufacturing, the conservation of carbon dioxide method improvement of recycled aggregate for the first time physical and mechanical properties of concepts, application in structural concrete and high performance concrete with recycled aggregate.

Assignees: JILIN SHENGXIANG BUILDING MAT GROUP CO LTD

33. Family 91432638 (CN114477825 A)

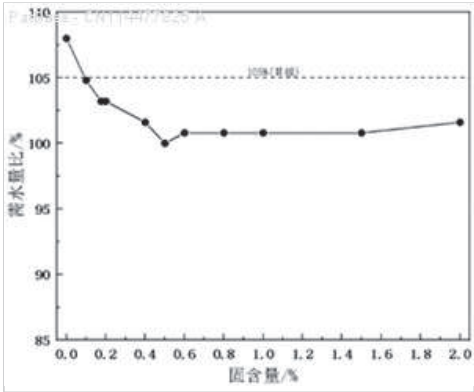
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Title

[EN] METHOD FOR MODIFYING, UPGRADING AND CARBON DIOXIDE MINERALIZATION EMISSION REDUCTION OF CIRCULATING FLUIDIZED BED FLY ASH, MODIFIED FLY ASH AND APPLICATION OF MODIFIED FLY ASH

Abstract

[EN] The invention provides a method for modifying and upgrading circulating fluidized bed fly ash in cooperation with carbon dioxide mineralization emission reduction, modified fly ash and application thereof, and belongs to the technical field of solid waste resource utilization and CO2 mineralization fixation emission reduction. Circulating fluidized bed fly ash is mixed with calcium-based alkaline feed liquid, calcium ions are attached to the surface of the circulating fluidized bed fly ash, then CO2-containing gas reacts with the calcium ions on the surface of the circulating fluidized bed fly ash to generate nano calcium carbonate particles, and the nano calcium carbonate particles are attached to gaps and holes of the circulating fluidized bed fly ash to form calcium carbonate particles. The water demand ratio of the circulating fluidized bed fly ash can be reduced, the gelling activity of the circulating fluidized bed fly ash is improved, the industrial application added value of the circulating fluidized bed fly ash is greatly improved, large-scale application of the circulating fluidized bed fly ash in the fields of cement and concrete is promoted, and the double effects of modifying and upgrading the circulating fluidized bed fly ash and mineralizing and fixing CO2 are achieved.



1st Main Claim

[MT] 1. A method of modifying texturing with carbon dioxide mineralization mitigation of circulating fluidized bed fly ash comprising the steps of:

Mixing circulating fluidized bed fly ash with a calcium-based alkaline feedstock solution to obtain a mixed material; said calcium-based alkaline feedstock solution containing calcium ions;

Subjecting the mixed material to a carbonization treatment in a CO2-containing atmosphere to obtain a modified fly ash.

Assignees: YUZHOU WASTE FREE CITY TECH RESEARCH INST CO LTD

34. Family 77225541 (US2021107840 AA)

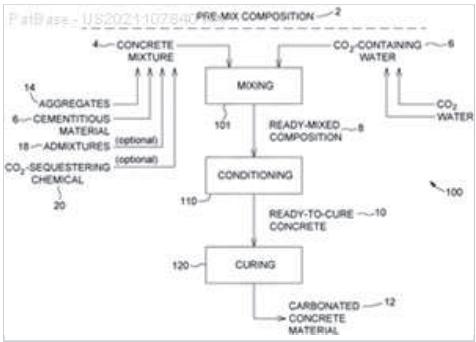
[View in PatBase](#)

Title (EP3818028 A1)

[EN] PROCESSES AND SYSTEMS FOR CARBON DIOXIDE SEQUESTRATION AND RELATED CONCRETE COMPOSITIONS

Abstract (EP3818028 A1)

[EN] A ready-mixed composition and a pre-mix composition for the production of a concrete material containing sequestered carbon dioxide, a CO₂-containing water used in such compositions, dry-batch and wet-batch processes for sequestering carbon dioxide in concrete material, general method and process for sequestering carbon dioxide in hardening concrete, system and ready-mixed truck to perform such processes and methods for the production of a ready-to-cure carbonated concrete. Compositions comprise a concrete mixture and a CO₂-containing water. The CO₂-containing water comprising water and at least one of blended CO₂ gas bubbles, dissolved H₂CO₃, carbonate ions (CO₃²⁻), bicarbonate ions (HCO₃⁻), nanosized alkaline earth metal carbonate and nanosized alkali metal carbonate particles. The concrete mixture comprises a cementitious material, aggregates and at least one CO₂-sequestering chemical for accelerating a CO₂ sequestration speed and maximizing the captured amount of the carbon dioxide.



1st Main Claim (EP3818028 A1)

[EN] 2

- sequestering chemical for accelerating a CO₂ sequestration speed and maximizing the captured amount of the carbon dioxide; and
- CO₂-containing water comprising water and at least one of blended CO₂ gas bubbles, dissolved H₂CO

Assignees: CRH GROUP CANADA INC; CRH CANADA GROUP INC; CRH GROUP SERVICES LTD

35. Family 63628933 (US2016280598 AA)

[View in PatBase](#)

Title

[EN] ADDITION OF CARBON DIOXIDE TO CONCRETE MIXTURES

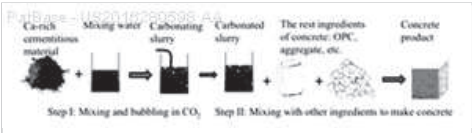
Abstract

[EN] A method for reducing the net amount of carbon dioxide generated in the manufacture of concrete by pre-carbonating calcium rich cementitious materials prior to the addition of ordinary Portland cement is disclosed. Additionally, a composition of concrete is disclosed, which is manufactured by using a mixture of pre-carbonated cementitious materials and ordinary Portland cement.

1st Main Claim

[EN] 1. A method for manufacturing concrete comprising: contacting a calcium-rich cementitious material in water with a carbon dioxide-rich gas to form a slurry; and adding ordinary Portland cement to the slurry.

Assignees: BOARD OF TRUSTEES OF UNIV OF ALABAMA; UNIV ALABAMA



36. Family 102910624 (WO24115090 A1)

[View in PatBase](#)

Title (EP4378907 A1)

[EN] COMPOSITE BINDER HARDENING BY CARBONATION

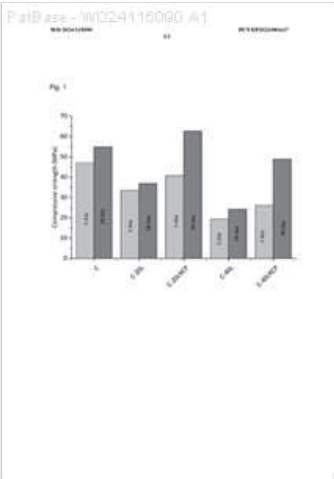
Abstract (EP4378907 A1)

[EN] Use of carbonated calcium rich waste material to make composite binders adapted to harden by carbonation comprising from 5 to 75 wt.- percent carbonated calcium rich waste material and from 20 to 95 wt.- percent of at least one calcium silicate with the sum of their amounts ranging from 50 to 100 wt.- percent of the composite binder and method for manufacturing building materials adapted to harden by carbonation comprising: providing a carbonated calcium rich waste material, mixing the carbonated calcium rich waste material with at least one calcium silicate to provide a composite binder comprising from 5 to 75 wt.- percent carbonated calcium rich waste material and from 20 to 95 wt.- percent calcium silicate(s) with the sum of their amounts ranging from 50 to 100 wt.- percent of the composite binder, and mixing the composite binder with water and optionally further components to provide the building material.

1st Main Claim (EP4378907 A1)

[EN] 1. Use of carbonated calcium rich waste material to make composite binders adapted to harden by carbonation comprising from 5 to 75 wt.- percent carbonated calcium rich waste material and from 20 to 95 wt.- percent of at least one calcium silicate with the sum of their amounts ranging from 50 to 100 wt.- percent of the composite binder.

Assignees: HEIDELBERG MAT AG; HCONNECT 2 GMBH



37. Family 103076299 (KR20240084764 A)

[View in PatBase](#)

Title

[EN] WASTE CONCRETE POWDER CARBONATION METHOD CWCP AGGREGATE AND MORTAR COMPOSITION INCLUDING THE SAME

Abstract

[MT] The present invention relates to a method for carbonation fine concrete powder , wherein the CaCO_3 content is increased by carbonating waste concrete powder using a pyrotechnic power plant or cement plant exhaust gas , and to a mortar composition in which the waste concrete powder carbonated by the method is applied as an aggregate . The present invention relates to a method for preparing a WCP having a particle diameter of 2.36 mm or less after breaking off waste concrete by breaking off circulating aggregates; (b) stirring the WCP with water in a chamber having internal environmental conditions of a temperature of 15 to 25 degrees Celsius , humidity of 45 to 55 degrees Celsius , CO_2 concentration of 18 to 30 percent and atmospheric pressure ; And (c) drying the carbonated WCP (CWCP) in which the CWCP is carbonated WCP, and a mortar composition prepared by the above waste concrete powder carbonation method, having a pH of 8.5 or less, and a portion of the CWCP aggregate and sand satisfying a standard of assembly 2.3-3.1 is substituted with the CWCP aggregate.

1st Main Claim

[MT] 1.(a) selecting a WCP having a particle diameter of 2.36 mm or less after crushing waste concrete to separate the circulating aggregates; (b) a temperature of 15-25°C, a humidity of 45-55%, CO_2 Stirring and carbonation the WCP by mixing and carbonation the WCP in a chamber having internal environmental conditions at a concentration of 18 to 30 % and atmospheric pressure at a weight ratio of 1:2.5 to 3.5; and (c) drying carbonated WCP (CWCP, carbon-applied Cacrete Power.

Assignees: KOREA INST CERAMIC ENG AND TECH; KOREA INST OF CERAMIC ENGINEERING AND TECH; KOREA INST OF CERAMIC ENGINEERING AND TECHNOLOGY

38. Family 10501215 (JP5254910 A2)

[View in PatBase](#)

Title

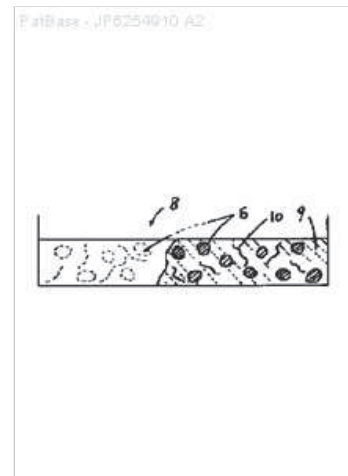
[EN] PLASTER MATERIAL CONTAINING CO₂ ADSORBED ZEOLITE AND ITS PRODUCTION AND PRODUCTION OF ITS SECONDARY PRODUCT

Abstract

[EN] PURPOSE: To accelerate the generation of strength, to improve aesthetic appearance and to prevent environmental destruction by incorporating aggregate contg. natural or synthetic zeolite adsorbed with CO₂, Ca(OH)₂ and/or Mg(OH)₂ at prescribed ratios into the above material.
CONSTITUTION: The natural and/or synthetic calcined zeolite is pulverized to 1 to 5mm grain sizes and is then put into a container having an inlet and outlet for ventilation which is kept at 0 to 80 deg.C and 10 to 50 percent humidity. Gas which contains the CO₂ at the ratio higher than the ratio of the ordinary air component and has 1.1 to 4.0atm pressure is introduced into this container. The gas is in succession passed for 5 to 60 minutes through this container to adsorb the CO₂ therein. The CO₂ adsorbed zeolite (A) is thus obtd. The plaster material contg. the CO₂ adsorbed zeolite (C) is then produced by mixing 1 to 80 weight percent component A and 99 to 20 weight percent particulate Ca(OH)₂ and/or Mg(OH)₂ (B). Inorg. fibers, etc., are then mixed with the component C at need and the mixture is molded. A planar body 8 consisting of the zeolite particles 6, the plaster base 9 and the fibers 10 is thus produced.

1st Main Claim

[MT] 1. CO₂ to adsorb or synthetic light, natural and the bone material-containing 0 parts by weight and 1 to 8, C-id [percent] 20 parts by weight A(oh)₂ and/or to a Mg(oh)₂ 299-id [percent], Characterized in that it comprises light-containing material, CO₂ Sinanen Zeomic plaster adsorption



39. Family 65173459 (US2019047175 AA)

[View in PatBase](#)

Title (EP3362237 A1)

[EN] CO₂-LADEN CONCRETE PRECAST PRODUCTS AND THE METHOD OF MAKING THE SAME

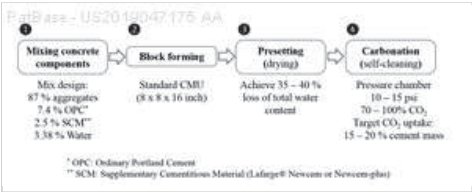
Abstract (EP3362237 A1)

[EN] The present invention relates to a process for producing precast products in an airtight enclosure, which comprises the steps of a carbonation of pre-dried concrete precast units by feeding CO₂ gas into a closed airtight enclosure under near ambient atmospheric pressure (psig between 0 and 2) and/or low pressure (between 2 and 15 psig) conditions, wherein said pre-dried concrete units have lost between 25 to 60 percent of their initial mix water content.

1st Main Claim (EP3362237 A1)

[EN] 1. A process for producing precast products in an airtight enclosure, which comprises the steps of: a) carbonation of pre-dried concrete precast units by feeding CO₂ gas into a closed airtight enclosure under near ambient atmospheric pressure (psig between 0 and 2) and/or low pressure (between 2 and 15 psig) conditions, wherein said pre-dried concrete units have lost between 25 to 60 percent of their initial mix water content.

Assignees: CARBOCLAVE CORP; AL GHOULEH ZAID; HARGEST PAUL WAYNE



40. Family 49922292 (JP2011207686 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR REDUCING CARBON DIOXIDE EMISSION IN PRODUCING PREMIX MORTAR PRODUCT

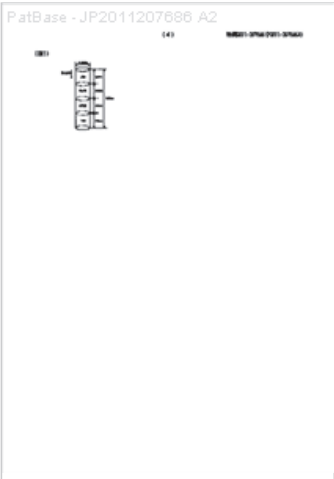
Abstract

[EN] PROBLEM TO BE SOLVED: To provide a method for reducing carbon dioxide emission in producing premix mortar products by which the amount of CO₂ emitted in producing premix mortar products is reduced and properties primarily required for the premix mortar products are effectively retained. SOLUTION: The method for reducing carbon dioxide emission in producing premix mortar products comprises including cement and a low carbon composite material mixed with at least two kinds of low carbon materials in the mass ratio of 97:3-70:30 in the premix mortar products. The emission of carbon dioxide during the production of the premix mortar products is reduced by greater than or equal to 0.03 CO₂-kg/kg as compared with the production of premix mortar products free of the low carbon materials.

1st Main Claim

[MT] 1. And Political Science in Pre-mortar products, cement, and a low-carbon composite material consisting of at least two more are blended material is low carbon, mass mixing ratio 97:3 to 70:30 By contained in the product carbon dioxide emissions during the production of said pre-MIX mortars, 0.03CO₂ as compared to carbon dioxide emissions during the manufacture of low carbon materials containing Puremikusu and a more reducing -kg/kg, how to reduce carbon dioxide emissions during the manufacture of pre-MIX mortar.

Assignees: SUMITOMO OSAKA CEMENT CO LTD



41. Family 92881565 (CN114907040 A)

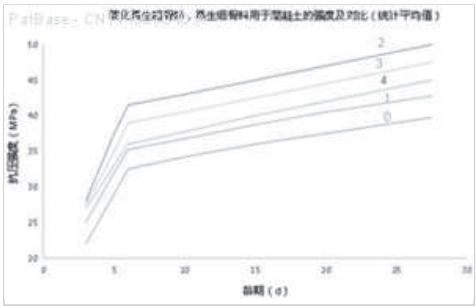
[View in PatBase](#)

Title

[EN] METHOD FOR GRINDING SOLID WASTE TO REMOVE CARBON DIOXIDE

Abstract

[EN] The invention relates to a method for removing carbon dioxide by grinding solid waste. The method comprises the following steps: crushing the solid waste into blocks with the size of less than or equal to 50mm; based on the total amount of the solid waste, adding 1-10.0 percent of amino acid salt and/or 1-10.0 percent of amino plasma, 1-10.0 percent of organic amine, 0.5-3.0 percent of an initiator and 0.5-3.0 percent of a cationic surfactant based on the total amount of the solid waste, and grinding the mixture to obtain recycled aggregate with the particle size of 6.5-20mm; the carbonized recycled aggregate is further obtained; and uniformly mixing and stirring the carbonized lightweight concrete with cement paste or cement mortar to prepare the carbonized lightweight concrete test piece. The carbonized aggregate is directly added into the cement concrete, in the cement mixing water, hydration heat or steam curing process, escaped CO₂ rapidly carbonizes and cures a cementing material, the cementing material is converted into the main component calcium carbonate of the concrete, and the carbon dioxide is permanently converted and sealed up.



1st Main Claim

[MT] 1. A method of grinding solid waste to remove carbon dioxide, characterized by the steps of:

Step (1), solid waste breakage size less than or equal to 50 mm lumps;

A step (2) of adding an amino acid salt 1-10.0% and/or an amine ion 1-10.0% and/or an amine ion 1-10.0%, an organic amine 1-10.0%, an initiator 0.5% -3.0% and a cationic surfactant 0.5% -3.0% as a percentage of the total amount of solid waste, based on the total amount of solid waste, and grinding the mixture to obtain regenerated aggregates having a particle size of 6.5 um-20 mm;

A step (3) of absorbing carbon dioxide in a high concentration of carbon dioxide environment to obtain carbonized regenerated aggregates;

Step (4), the carbonized regenerated aggregate is mixed with cement grout or cement mortar and stirred uniformly into mineralized lightweight concrete test pieces.

Assignees: BEIJING JINXIU NEW TECH DEVELOPMENT CO LTD

42. Family 63599459 (US2016272544 AA)

[View in PatBase](#)

Title (EP3271311 A1)

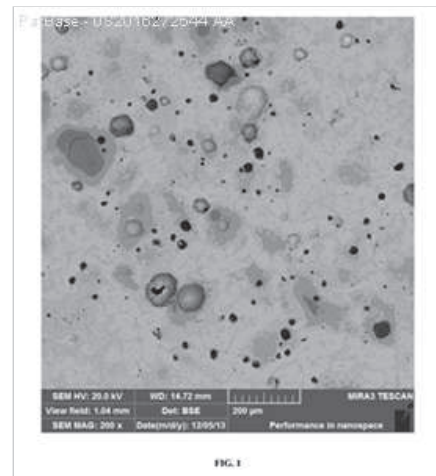
[EN] MICROSTRUCTURED CARBONATABLE CALCIUM SILICATE CLINKERS AND METHODS THEREOF

Abstract (EP3271311 A1)

[EN] The invention provides novel, microstructured clinker and cement materials that are characterized by superior grindability and reactivity. The disclosed clinker and cement materials are based on carbonatable calcium silicate and can be made from widely available, low cost raw materials via a process suitable for large-scale production. The method of the invention is flexible in equipment and processing requirements and is readily adaptable to manufacturing facilities of conventional Portland cement.

1st Main Claim (EP3271311 A1)

[EN] 1. A non-hydraulic clinker material, comprising particles of uncarbonatable silica (SiO_2) dispersed in a matrix comprising at least one carbonatable calcium silicate phase comprising at least one of wollastonite and pseudowollastonite.



Assignees: SOLIDIA TECHNOLOGIES INC; LAFARGE; LAFARGE SA; HOLCIM LTD; HOLCIM TECHNOLOGY LTD; SOLIDIA TECH INC; HOLCIM TECH LTD; HOLCIM TECHNOLOGY LTD

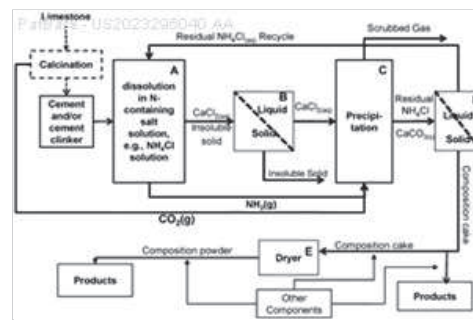
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[EN] METHODS AND SYSTEMS TO CAPTURE CARBON DIOXIDE EMISSIONS

[EN] Provided herein are methods and systems to utilize cement or cement clinker as feedstock to capture carbon dioxide emissions and form a composition comprising calcium carbonate.

[EN] 1. A method to form a composition, comprising: (i) dissolving cement and/or cement clinker in N-containing salt solution to produce an aqueous solution comprising calcium salt; and (ii) treating the aqueous solution comprising calcium salt with a gaseous stream comprising carbon dioxide to form a composition comprising calcium carbonate.

Assignees: ARELAC INC



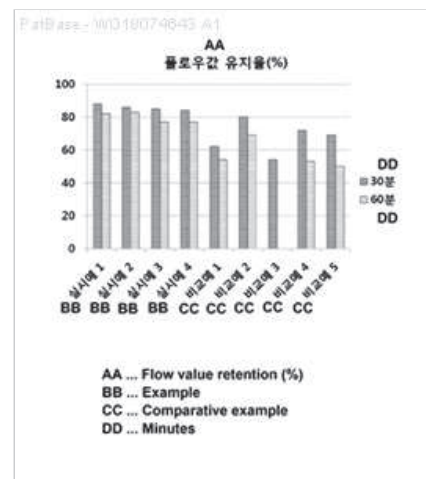
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[EN] MINE BACKFILL COMPOSITION COMPRISING CARBON DIOXIDE-FIXED FLY ASH AND BOTTOM ASH FROM CIRCULATING FLUIDIZED BED COMBUSTION BOILER

[EN] An embodiment of the present invention provides a mine backfill composition comprising: cement; and fly ash and bottom ash from a circulating fluidized bed combustion boiler, wherein carbon dioxide is fixed in the fly ash and bottom ash.

[MT] Cement; fly ash of circulating fluidized bed boiler and the

non-ash); and flooring (flooring and dispersed in carbon dioxide is immobilized, characterized in that the fixation light filler composition).



Assignees: KOREA INST OF GEOSCIENCE AND MINERAL RESOURCES KIGAM;
HANIL CEMENT CO LTD; KOREA INST GEOSCIENCE AND MINERAL RESOURCES KIGAM; KOREA INST OF GEOSCIENCE
AND MINERAL RESOURCES; KOREA INST GEOSCIENCE AND MINERAL RESOURCES

45. Family 70914392 (CN108455935 A)

[View in PatBase](#)

Title

[EN] HIGH-STRENGTH CONCRETE BASED ON CARBON DIOXIDE FOAMING AGENT

Abstract

[EN] The invention provides high-strength concrete based on a carbon dioxide foaming agent. The high-strength concrete is mainly prepared from the following components in parts by weight: silicate cement, an aggregate composition, mineral powder, a carbon dioxide foaming agent and water. The concrete has very good performances of sealing and adsorbing the carbon dioxide foaming agent, and can be matched with the carbon dioxide foaming agent for use, so that strength of whole concrete is improved. Moreover, mineral powder, the aggregate composition and the like are specially selected, so that durability, permeability resistance, apparent compactness and slump of concrete can be remarkably improved, and therefore, processing performance of the concrete is remarkably improved.

1st Main Claim

[MT] 1. Based on carbon dioxide blowing agent of high-strength concrete, characterized in that said high strength concrete is mainly composed of the following parts by weight of components:

Portland cement 50-70 15-30 Mineral aggregate composition powder 18-27

25-35 25-35 water carbon dioxide blowing agent.

Assignees: BEIJING YISHIZHUYE BUILDING TECH DEVELOPMENT CO LTD

46. Family 100582534 (WO24003278 A1)

[View in PatBase](#)

Title (EP4547376 A1)

[EN] A METHOD OF CAPTURING CARBON DIOXIDE

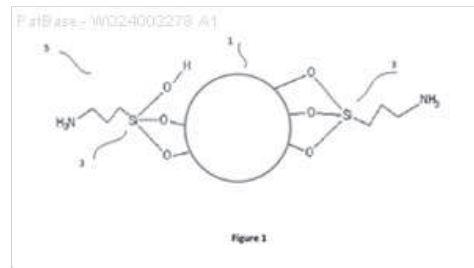
Abstract (EP4547376 A1)

[EN] The present invention relates to a method of capturing carbon dioxide comprising: a) providing a particulate material, wherein the particulate material comprises calcium carbonate and/or titanium dioxide, b) providing a silane, c) providing a surface activator, d) mixing the particulate material and the surface activator to form a surface activated particulate material, e) mixing the silane and the surface activated particulate material to form a mixture, f) mixing water and the mixture to form a composition, g) drying the composition to produce a carrier, and h) treating the carrier with carbon dioxide.

1st Main Claim (EP4547376 A1)

[EN] 1) A method of capturing carbon dioxide comprising: a) providing a particulate material, wherein the particulate material comprises calcium carbonate and/or titanium dioxide, b) providing a silane, c) providing a surface activator, d) mixing the particulate material and the surface activator to form a surface activated particulate material, e) mixing the silane and the surface activated particulate material to form a mixture, f) mixing water and the mixture to form a composition, g) drying the composition to produce a carrier, and h) treating the carrier with carbon dioxide.

Assignees: CRH GROUP SERVICES LTD



47. Family 96589849 (US2023093848 AA)

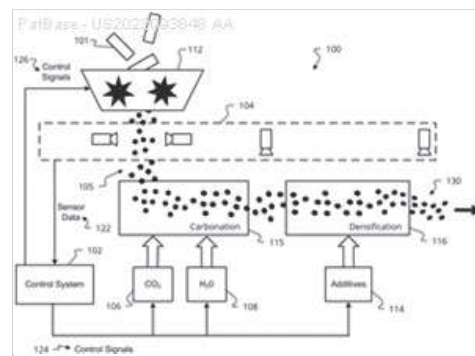
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Title (EP4247768 A1)

[EN] RECYCLED CONCRETE PREPARATION

Abstract (EP4247768 A1)

[EN] Methods, systems, and apparatus, including computer programs encoded on computer storage media, for processing recycled concrete aggregate (RCA). One of the methods includes obtaining first optical measurements of RCA particles; determining an initial characterization of the RCA particles; iteratively performing a carbonation process on the RCA particles, obtaining second optical measurements of the RCA particles, and determining a second characterization of the RCA particles, where conditions of the carbonation process are initially set based on the initial characterization, and the conditions of the carbonation process are adjusted based on the second characterization; iteratively performing a densification process on the RCA particles, obtaining third optical measurements of the RCA particles, and determining a third characterization of the RCA particles, where conditions of the densification process are initially set based on the initial characterization or the second characterization, and the conditions of the densification process are adjusted based on the third characterization.



1st Main Claim (EP4247768 A1)

[EN] 1. A method of preparing recycled concrete aggregate (RCA), the method comprising: obtaining, from first optical sensors, first optical measurements of RCA particles as the RCA particles are conveyed past the first optical sensors; determining, based on the first measurements, an initial characterization of the RCA particles; iteratively performing a carbonation process on the RCA particles, obtaining second optical measurements of the RCA particles, and determining, from the second measurements, a second characterization of the RCA particles, wherein conditions of the carbonation process are initially set based on the initial characterization, and the conditions of the carbonation process are adjusted based on the second characterization; ceasing the iterative performance of the carbonation process in response to the second characterization meeting target carbonation characteristics; iteratively performing a densification process on the RCA particles, obtaining third optical measurements of the RCA particles, and determining, from the third measurements, a third characterization of the RCA particles, wherein conditions of the densification process are initially set based on the initial characterization or the second characterization, and the conditions of the densification process are adjusted based on the third characterization; and ceasing the iterative performance of the densification process in response to the third characterization meeting target densification characteristics.

Assignees: X DEV LLC; DEV LLC

48. Family 108258509 (KR20250080010 A)

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Title

[EN] 3D POWDER COMPOSITION FOR 3D PRINTING BASED ON ALUMINA CEMENT CAPABLE OF FIXING CARBON DIOXIDE AND METHOD FOR MANUFACTURING THE SAME

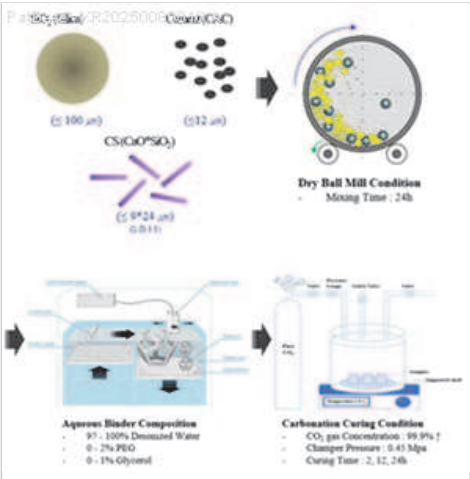
Abstract

[MT] The present invention relates to a powder composition for 3D printing based on alumina cement capable of fixing carbon dioxide, a molded body, and a method for manufacturing the same. The powder composition and the molded body of the present invention are manufactured by including an inorganic powder, calcium aluminate cement, and wollastonite, and a catalyst support using the molded body can fix carbon dioxide to have suitable strength and shape while contributing to carbon neutrality, and thus can be used for a high-performance environmental catalyst. In addition, the problems of the existing extrusion process requiring a long manufacturing time and additional organic additives can be overcome by simple and fast 3D printing.

1st Main Claim

[MT] Mineral powder;
Calcium aluminate cement; and
wollastonite (CaSiO₃);
A powder composition comprising:

Assignees: KOREA INST OF INDUSTRIAL TECHNOLOGY KITECH



49. Family 51299465 (KR20120063280 A)

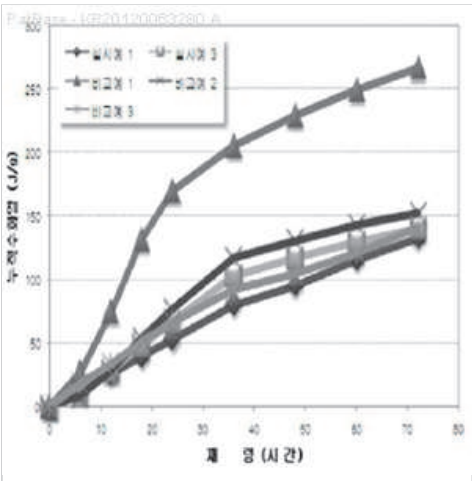
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Title
[EN] HIGH FUNCTIONAL BINDER COMPOSITION FOR CARBON DIOXIDE REDUCTION DISPLAYING PROPERTIES OF EARLY STRENGTH

Abstract
[EN] PURPOSE: A carbon dioxide reduction type binder composition which has high early strength property is provided to improve concrete strength degradation according to large amount of industrial byproduct and cement use by including phosphate magnesita, clinker dust, calcium hydroxide, and a mixture of calcium Sulfoaluminate aluminate based compound and dimorphism anhydrous gypsum. CONSTITUTION: A carbon dioxide reduction type binder composition which has high early strength property comprises 10-20 weight percent of normal Portland cement, 30-80 weight percent of blast furnace slag micropowder, 5-30 weight percent of fly ash, 1-5 weight percent of calcium hydroxide, 1-10 weight percent of mixture of calcium sulfoaluminate($4\text{CaO}\cdot3\text{Al}_2\text{O}_3\cdot\text{SO}_3$) based compound(CSA) and dimorphism anhydrous gypsum(CaSO_4), and 1-10 weight percent of clinker dust, and 1-3 weight percent of phosphate magnesita. A weight ratio of the dimorphism anhydrous gypsum to CSA is 1:1-4. The Blaine of clinker dust has a specific surface area of 8,000-12,000 cm^2/g . Content amount of SO_3 is 2-5 weight percent and $\text{K}_2\text{O}+\text{Na}_2\text{O}$ is 1-5 weight percent.

1st Main Claim
[MT] 1. In the ordinary Portland cement, aluminous cement 10-20 parts by weight of blast furnace slag, blast furnace slag fine powder fly ash 30 to 80% by weight, 5-30% by weight of fly ash 1-5% by weight of calcium hydroxide calcium sulfo aluminate (CSA) based compounds and ($4\text{CaO}\cdot3\text{Al}_2\text{O}_3\cdot\text{SO}_3$), anhydrous gypsum, CaSO_4 Release 1-10% by weight of a mixture comprising a (clinker clinker dust (kiln and 1-10% by weight, 1-3% by weight of phosphate of magnesita (magnesita) crude steel characteristics, including reduced CO_2 binder composition for high functionality.

Assignees: YUJIN CO LTD



50. Family 103185784 (US2024199493 AA)

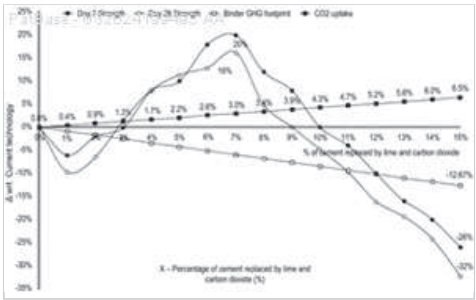
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Title

[EN] SYSTEMS AND METHODS FOR STORING AND MINERALIZING CARBON DIOXIDE WITH LIME

Abstract

[EN] Methods and systems for storing and mineralizing carbon dioxide in soil are disclosed herein. In some embodiments, the method comprises adding lime and carbon dioxide to a soil column including soil to form treated soil. After adding the lime and carbon dioxide, the method also includes strengthening the treated soil in the soil column by mineralizing the lime and carbon dioxide in the soil column. The method can further include adding a binder to the soil column and mixing the binder with the soil, lime, and carbon dioxide. The binder can include, for example, pozzolan, cement, cementitious material, and/or a manufactured calcium carbonate product.



1st Main Claim

[EN] 1. A binder composition for storing carbon dioxide, the composition comprising:
5-30 percent of lime by weight;
45-90 percent of a supplementary cementitious material (SCM) by weight;
1-20 percent of calcium carbonate by weight; and
up to 5 percent of carbon dioxide by weight.

Assignees: GRAYMONT WESTERN CANADA INC

51. Family 61209553 (CN105174766 A)

[View in PatBase](#)

Title

[EN] METHOD FOR REINFORCING RECYCLED CONCRETE FINE AGGREGATE BY USING CARBON DIOXIDE

Abstract

[EN] The invention discloses a method for reinforcing recycled concrete fine aggregate by using carbon dioxide, which comprises the following steps: (1) calcium hydroxide solution or calcium salt calcification treatment: spreading recycled fine aggregate prepared from construction waste on a tray, spraying a calcium hydroxide or calcium salt solution, and stirring uniformly; (2) CO₂ curing: putting the recycled fine aggregate subjected to calcium hydroxide solution or calcium salt calcification treatment in a closed carbonization box, and carrying out carbonization curing until the surface is completely carbonized; and (3) recycled mortar preparation: preparing recycled mortar with the substitution rate of 100 percent by using the treated recycled fine aggregate. Compared with the unreinforced recycled aggregate, the crushing value of the recycled fine aggregate prepared by the method is lowered by nearly 45 percent, and the water absorptivity is lowered by nearly 53 percent. Compared with the recycled mortar prepared from the unreinforced recycled aggregate, the consistency of the recycled mortar prepared by the method is enhanced by 42 percent or so, the 7d strength of the mortar is enhanced by 15-26 percent, and the 28d strength can be enhanced by 17-24 percent.

1st Main Claim

[MT] 1 a method to strengthen the use of carbon dioxide recycled concrete fine aggregate, which is characterized by: comprising the following steps:

- (1) a solution of calcium hydroxide or calcium calcium process: take construction waste from recycled fine aggregate prepared tile in the tray, after spraying a solution of calcium hydroxide or calcium salt and stir well;
- (2) CO₂ conservation: will be placed through a solution of calcium hydroxide or calcium salts after calcium treatment of recycled fine aggregate airtight carbonation tank, carbonation conservation to the surface carbonization;
- (3) Preparation of mortar Regeneration: use treated fine aggregate for preparing substituted regeneration rate of 100 percent recycled mortar.

Assignees: UNIV SOUTHEAST; ZHENJIANG JIANKE CONSTRUCTION SCIENCE AND TECHNOLOGY CO LTD; SOUTHEAST UNIV

52. Family 106695153 (KR102769543 B1)

[View in PatBase](#)

Title

[EN] PHOTOSYNTHETIC MICROORGANISMS SURFACE-TREATED CONCRETE BLOCKS FOR SIDEWALKS FOR CARBON DIOXIDE SEQUESTRATION IN ATMOSPHERIC AND MANUFACTURING METHOD FOR THE SAME

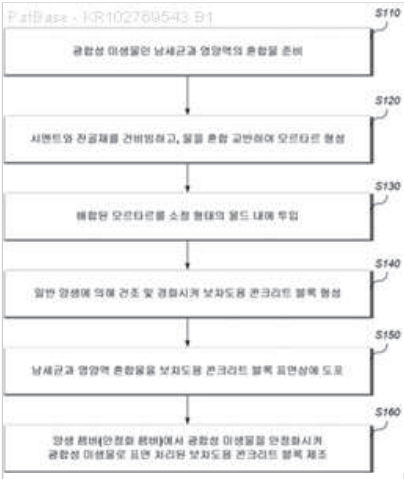
Abstract

[MT] By surface-treating concrete blocks, such as sidewalk blocks, composed of cement composites, with photosynthetic microorganisms, carbon dioxide in the atmosphere can be fixed, and calcium carbonate produced during this carbon dioxide fixation process can improve the durability and water permeability of the concrete block. In addition, no separate pollutants are produced during the carbon dioxide fixation process, and carbon dioxide is converted into oxygen, so it can contribute to improving living air quality. In addition, carbon dioxide fixation can continuously occur as long as inorganic nutrients are provided in the surrounding environment, thereby exhibiting high carbon dioxide storage efficiency. Concrete blocks for sidewalks and a method for manufacturing the same, surface-treated with photosynthetic microorganisms for fixation of carbon dioxide in the atmosphere, are provided.

1st Main Claim

[MT] As a concrete interlocking block for a roadway, a concrete block (110) for a roadway formed by mixing 100 parts by weight of cement and 25 to 60 parts by weight of a latent hydraulic powder as a binder (B), 100 to 300 parts by weight of fine aggregate, and 25 to 64 parts by weight of water as a mixing agent; and
The mixture of 15 to 150 parts by weight of cyanobacteria and nutrient solution is applied to the surface of the concrete block (110) for the above-mentioned guardrail, and is formed by mixing and stirring the cyanobacteria culture solution and nutrient solution, and then stabilizing the nutrient solution, based on the 100 parts by weight of the cement, (120);
Including, but not limited to,
The above-mentioned male bacteria are photosynthetic microorganisms that fix carbon dioxide (CO₂) in the atmosphere and produce calcium carbonate during the metabolic process; and
The above carbon dioxide (CO₂) fixation by the above-mentioned photosynthetic bacteria continuously occurs when inorganic nutrients such as calcium or sodium are provided in the surrounding environment, and the carbon dioxide (CO₂) is converted into oxygen (O₂) during the carbon dioxide (CO₂) fixation process, a concrete block for a roadside surface-treated with photosynthetic microorganisms for fixation of carbon dioxide in the atmosphere.

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



53. Family 97990235 (JP2023096668 A2)

[View in PatBase](#)

Title

[EN] METHOD FOR MANUFACTURING CARBON DIOXIDE GAS FIXATION CONCRETE

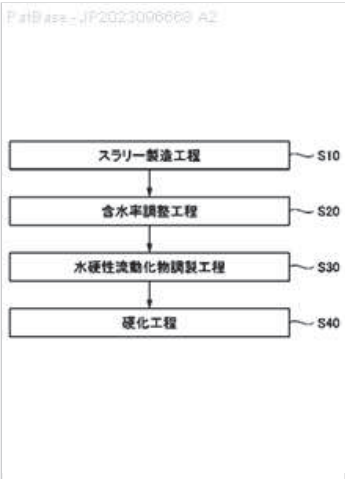
Abstract

[EN] To provide a method for manufacturing carbon dioxide gas fixation concrete which can reduce an emission amount of carbon dioxide gas compared to conventional methods.SOLUTION: A method for manufacturing carbon dioxide gas fixation concrete includes: a slurry manufacturing step of supplying carbon dioxide gas to a sludge liquid obtained by solid-liquid separation of a concrete sludge, and manufacturing a light calcium carbonate-containing slurry containing a light calcium carbonate which is precipitated in the sludge liquid and where the carbon dioxide gas is immobilized; a water content adjustment step of measuring and adjusting a water content of the light calcium carbonate-containing slurry; a hydraulic fluidized material adjustment step of adjusting a hydraulic fluidized material which contains a water content-adjusted light calcium carbonate-containing slurry having an adjusted water content of the light calcium carbonate-containing slurry, cement, an aggregate, and a precipitation inhibitor for inhibiting precipitation of the light calcium carbonate, and has the water content within a predetermined range; and a curing step of placing and curing the hydraulic fluidized material, to obtain the carbon dioxide gas fixation concrete.SELECTED DRAWING: Figure 1

1st Main Claim

[MT] 1. A method for producing a light calcium carbonate-containing slurry, comprising: A slurry production step of supplying carbon dioxide to a sludge solution obtained by solid-liquid separation of concrete sludge and producing a light calcium carbonate-containing slurry containing light calcium carbonate precipitated in the sludge solution and immobilized with the carbon dioxide; a water content adjustment step of measuring and adjusting a water content of the light calcium carbonate-containing slurry, A water content-adjusted light calcium carbonate-containing slurry having a water content adjusted in the light calcium carbonate-containing slurry; and A hydraulic fluid preparation step of preparing a hydraulic fluid containing a cement, an aggregate, and a precipitation inhibitor for inhibiting precipitation of the light calcium carbonate, And a curing step of casting and curing the hydraulic fluidized material to obtain carbon dioxide-immobilized concrete.

Assignees: KAJIMA CORP

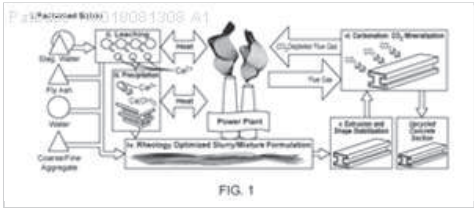


54. Family 69574437 (WO18081308 A1)

[View in PatBase](#)

Title
[EN] UPCYCLED CO2-NEGATIVE CONCRETE PRODUCT FOR USE IN CONSTRUCTION

Abstract
[EN] A manufacturing process of a concrete product includes: (1) extracting calcium from reclaimed solids as portlandite; (2) forming a cementitious slurry including the portlandite; (3) shaping the cementitious slurry into a structural component; and (4) exposing the structural component to carbon dioxide, wherein the portlandite included in the structural component is converted to limestone, thereby forming the concrete product.



1st Main Claim

[EN] 1. A manufacturing process of a concrete product, comprising: extracting calcium from reclaimed solids as portlandite; forming a cementitious slurry including the portlandite; shaping the cementitious slurry into a structural component; and exposing the structural component to carbon dioxide, wherein the portlandite included in the structural component is converted to limestone, thereby forming the concrete product.

Assignees: UNIV CALIFORNIA; UNIV ARIZONA STATE

55. Family 46814459 (WO09086460 A1)

[View in PatBase](#)

Extended Family Number: 42613795

Title (EP2118004 A1)

[EN] METHODS OF SEQUESTERING CO₂

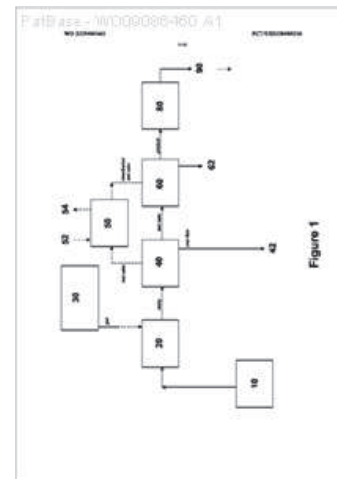
Abstract (EP2118004 A1)

[EN] Methods of sequestering carbon dioxide (CO₂) are provided. Aspects of the methods include precipitating a storage stable carbon dioxide sequestering product from an alkaline-earth-metal-containing water and then disposing of the product, e.g., by placing the product in a disposal location or using the product as a component of a manufactured composition. Also provided are systems for practicing methods of the invention.

1st Main Claim (EP2118004 A1)

[EN] 1. A process comprising forming a stable C₂-containing precipitate from a human-produced gaseous source of CO₂, wherein the formation of the precipitate utilizes a process for removing protons from an aqueous solution in which a portion or all of the CO₂ of said gaseous source of CO₂ is dissolved, and wherein the CO₂ produced by said process of removing protons is less than 70 percent of the CO₂ removed from the gaseous source of CO₂ by said formation of precipitate.

Assignees: CALERA CORP; ARELAC INC; YOUNGS ANDREW; CONSTANTZ BRENT; GILLIAM RYAN J; DANZIGER ROBERT; WAY J DOUGLAS; KIRK DONALD W; FARSAK KASRA; TUET PHILIP BRIAN; DECKER VALENTIN; BARD ALLEN J; OMELON SIDNEY



56. Family 62177347 (US2017226021 AA)

[View in PatBase](#)

Title

[EN] ENHANCED CARBONATION AND CARBON SEQUESTRATION IN CEMENTITIOUS BINDERS

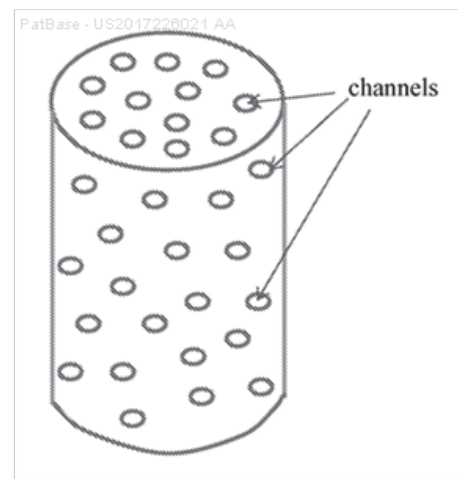
Abstract

[EN] A manufacturing process of a cement product includes: (a) reacting at least one anhydrous or hydrated cement component with liquid or supercritical CO₂ to form a cement composition; and (b) curing the cement composition to form a cement product.

1st Main Claim

[EN] **1.** A manufacturing process of a cement product, comprising:
(a) conditioning at least one cement component in an atmosphere with a relative humidity greater than 8 percent; and
(b) reacting the at least one cement component with CO₂ to form a cement product.

Assignees: UNIV CALIFORNIA; SANT GAURAV; VANCE KIRK E; BALONIS MAGDALENA



57. Family 84526817 (ES2819275 AA)

[View in PatBase](#)

Title

[EN] COMPOSITION FOR SINGLE-LAYER MORTAR THAT PURIFIES CARBON DIOXIDE GASES, AND OTHER GASEOUS CHEMICAL COMPOUNDS (MACHINE-TRANSLATION BY GOOGLE TRANSLATE, NOT LEGALLY BINDING)

Abstract

[EN] Composition for monolayer mortar that purifies carbon dioxide gases and other gaseous chemical compounds, consisting of the following formulation: Aggregates in different granulometries 65 percent -82.5 percent Portland cement 52.5 7 percent -15 percent Additives: - cellulose ethers 1 percent -2 percent - calcium formate 0.5 percent -2 percent - magnesium stearate 0.5 percent -1 percent - perlite 1 percent -2 percent - fibers 0.5 percent -2 percent - redispersible resins 0.5 percent -1 percent - anti-cracking 0.2 percent -1 percent - other mineralizing additives based on iron, calcium monoxide, titanium dioxide and silicon 5 percent -10 percent. (Machine-translation by Google Translate, not legally binding)

1st Main Claim

[MT] Claims

Assignees: TRUCCSA SIGLO XXI SL

IP Base - ES2819275 AA	
SOLICITUD DE PATENTE	
A1	
Fecha de presentación: 29.01.2021	Solicitantes: TRUCCSA SIGLO XXI SL (100.0%) Calle Bulgarest, Numero 42, Poligono Industrial Cabezo Benza 30201 CARTAGENA (Murcia) ES
Fecha de publicación de la solicitud: 15.04.2021	Inventores: FERNANDEZ MECA, Miguel y GARCIA EGEA, Jose Manuel
	Agente Representante: JUSTEL TEJEDOR, Valentin
Título: COMPOSICIÓN PARA MORTERO MONOCAPA QUE PURIFICA LOS GASES DE DIÓXIDO DE CARBONO, Y OTROS COMPUESTOS QUÍMICOS GASEOSOS	
Resumen: Composición para mortero monocapa que purifica los	

58. Family 93016651 (KR20220118759 A)

[View in PatBase](#)

Title

[EN] METHOD AND COMPUTER PROGRAM FOR PROVIDING OPTIMAL MIXTURE OF LIMESTONE BLENDED CONCRETE CONSIDERING LOW CARBON DIOXIDE EMISSIONS

Abstract

[EN] According to the present invention, a carbon dioxide emission amount is minimized in consideration of carbonation durability considering the carbon dioxide emission amount and a climate change if inputted is only information on a composition element mixture range of concrete, a composition element ratio range, compression strength, workability, and carbonation durability so as to allow a program to provide information on an eco-friendly limestone mixture concrete composition with excellent durability according to a climate change, thereby having an advantage of designing low-CO₂ limestone mixture concrete without profession knowledge about concrete.



1st Main Claim

[MT] 1. Low -CO₂ A method for optimal design of limestone mixed concrete compositions, characterized in that it has a low -CO₂ When an optimal design program of a limestone mixed concrete composition is executed, the program is cement (kg/m³), Limestone powder (kg/m³), Water (kg/m³), coarse aggregate (kg/m³) and ganglia (kg/m³A 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 water/binder ratio, limestone powder/binder ratio, water/solid 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, And design slump value (mm) compressive strength including input windows-workability input windows; service life value (years), 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), Limestone powder (kg/m³), Water (kg/m³), Granuclear material (kg/m³), coarse aggregate (kg/m³), and sensitizer (kg/m³Low -CO₂ including)₂ A first step of providing a concrete composition content output window for outputting an optimum content of a limestone mixed concrete composition; a calculation execution button; and a storage button on a screen; and a second step of providing the component compounding range input window, When all of a component ratio range input window, a compressive strength-frost-workability input window, and a carbonation durability condition input window are input and the calculation execution button is selected and calculation is executed, the computer is an objective function CO₂ And calculating contents of cement, limestone powder, water, debris, and coarse aggregate and contents of water reducer that satisfy the compressive strength limiting conditions, carbonation durability limiting conditions, workability limiting conditions, absolute volume limiting conditions, component compounding range limiting conditions, and component ratio limiting conditions using the input value, wherein the cement, limestone powder, water, And a content of coarse aggregate and a content of water reducer using a genetic algorithm (genetic algorithm) in which the objective function has a minimum and the compressive strength limiting conditions, carbonation durability limiting conditions, workability limiting conditions, And a second step; of calculating optimum content values satisfying absolute volume limiting conditions, component blending range limiting conditions, and component ratio limiting conditions and outputting the optimum content values to the concrete composition content output window -CO₂ A method for optimal design of limestone mixed concrete compositions.

Assignees: KNU IND COOPERATION FOUNDATION; KNU IND COOPERATION FOUND

59. Family 12148883 (JP7088362 A2)

[View in PatBase](#)

Title

[EN] GASEOUS CARBON DIOXIDE ADSORBENT

Abstract

[EN] PURPOSE:To provide a low-cost gaseous CO₂ adsorbent capable of efficiently fixing gaseous CO₂ in the air.

CONSTITUTION:Water is added to industrial waste made of coal ash or blast furnace slag and they are granulated or crushed to obtain the objective gaseous CO₂ adsorbent made of a powdery, granular or crushed material contg. hydrate of a calcium compd.

1st Main Claim

[MT] Carbon dioxide adsorbent material composed of pulverized powder containing a calcium compound and hydrates, and industrial waste mainly consisting of coal ash, or blast furnace slag 1. , or granules.

Assignees: OZAWA CONCRETE KOGYO KK; TOHOKU ELECTRIC POWER CO

60. Family 89804625 (TW202204286 A)

[View in PatBase](#)

Title

[EN] CEMENTLESS TYPE PERMEABLE CONCRETE AND FORMING METHOD THEREOF THE ADDITION OF CEMENT IS REMOVED IN THE PROCESS, SO THAT THE CONCRETE DOES NOT GENERATE CARBON DIOXIDE DURING THE FORMATION PROCESS

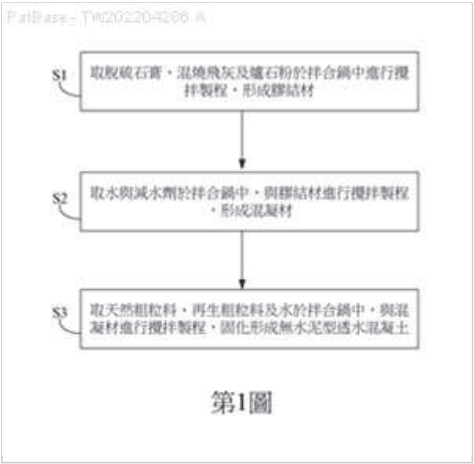
Abstract

[EN] The invention relates to a cementless type permeable concrete and a molding method thereof. The cementless type permeable concrete with good hardness, durability and water permeability is formed by further adding natural coarse aggregates and recycled coarse aggregates in the concrete manufacturing process. Furthermore, the addition of cement is removed in the process, so that the concrete does not generate carbon dioxide during the formation process, so as to achieve the effect of protecting the environment.

1st Main Claim

[MT] 1. A cement-free water-permeable concrete composition comprising:
Monohydrate;
A mixed fly ash;
A furnace stone powder;
Sulfur gypsum;
A water reducing agent;
A natural coarse grain; and
A regenerated coarse granule;
Wherein the regenerated coarse granule has a maximum particle size of 19 mm, a specific gravity of 2.34, a water absorption of 8.76%, and a crushing unit of 1540.5 kg/m3.

Assignees: NATIONAL ILAN UNIV; UNIV NAT ILAN



61. Family 62339478 (KR101620038 B1)

[View in PatBase](#)

Title

[EN] CONCRETE COMPOSITION FOR CARBON DIOXIDE REDUCTION

Abstract

[EN] The present invention relates to a carbon dioxide-reducing concrete composition improved in terms of crack resistance, containing 10 to 40 parts by weight of fly ash, 10 to 40 parts by weight of Portland cement, 10 to 40 parts by weight of calcium carbonate, 5 to 20 parts by weight of stone flour, 1 to 10 parts by weight of an activation agent, 1 to 3 parts by weight of reinforcement fiber, and 1 to 3 parts by weight of aluminum hydroxide and alumina mixture with respect to 100 parts by weight of ground granulated blast furnace slag.

1st Main Claim

[MT] 1. Blast furnace slag fine powder 100 for the parts by weight of fly ash, 10 to 40 parts by weight, Portland cement 10 to 40 parts by weight, calcium carbonate of 10 to 40 parts by weight of stone dust from 5 to 20 parts by weight of the activator 1 to 10 parts by weight, reinforcing fibers 1 to 3 parts by weight of aluminum hydroxide and alumina mixture is from 1 to 3 parts by weight of the polycarboxylic acid-based water reducing agent from 1 to 3 parts by weight, comprising a urethane thickener 0.5 to 1 part by weight of ethyl alcohol, 0.05 to 0.5 parts by weight of aluminum hydroxide and alumina ever made to control the mixture temperature and cracking, aluminum hydroxide and alumina weight ratio of 7: 3 to 8: 2 characterized by reducing the carbon dioxide-type concrete composition having improved resistance to cracking.

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

62. Family 63840544 (KR20160121691 A)

[View in PatBase](#)

Title

[EN] A COMPOSITION OF CEMENTITIOUS BINDER WITH REDUCING PROPERTIES OF CO₂ EMISSION STEAM CURING CONCRETE COMPRISING THE SAME

Abstract

[EN] The present invention relates to a low-carbon binder composition for replacing cement and mortar and concrete including the same and, more particularly, to a low-carbon binder composition for replacing cement and mortar and concrete including the low-carbon binder composition for replacing cement including fluidized boiler fly ash, slaked lime, reformed plaster, and an alkaline alunite compound obtained by firing a mixture of an alkaline aqueous solution, paper ash or fluidized boiler fly ash, and waste aluminum powder or waste zeolite catalyst obtained in an aluminum foundry for 30 to 60 minutes at a temperature of 900 to 1,100 degrees Celsius. [Keyword] Low-carbon binder, alkaline alunite, fluidized boiler fly ash.

1st Main Claim

[MT] 1. usually 10 to 40 weight percent; Portland cement and slag Crusher with 40 to 60 weight percent; 20-30 weight percent inorganic joinery; featuring being consists of a CO₂ reduction of combined low-carbon for cement ash composition

Assignees: GAP O CO LTD

63. Family 98434026 (CN116535235 A)

[View in PatBase](#)

Title

[EN] PRODUCT FOR ABSORBING AND CONSOLIDATING CARBON DIOXIDE AS WELL AS PREPARATION METHOD AND APPLICATION THEREOF

Abstract

[EN] The invention provides a product for absorbing and consolidating carbon dioxide. The product is obtained by pouring and molding pouring slurry, the pouring slurry comprises steel slag, activated carbon, cement, quartz sand, a water reducing agent and a reinforcing agent; the mass ratio of the steel slag to the activated carbon to the cement to the quartz sand is (110-140): (30-50): (15-30): (1-35). The steel slag and the activated carbon are used as raw materials of the prepared mixed dry ball material, carbon dioxide can be continuously adsorbed, the carbon dioxide absorption amount is increased, during product maintenance and later use, the adsorbed carbon dioxide can be slowly released and reacts with the steel slag inside, the product is carbonized more uniformly, the carbon dioxide is converted into calcium carbonate through a reaction, and the carbon dioxide is recycled. Slow release to the external environment in a gas form is avoided; meanwhile, the dry ball material also plays a role of aggregate to form a compact net-shaped structure, so that the mechanical property of the product is enhanced. The invention also provides a preparation method and application of the product for absorbing and consolidating carbon dioxide.

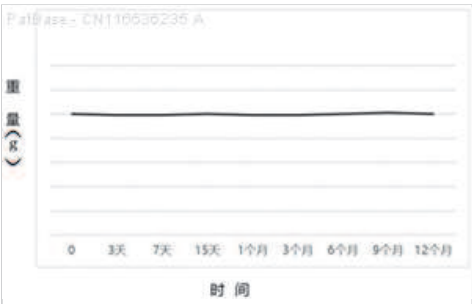
1st Main Claim

[MT] 1. An article for absorbing consolidated carbon dioxide obtained by casting a cast slurry;

The casting slurry comprises steel slag, activated carbon, cement, quartz sand, a water reducer, and a reinforcing agent;

The mass ratio of slag, activated carbon, cement, and quartz sand is (110-140): (30-50): (15-30): (1-35).

Assignees: SHANDONG JINGYUN TAIBO NEW MATERIAL TECH CO LTD



64. Family 92091476 (US2024010573 AA)

[View in PatBase](#)

Title (EP4263027 A1)

[EN] ???METHODS OF PRODUCING CURED COSEQUESTERING SOLID COMPOSITIONS, SYSTEMS FOR PRACTICING THE SAME AND CURED CO 2 SEQUESTERING SOLID COMPOSITIONS PRODUCED THEREFROM

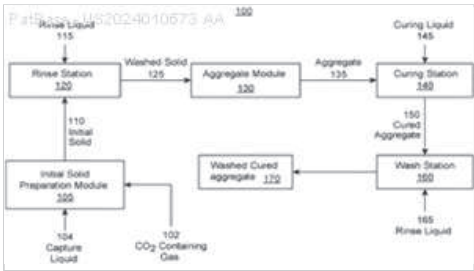
Abstract (EP4263027 A1)

[EN] Methods of producing cured CO₂ sequestering solid compositions, e.g., precipitate or aggregate compositions, are provided. Aspects of the methods include preparing an initial CO₂ sequestering solid composition, and then contacting the initial composition with a curing liquid sufficient to produce a cured CO₂ sequestering solid composition. Also provided are systems for performing the methods and cured CO₂ sequestering solid compositions produced therefrom.

1st Main Claim (EP4263027 A1)

[EN] 1. A method of producing a cured CO₂ sequestering solid, the method comprising: a) preparing an initial CO₂ sequestering solid composition; and b) contacting the initial CO₂ sequestering solid composition with a curing liquid sufficient to produce a cured CO₂ sequestering solid.

Assignees: BLUE PLANET SYSTEMS INC; BLUE PLANET SYSTEMS CORP



65. Family 76477338 (KR102043393 B1)

[View in PatBase](#)

Title

[EN] IMPROVED DURABILITY ECO-FRIENDLY CONCRETE COMPOSITION FOR DECREASING FINE DUST MINUTE PLASTIC AND CARBON DIOXIDE USING SEAWEED AND CONSTRUCTING METHODS USING THEREOF

Abstract

[EN] The present invention relates to an environmentally-friendly ordinary concrete composition with reduced production of fine dust, microplastic and carbon dioxide and increased durability by using seaweed, and a construction method using the same. According to the present invention, the environmentally-friendly ordinary concrete composition comprises 20 to 150 parts by weight of cement, 10 to 1,000 parts by weight of aggregate, 3 to 20 parts by weight of fiber, 10 to 40 parts by weight of calcium sulfoaluminate, 2 to 10 parts by weight of metakaolin, 10 to 70 parts by weight of fly ash, 20 to 60 parts by weight of blast furnace slag, 3 to 15 parts by weight of methylmethacrylate, 1 to 10 parts by weight of a retarder, 1 to 10 parts by weight of an air entraining agent, 0.5 to 5 parts by weight of a defoamer, and 0.01 to 5 parts by weight of a high performance water reducing agent with respect to 100 parts by weight of seaweed. Accordingly, the ordinary concrete composition absorbs carbon dioxide during curing of concrete without generating fine dust and microplastic, thereby providing an effect of reducing generation of greenhouse gas while satisfying physical properties such as durability, compressive strength and the like, required to the concrete composition.

1st Main Claim

[MT] 1. Based on 100 parts by weight of the algae 20 to 150 parts by weight of fine aggregate, cement 10 to 1,000 parts by weight; fibers; from 3 to 20 parts by weight; calcium sulfo aluminate (CSA); 10 to 40 parts by weight 2 to 10 parts by weight metakaolin;; 10 to 70 parts by weight fly ash, blast furnace slag, 20 to 60 parts by weight to 15 parts by weight of methyl methacrylate, 3 to 10 parts by weight; a first delay; air-entraining agent 1 to 10 parts by weight; defoaming agent 0.5 to 5 parts by weight of 0.01 to 5 parts by weight of a superplasticizer; and a plain concrete composition, based on 100 parts by weight of algae as well gum, 0.1 to 3 parts by weight of oleic acid sodium, algae, further comprising 1 to 5 parts by weight based on 100 parts by weight, further including butyl glycidyl ether, seaweed 1 to 6 parts by weight based on 100 parts by weight and further including, lithium carbonate based on 100 parts by weight of algae, further comprising 0.1 to 2 parts by weight, based on 100 parts by weight of acrylonitrile of algae and further comprising 1 to 10 parts by weight, 100 parts by weight based on seaweed calcium phosphate 0.1 to 2 parts by weight, seaweed calcium nitrite further comprising 100 parts by weight based on 1 to 10 parts by weight Further comprising a seaweed based on 100 parts by weight of lithium hydroxide, further comprising 1 to 5 parts by weight, tetra-fluoro-ethylene, based on 100 parts by weight of algae and further comprising 1 to 10 parts by weight based on 100 parts by weight of algae, zeolite, further comprising 1 to 10 parts by weight, based on 100 parts by weight of kaolinite, algae and further comprising 2 to 8 parts by weight, 100 parts by weight of algae hypochlorite is in the range of 0.1 to 3 parts by weight of further comprising, sulfoxide, polyethylene glycol allyl ether based on 100 parts by weight of algae and further comprising 1 to 10 parts by weight, sodium hexametaphosphate, relative to 100 parts by weight of algae, further comprising 1 to 10 parts by weight oleic esters, sorbitan monooleate, seaweed 1 to 5 parts by weight based on 100 parts by weight of further comprises and, Ppa-based on 100 parts by weight of algae, further comprising 1 to 3 parts by weight, based on 100 parts by weight of algae potassium sorbate, further comprising 1 to 10 parts by weight based on 100 parts by weight of algae, itaconic acid, 1 to 10 parts by weight, and further comprising a seaweed based on 100 parts by weight is from 1 to 10 parts by weight of algae, and further comprising 100 parts by weight of 0.1 to 10 parts by weight. Further, cellulose acetate butyrate, relative to 100 parts by weight of algae and further comprising 1 to 10 parts by weight, based on 100 parts by weight of the magnesium oxide of algae, further comprising 1 to 10 parts by weight, coco betaine, 2 to 8 parts by weight relative to 100 parts by weight of algae (green plain concrete composition further comprises a.

Assignees: DAEHAN HITECH CONSTRUCTION CO LTD; KANG CHANG GU

66. Family 61254567 (WO15199291 A1)

[View in PatBase](#)

Title

[EN] EARLY STRENGTH DEVELOPMENT TYPE, HIGH-FLUIDITY, LOW-HEAT, HIGH-DURABILITY, AND CARBON DIOXIDE REDUCTION TYPE CONCRETE COMPOSITION

Abstract

[EN] An early strength development type, high-fluidity, low-heat, high-durability, and carbon dioxide reduction type concrete composition of the present invention comprises: 10 to 40 parts by weight of fly ash; 10 to 40 parts by weight of Portland cement; 10 to 40 parts by weight of calcium carbonate; 5 to 20 parts by weight of crushed stone powder; 1 to 10 parts by weight of an activator; and 1 to 3 parts by weight of a superplasticizer, on the basis of 100 parts by weight of ground granulated blast furnace slag (GGBFS).

1st Main Claim

[MT] Fly ash 10 to 40 parts by weight based on the blast furnace slag fine powder 100 parts by weight of Portland cement 10-40 parts by weight of calcium of 10 to 40 parts by weight of carbon, stone dust from 5 to 20 parts by weight of the activator 1 to 10 parts by weight of a fluidized early comprises a first part to 3 parts by weight strength-type high fluidity low heat durability and reduction of carbon dioxide form the concrete composition.

Assignees: DAEWOO ENG AND CONSTR CO LTD

67. Family 96764070 (CA3177657 AA)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE-ADSORBING ARTIFICIAL STONE COMPOSITIONS

Abstract

[EN] The present disclosure relates to carbon dioxide-adsorbing artificial stone compositions. In some embodiments, the artificial stone can be formed from an uncured mixture of: between 25 wt percent and 40 wt percent binder; between 20 wt percent and 25 wt percent filler a polycarboxylate-based admixture, and a diluent. At least a portion of the filler comprises a component capable of mineral carbonation, which can be a metal oxide, such as calcium oxide, a silicon oxide, a magnesium oxide, an iron oxide, a magnesium iron silicate, a nickel oxide, and a manganese oxide. In some embodiments, at least a portion of the filler is olivine. When the artificial stone is exposed to CO₂ and water, such as typical environmental conditions, the artificial stone adsorbs atmospheric CO₂, thus sequestering or adsorbing the carbon in the artificial stone.

1st Main Claim

[EN] 1. An artificial stone formed from an uncured mixture comprising: - between 25 wt percent and 40 wt percent binder; - between 20 percent and 35 percent filler; - between 1.5 wt percent and 2 wt percent polycarboxylate-based admixture; and - a diluent; wherein at least a portion of the filler comprises a component capable of mineral carbonization. lo

Assignees: VELOCITY GREEN ENERGY INC

68. Family 76477357 (KR102043397 B1)

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Title

[EN] IMPROVED DURABILITY ECO-FRIENDLY QUICK-HARDENING CONCRETE COMPOSITION FOR DECREASING FINE DUST MINUTE PLASTIC AND CARBON DIOXIDE USING SEAWEED AND CONSTRUCTING METHODS USING THEREOF

Abstract

[EN] The present invention relates to an environmentally-friendly ultra-rapid hardening pavement concrete composition with reduced production of fine dust, microplastic, and carbon dioxide and increased durability by using seaweed, and a construction method using the same. According to the present invention, the environmentally-friendly ultra-rapid hardening pavement concrete composition comprises 20 to 150 parts by weight of cement, 10 to 1,000 parts by weight of aggregate, 10 to 40 parts by weight of calcium sulfoaluminate, 2 to 10 parts by weight of metakaolin, 10 to 70 parts by weight of fly ash, 20 to 60 parts by weight of blast furnace slag, 3 to 15 parts by weight of methylmethacrylate, 1 to 10 parts by weight of a retarder, 1 to 10 parts by weight of an air entraining agent, and 0.5 to 5 parts by weight of a defoamer with respect to 100 parts by weight of seaweed. Accordingly, carbon dioxide is absorbed during curing of concrete without generating fine dust and microplastic, thereby providing an effect of reducing generation of greenhouse gas. Moreover, the composition is quickly hardened while satisfying required physical properties such as durability, compressive strength and the like, thereby providing an effect of reducing a construction period.

1st Main Claim

[MT] 1. Based on 100 parts by weight of the algae 20 to 150 parts by weight of fine aggregate, cement 10 to 1,000 parts by weight of; calcium sulfo aluminate (CSA); 10 to 40 parts by weight 2 to 10 parts by weight metakaolin;; 10 to 70 parts by weight fly ash, blast furnace slag, 20 to 60 parts by weight to 15 parts by weight of methyl methacrylate, 3 to 10 parts by weight; a first delay; air-entraining agent 1 to 10 parts by weight; defoaming agent 0.5 to 5 parts by weight of 0.01 to 5 parts by weight of a superplasticizer; and a concrete composition zinnias around the packaging of algae gum, as well 0.1 to 3 parts by weight based on 100 parts by weight and further including an oleic acid sodium as the seaweed 1 to 5 parts by weight based on 100 parts by weight, further including butyl glycidyl ether, seaweed 1 to 6 parts by weight based on 100 parts by weight and further including, lithium carbonate based on 100 parts by weight of algae, further comprising 0.1 to 2 parts by weight, based on 100 parts by weight of acrylonitrile of algae and further comprising 1 to 10 parts by weight, 100 parts by weight based on seaweed calcium phosphate 0.1 to 2 parts by weight calcium nitrite, further comprising 1 to 10 parts by weight based on 100 parts by weight of algae (seaweed lithium hydroxide and further comprises, Relative to 100 parts by weight, further comprising 1 to 5 parts by weight), based on 100 parts by weight of algae and further comprising 1 to 10 parts by weight, based on 100 parts by weight of zeolite, algae, further comprising 1 to 10 parts by weight, based on 100 parts by weight of kaolinite, algae and further comprising 2 to 8 parts by weight, 100 parts by weight of algae hypochlorite is in the range of 0.1 to 3 parts by weight of further comprising, sulfoxide, polyethylene glycol allyl ether based on 100 parts by weight of algae and further comprising 1 to 10 parts by weight, sodium hexametaphosphate, relative to 100 parts by weight of algae, further comprising 1 to 10 parts by weight oleic esters, sorbitan monooleate, seaweed 1 to 5 parts by weight based on 100 parts by weight of further comprises and, Ppa-based on 100 parts by weight of algae, further comprising 1 to 3 parts by weight, based on 100 parts by weight of algae potassium sorbate, further comprising 1 to 10 parts by weight based on 100 parts by weight of algae, itaconic acid, 1 to 10 parts by weight, and further comprising a seaweed based on 100 parts by weight is from 1 to 10 parts by weight of algae, and further comprising from 0.1 to 10 parts by weight based on 100 parts by weight, and further comprising a first cellulose acetate A seaweed based on 100 parts by weight of butyl methacrylate, and further comprising from 1 to 10 weight parts, relative to 100 parts by weight of the magnesium oxide of algae, further comprising 1 to 10 parts by weight, coco betaine, 2 to 8 parts by weight relative to 100 parts by weight of algae and further comprising an eco-friendly packaging unit for maintenance of the initial velocity around the concrete composition.

Assignees: DAEHAN HITECH CONSTRUCTION CO LTD; KANG CHANG GU

69. Family 95245868 (CN115521097 A)

[View in PatBase](#)

Title

[EN] METHOD FOR SYNERGISTICALLY PREPARING CEMENT-FREE CEMENTING MATERIAL FOR ABSORBING AND FIXING CARBON DIOXIDE FROM MULTIPLE SOLID WASTES AND APPLICATION OF CEMENT-FREE CEMENTING MATERIAL

Abstract

[EN] The invention belongs to the technical field of solid waste treatment and resource utilization, and particularly relates to a method for preparing a cement-free cementing material for absorbing and fixing CO₂ through multi-solid-waste cooperative treatment and application of the cement-free cementing material. The cement-free cementing material is prepared from coal-based solid waste such as coal gangue, fly ash, gasified ash, desulfurized gypsum and the like to cooperatively process alkaline industrial waste residues, corresponding tailings and low-grade waste ores, and is prepared from the following components in parts by mass: 25 to 35 parts of aggregate, 30 to 45 parts of base material, 15 to 25 parts of admixture, 10 to 15 parts of stabilizer and 15 to 25 parts of activity accelerant, and the cement-free cementing material can be used for absorbing and solidifying CO₂. The effective emission reduction of CO₂ is realized, and meanwhile, the efficient resource utilization of a large amount of industrial solid wastes is promoted. The cement-free cementing material prepared from the raw materials in parts by mass can be used for effectively carrying out absorption curing and mineralization reaction of CO₂ and promoting emission reduction of CO₂.

1st Main Claim

[MT] 1. A method of absorbing CO₂ Of cement-free cementitious material, characterized in that it comprises the following parts by mass of components:

25 parts of aggregate, 30 parts of base, 15 parts of blend 15 parts of 25 parts of stabilizer, 15 parts of stabilizer, 15 parts of accelerator, 15 parts of accelerator, 15 parts of accelerator and 25 parts of accelerator;

The aggregate comprises a first coal mine spoil, a first gasified ash slag, a first alkaline industrial waste slag, a first tailings, The lightweight aggregate is calcined from a first tailings and/or a first low grade ore after blending with a first coal mine spoil, the aggregate having a particle size of 0.15 stubs 3 mm;

The binder comprises one or more of fly ash, a second gasified ash and a second alkaline industrial slag, the binder having a particle size of 0.15 mm;

The blend comprises one or more of a second coal mine spoil, a second alkaline industrial waste slag, a second tailings, and a second low grade mine, the blend having a particle size of 0.15 mm;

The stabilizer comprises de-sulfur gypsum and a second alkaline industrial waste slag;

The activity promoter is calcined from a second tailings and/or a second low grade ore being blended with a second coal mine spoil;

The first coal mine spoil and the second coal mine spoil independently comprise one or more of high calcium coal mine spoil, high alkali coal mine spoil, and high iron coal mine spoil; the mass content of Cao in the high calcium coal mine spoil, the mass content of Cao in which Na is in₂O and K.₂Total mass content of O, greater than or equivalent to 5, Fe in the high iron coal mine spoil.₂O.₃The mass content of the product is: Creator than or equivalent to 8;

The first and second gasified ashes independently comprise one or more of high calcium gasified ash, an overbased gasified ash, and a high iron gasified ash; a mass content of Cao in the high calcium gasified ash, greater than or equivalent to 15 shades, the high alkali gasified ash being Na in the overbased gasified ash₂O and K.₂The total mass content of O, the Fe in the iron gasified ash. The total mass content of O, the Fe in the iron gasified ash₂O.₃The mass content of the product is: Creator than or equivalent to 8;

The first and second tailings are independently alkali metal or alkaline-earth metal-containing tailings; the first and second low-grade minerals are independently alkali metal or alkaline-earth metal-containing low-grade minerals, The mass content of alkali metals in the tailings containing alkali metals and low grade ores is independently greater than or equivalent to 10, The mass content of alkaline earth metal in the tailings and low grade ores containing alkaline earth metal are independently greater than or equivalent to 25;

The fly ash comprises one or more of a high calcium fly ash, a high base fly ash, and a high iron fly ash; a mass content of Cao in the high calcium fly ash, a Na in the high alkali fly ash₂O and K.₂Total mass content of O, grater than or equivalent to 5, Fe in the iron fly ash₂O.₃Mass content greater than or equivalent to 8.

Assignees: SHU XINQIAN

70. Family 102586634 (CN118005339 A)

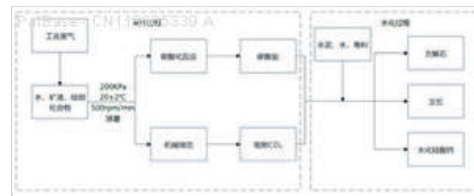
[View in PatBase](#)

Title

[EN] METHOD FOR PREPARING CONCRETE BASED ON SLAG, SILICON-ALUMINUM COMPOUND AND CO₂ WASTE GAS

Abstract

[EN] The invention relates to a method for preparing concrete based on slag, a silicon-aluminum compound and CO₂ waste gas, and belongs to the field of green concrete. Comprising the following steps: adding a certain mass of slag, a silicon-aluminum compound and water into a ball milling tank; introducing CO₂ waste gas into the tank, and stopping introducing the CO₂ waste gas when the gas pressure in the tank reaches the standard; and starting the ball mill, repeatedly inflating for multiple times, carrying out ball milling until the median particle size reaches the standard and CO₂ is completely reacted and adsorbed by the slag, and finally preparing the concrete by using the slag mixture meeting the requirements. According to the invention, the slag is promoted to react and adsorb CO₂ through doping the silicon-aluminum compound in the slag and the mechanical action of the ball mill, the hydration activity is improved, and a part of CO₂ is dissolved in water during ball milling and reacts with the slag to generate carbonate; the residual CO₂ is adsorbed among slag pores and participates in the reaction in the hydration process, so that the early strength of the slag concrete can be improved, the dry shrinkage slump loss of the slag concrete is reduced, and the prepared slag concrete has the characteristics of good workability, good durability and environmental protection.



1st Main Claim

[MT] 1. A slag-based, silicoaluminide compound with CO₂A method for preparing concrete from exhaust gases, characterized in that it comprises the following steps:

The method comprises the steps of: (1) weighing a quantity of slag, silica-alumina compound and distilled water, and premixing in a mixer, and putting it into a ball mill tank with alumina as the ball milling medium;

(2) Use an air pump to pass CO into the ball mill tank₂Exhaust gas, shutting down the charge pump when the gas pressure within the tank is at a standard;

(3) Start the ball mill, grind at 400 to 600 rpm/min for 10 to 20 minutes, rest, repeat step (2) and continue grinding, repeat multiple times until the prescribed mass M of CO is introduced₂Exhaust gas, when the last CO is introduced₂When the exhaust gas is not enough to make the tank gas pressure to reach the standard, the use of nitrogen gas to fill the tank gas pressure to reach the standard, the whole process using industrial air cooler control the ball mill tank temperature is 20 plus or minus 2 degrees centigrade;

(4) determining the median particle size of the mixture of slag and the silicoaluminide compound, and if the median particle size is not satisfactory, continuing the ball milling under nitrogen until a satisfactory mixture of slag and silicoaluminide compound is obtained;

(5) mixing the mixture of the slag and the silicoaluminous compound obtained in step (4) with a silicate cement to obtain a slag cement mixture, adding water in a mass ratio of water to slag cement mixture (0.35-0.41): 1, and stirring with a mass of coarse aggregate to prepare a slag concrete;

(6) pouring the slag concrete obtained in step (5) into a mold, vibrating and compacting, The mold is then sealed at 22 plus or minus 2 degrees centigrade, greater than or equal to 90% relative humidity for 24h, demolded, and maintained to the specified age.

Assignees: SECOND CONSTRUCTION CO OF CHINA CONSTRUCTION EIGHTH ENGINEERING DIVISION LTD; SECOND CONSTRUCTION LTD CO OF CHINA CONSTRUCTION EIGHTH ENGINEERING DIVISION; SHANDONG UNIV; UNIV SHANDONG

71. Family 52239992 (US2013036948 AA)

[View in PatBase](#)

Title (EP2702009 A2)

[EN] METHODS AND COMPOSITIONS USING CALCIUM CARBONATE AND STABILIZER

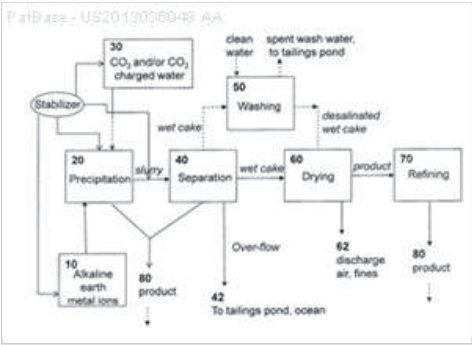
Abstract (EP2702009 A2)

[EN] Provided herein are compositions, methods, and systems for a material containing metastable carbonate and stabilizer. Methods for making the compositions and using the compositions are also provided.

1st Main Claim (EP2702009 A2)

[EN] 1. A composition, comprising a metastable carbonate and a stabilizer.

Assignees: CALERA CORP; FERNANDEZ MIGUEL; CHEN IRVIN; LEE PATRICIA TUNG; GINDER VOGEL MATTHEW; KENDALL TREAVOR; BOURCIER WILLIAM; GARRISON GEOFFREY; LU PENG; KENDALL TEAVOR



72. Family 49934084 (US2011277670 AA)

[View in PatBase](#)

Title

[EN] SYSTEMS AND METHODS FOR PROCESSING CO2

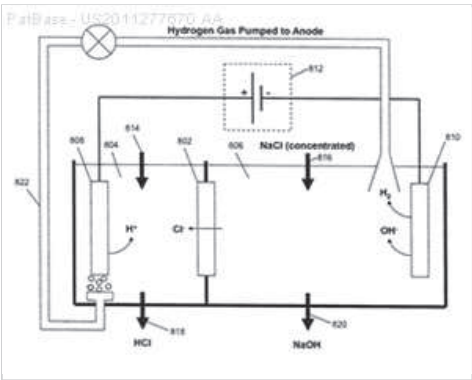
Abstract

[EN] Systems and methods for lowering levels of carbon dioxide and other atmospheric pollutants are provided. Economically viable systems and processes capable of removing vast quantities of carbon dioxide and other atmospheric pollutants from gaseous waste streams and sequestering them in storage-stable forms are also discussed.

1st Main Claim

[EN] 1. A method comprising: i) obtaining a slurry comprising a precipitated CO₂-sequestering carbonate and/or bicarbonate compound composition and a supernatant solution from which the carbonate compound composition was precipitated, wherein the carbonate and/or bicarbonate compound composition has a delta¹³C value less than -10‰ and comprises aragonite, vaterite, amorphous calcium carbonate, or a combination thereof; ii) separating the CO₂-sequestering carbonate compound composition from the supernatant solution utilizing at least one of the following techniques: a. gravity separation; b. mechanical separation; or c. thermal evaporation; to provide a dewatered slurry comprising the CO₂-sequestering carbonate compound composition at a concentration of solids of at least 20 wt percent and a first portion of the supernatant solution, and an effluent solution comprising a second portion of the supernatant solution; and iii) processing the effluent solution in a first process and the CO₂-sequestering carbonate compound composition in a second process.

Assignees: ELLIOTT ROBERT W; SELF KYLE; FARSAK KASRA; CURTIS BRIAN; BELLUR SRIKANTH; FERNANDEZ MIGUEL; TUET PHILIP BRIAN



73. Family 96922730 (KR20230053755 A)

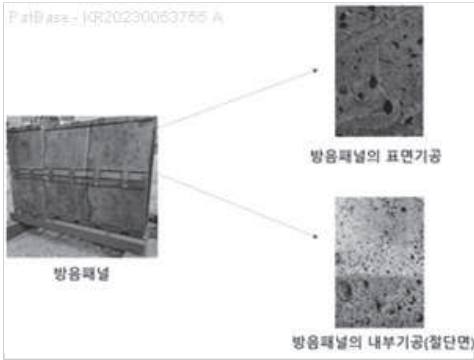
[View in PatBase](#)

Title

[EN] POROUS SOUND ABSORBING PANEL MADE OF THE AERATED CONCRETE FOR REDUCING NITROGEN OXIDE AND CARBON DIOXIDE AND SOUNDPROOF WALL USING THE SAME

Abstract

[EN] The present invention relates to a porous soundproof panel made of aerated concrete for reducing nitrogen oxide and carbon dioxide, and a road soundproof wall using the same. The present invention provides a porous soundproof panel made of aerated concrete which is manufactured by mixing an animal foaming agent with a paste for aerated concrete containing a mixed composition of circulating fluidized bed boiler fly ash, titanium dioxide, and activated carbon as a binder ingredient, making the same dough, and being cured in a mold. According to a composition characteristic of aerated concrete, the porous soundproof panel satisfies a reduction performance of both nitrogen oxide and carbon dioxide, which are pollutants in the air, and since the porous soundproof panel made of aerated concrete is lightweight, the construction is convenient, and the panel can be easily constructed between existing soundproof panels by using a connection bracket.



1st Main Claim

[MT] 1. A porous sound insulation panel comprising a cellular concrete formed by mixing and kneading an animal foaming agent with a paste for foam concrete containing 40 to 84 weight percent cement , 10 to 40 weight percent circulating fluidized bed boiler fly ash , 1 to 5 weight percent titanium dioxide and 5 to 15 weight percent activated carbon as binder components.

Assignees: GACHON UNIV OF IND ACADEMIC COOPERATION FOUNDATION; UNIV GACHON IND ACAD COOP FOUND

74. Family 50014130 (US2011290156 AA)

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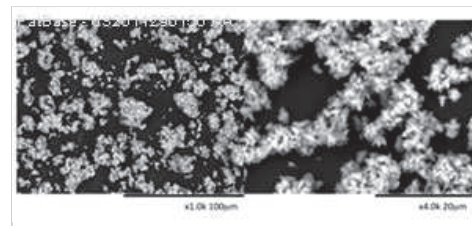
Extended Family Number: 42613795

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] 1. A method for producing a formed building material comprising: a) producing a CO₂-sequestering component from a saltwater solution of divalent cations and a gaseous waste stream comprising CO₂; and b) forming the formed building material from the CO₂-sequestering component in a process comprising contacting the CO₂-sequestering component with freshwater, 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

75. Family 99010296 (US2025162197 AA)

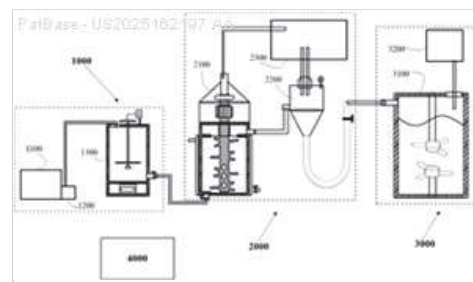
[View in PatBase](#)

Title

[EN] SYSTEM FOR CO₂ STORAGE AND UTILIZATION OF CONCRETE MIXING PLANT AND METHOD THEREOF

Abstract

[EN] The present disclosure provides a system for CO₂ storage and utilization of a concrete mixing plant and a method thereof. The system includes a slurry making module, a cyclic grinding module and a material storage and application module. The cyclic grinding module can grind, in the presence of a gas containing CO₂ and medium balls, a composite slurry prepared by the slurry making module, and can cyclically use the gas containing CO₂, so as to realize continuous production of a carbon-mineralized slurry. The material storage and application module includes a material storage bin and a mixing machine connected with each other, and the material storage bin is configured to receive and store the carbon-mineralized slurry from a slurry bin. The mixing machine is configured to mix and prepare the carbon-mineralized slurry into a commodity concrete.



1st Main Claim

[EN] 1. A system for CO₂ storage and utilization of a concrete mixing plant, comprising a slurry making module, a cyclic grinding module and a material storage and application module, wherein, the slurry making module is configured to mix a concrete mixing plant waste slurry, a natural ore and an industrial aid to produce a composite slurry and convey the composite slurry to the cyclic grinding module; the cyclic grinding module comprises a grinding machine, a material discharge component and a CO₂ circulating component, a mixing element is disposed inside the grinding machine, the mixing element comprises a hollow rotary shaft and medium balls, the material discharge component comprises a gas storage bin and a slurry bin communicated with each other and disposed up and down, the gas storage bin is connected sequentially with the grinding machine and the CO₂ circulating component, the gas storage bin is configured to supply a gas containing CO₂ to the CO₂ circulating component, the CO₂ circulating component is configured to convey the gas to the grinding machine and recover a tail gas containing CO₂ generated during a grinding process of the gas containing CO₂ and the medium balls for the composite slurry in the grinding machine, and the grinding machine is configured to grind and prepare the composite slurry in the presence of the gas containing CO₂ and the medium balls into a carbon-mineralized slurry and convey the carbon-mineralized slurry to the slurry bin of the material discharge component; the material storage and application module comprises a material storage bin and a mixing machine connected with each other, and the material storage bin is configured to receive and store the carbon-mineralized slurry from the slurry bin, and the mixing machine is configured to mix and prepare the carbon-mineralized slurry into a commodity concrete; the slurry making module comprises a sand stone separating machine, a sand removing machine and a slurry making machine connected sequentially, the slurry making machine comprises a machine body, a slurry outlet at an outer side of the machine body, a material-adding opening on a top of the machine body, a first rotary shaft in a middle of the top of the machine body and a first motor on the top of the machine body, rotary blades are disposed at a lower end of the first rotary shaft and extended into the machine body, and an upper end of the first rotary shaft is connected with a drive part of the first motor through a bevel gear; the grinding machine comprises a cylinder body, a material inlet at a bottom of the cylinder body, a screen in the cylinder body, a sealed console on a top of the cylinder body and the mixing element in the sealed console, the material inlet is connected with the slurry outlet of the slurry making machine, the screen divides an interior of the cylinder body into an above-screen finished product bin and an under-screen grinding bin, a gas inlet provided with a gas pipe is opened on a top of the sealed console, the mixing element further comprises a second motor and a drive rotary rod, an output end of the second motor is fixedly connected with the drive rotary rod, the drive rotary rod is fixedly connected with the hollow rotary shaft, a top of the hollow rotary shaft is connected with the gas pipe, a lower end of the hollow rotary shaft extends to the grinding bin, centrifugal blades and uniformly-distributed gas outlets are disposed on the hollow rotary shaft in the grinding bin, and a first material outlet is disposed at an outer side of the finished product bin; a slurry inlet is disposed at a side of the gas storage bin of the material discharge component, the slurry inlet is connected with the first material outlet of the finished product bin, a gas relief opening and a gas pressure meter are disposed on a top of the gas storage bin, the CO₂ circulating component is provided with a circulating gas inlet and a circulating gas outlet, the gas relief opening of the gas storage bin is connected with the circulating gas inlet of the CO₂ circulating component, the circulating gas outlet is connected with the gas inlet of the grinding machine, and an outlet end of the slurry bin of the material discharge component is connected with a U-shaped pipe; a feed pipe connected with the U-shaped pipe is disposed at an upper end of an outer side of the material storage bin, and a second material outlet connected with the mixing machine is disposed on a top of the material storage bin.

Assignees: HUBEI UNIV OF TECHNOLOGY; UNIV HUBEI TECHNOLOGY

76. Family 105186272 (JP2024158503 A2)

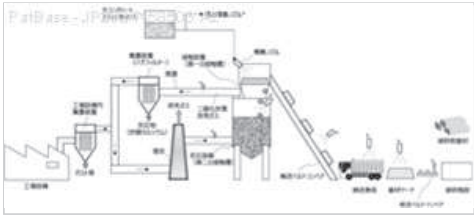
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Title

[EN] METHOD FOR PRODUCING ROADBED MATERIAL AND APPARATUS FOR PRODUCING ROADBED MATERIAL, AND METHOD FOR RECOVERING CARBON DIOXIDE

Abstract

[EN] To provide a method and an apparatus for producing a roadbed material by a simple operation, which is highly versatile in that it can be applied to a wide variety of materials, and a method for recovering carbon dioxide.SOLUTION: A method for producing a roadbed material comprises a first contacting step in which ready-mixed concrete sludge water 1 and a base material are contacted, a second contacting step in which the contained component and carbon dioxide-containing gas are contacted, a third contacting step in which the carbon dioxide-containing gas and ready-mixed concrete sludge water 2 are contacted, and a recovering step in which a reactant containing calcium carbonate is collected by a dust collector. An apparatus for producing the roadbed material comprises a contacting device with which the first contacting step is performed, a reaction vessel with which the second contacting step is performed, a gas duct and a spray nozzle with which the third contacting step is performed, and the dust collector, and a method for recovering carbon dioxide comprises the first contacting step, the second contacting step, the third contacting step, and the recovering step.SELECTED DRAWING: None



1st Main Claim

[MT] 1. A first contact step of obtaining a content containing ready-mixed concrete sludge water 1 and a base material by contacting the ready-mixed concrete sludge water 1 with the base material, a second contact step of obtaining a base material containing the base material and calcium carbonate by contacting the content with a carbon dioxide-containing gas, A third contact step of obtaining a reaction product containing calcium carbonate; and a recovery step of recovering the reaction product containing calcium carbonate with a dust collector.

Assignees: SUMITOMO OSAKA CEMENT CO LTD; MAEDA ROAD CONSTRUCTION CO LTD

77. Family 63114932 (US2016229760 AA)

[View in PatBase](#)

Title

[EN] CONCRETE COATINGS AND COMPOSITIONS THAT ABSORB CARBON DIOXIDE

Abstract

[EN] Disclosed are compositions containing at least 5 weight percent of a silicate based on the total weight of the composition, wherein the silicate is an alkali metal silicate and/or an alkaline earth metal silicate, at least 20 weight percent of one or more calcium oxygenates; and water to 100 weight percent.

1st Main Claim

[EN] 1. A composition comprising:
at least 5 weight percent of a silicate based on the total weight of the composition, wherein the silicate is an alkali metal silicate and/or an alkaline earth metal silicate;
at least 20 weight percent of one or more calcium oxygenates; and
water to 100 weight percent.

Assignees: DRY CAROLYN



78. Family 106343006 (CN119330674 A)

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Title

[EN] CO2 FOAM CONCRETE MATERIAL BASED ON SOLID WASTE-BASED MULTI-COMPONENT GEL SYSTEM AND PREPARATION METHOD

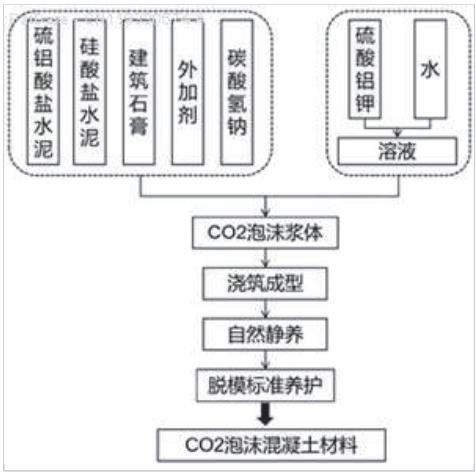
Abstract

[EN] The invention belongs to the field of green low-zero-carbon building materials, and provides a CO2 foam concrete material based on a solid waste-based multi-component gel system and a preparation method thereof, the CO2 foam concrete material comprises the following components by mass: 20 percent -42 percent of solid waste-based sulphoaluminate cement, 15 percent -60 percent of semi-hydrated gypsum, 6 percent -15 percent of Portland cement, 0-20 percent of mineral powder, and 2 percent -4 percent of sodium bicarbonate, the concrete admixture comprises the following raw materials in percentage by weight: 3 percent -6 percent of aluminum potassium sulfate, 0.2 percent -0.4 percent of a retarder, 0.02 percent -0.2 percent of a water reducing agent and 0.02 percent -0.06 percent of calcium stearate, and the sum of the percentages of all the raw materials is 100 percent. On the basis of ensuring that the foam concrete meets the strength requirement, the apparent density is obviously reduced; the compound system formed by the solid waste-based sulphoaluminate cement, the Portland cement and the semi-hydrated gypsum obviously improves the mechanical property of the carbon dioxide foam concrete and greatly improves the mechanical property of the carbon dioxide foam concrete.

1st Main Claim

[MT] 1.A CO based solid waste based multi-gelling system₂Foam concrete material, characterized in that it consists of the following components in mass percentage: Solid waste-based sulfur aluminate cement 20-42%, semi-hydrated gypsum 15-60%, silicate cement 6-15%, mineral powder 0-20%, sodium bicarbonate 2-4%, sulfuric acid aluminum potassium 3-6%, Retarder 0.2-0.4%, water-reducing agent 0.02-0.2%, calcium stearate 0.02-0.06%, the sum of the percentages of each raw material is 100%.

Assignees: SHANDONG UNIV; GUOSHUN GREEN BUILDING TECH CO LTD; UNIV SHANDONG



79. Family 104670659 (US2024327305 AA)

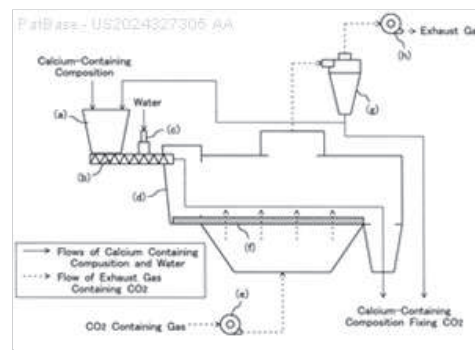
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Title (EP4438159 A1)

[EN] A METHOD FOR PRODUCING A COMPOSITION CONTAINING CALCIUM WITH FIXED CO₂ AND AN APPARATUS THEREFOR

Abstract (EP4438159 A1)

[EN] A calcium-containing composition with fixed CO₂ is produced by contacting a mixture of a calcium-containing composition before CO₂ fixation and water with a CO₂-containing gas. The calcium-containing composition, liquid water, and the CO₂-containing gas having a temperature between 20 degree Celsius and 300 degree Celsius and a CO₂ concentration between 1 volume percent and 100 volume percent are supplied to a reactor. By the supplied CO₂-containing gas, the calcium-containing composition and water are made to flow in the reactor. Alternatively, the calcium-containing composition and water are in the reactor. Thus, CO₂ is fixed in the calcium-containing composition and simultaneously the calcium-containing composition is dried to a water content of 5 mass percent or less.



1st Main Claim (EP4438159 A1)

[EN] 1. A method for producing a calcium-containing composition with fixed CO₂, by making a mixture of a calcium-containing composition before fixing CO₂ and water in contact with a CO₂-containing gas, **characterized by** the steps of:

- supplying into a reactor the calcium-containing composition, liquid water, and a CO₂-containing gas having a temperature not less than 20 degree Celsius and not more than 300 degree Celsius and a CO₂ concentration not less than 1 volume percent and not more than 100 volume percent; and
- fixing CO₂ to the calcium-containing composition and simultaneously drying the calcium-containing composition by making the calcium-containing composition and the water flow in the reactor by the CO₂-containing gas supplied, or by agitating the calcium-containing composition and the water in the reactor,
- wherein the calcium-containing composition with fixed CO₂ has a water content not more than 5 mass percent.

Assignees: TOKUYAMA CORP

80. Family 100977128 (US11884602 BA)

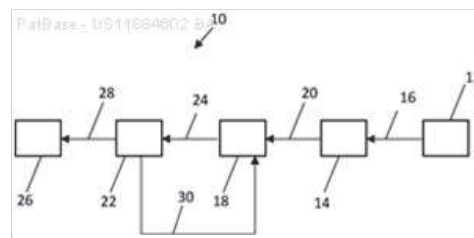
[View in PatBase](#)

Title

[EN] CARBON MINERALIZATION USING HYALOCLASTITE, VOLCANIC ASH OR PUMICE POZZOLAN, CEMENT AND CONCRETE USING SAME AND METHOD OF MAKING AND USING SAME

Abstract

[EN] The invention comprises a method of sequestering carbon dioxide. The method comprises delivering hyaloclastite, a volcanic glass or pumice to a mill capable of reducing the particle size of the hyaloclastite, a volcanic glass or pumice; processing the hyaloclastite, a volcanic glass or pumice in the mill so that the processed hyaloclastite, a volcanic glass or pumice has a volume-based mean particle size of less than or equal to 40 micro m; and exposing the hyaloclastite, a volcanic glass or pumice to carbon dioxide in gaseous, liquid or solid form during or after the particle reduction process.



1st Main Claim

[EN] 1. A method of mineralizing carbon dioxide comprising:
delivering hyaloclastite to a mill capable of reducing the particle size of the hyaloclastite;
processing the hyaloclastite in the mill so that the processed hyaloclastite has a volume-based mean particle size of less than or equal to 40 micro m; and
exposing the hyaloclastite to carbon dioxide in gaseous, liquid or solid form during the particle reduction process, wherein the carbon dioxide gas is at a concentration greater than its atmospheric concentration.

Assignees: CIUPERCA ROMEO ILARIAN; GREENCRAFT LLC

81. Family 55823122 (WO15062333 A1)

[View in PatBase](#)

Title

[EN] ANTI-CARBONATION WATERPROOF SLURRY

Abstract

[EN] An anti-carbonation waterproof slurry. The anti-carbonation waterproof slurry is a composite slurry having two components of organic and inorganic materials, and the component raw materials of the slurry comprise: cement, quartz powder, redispersible emulsion powder, cellulose ether, a superplasticizer, a water repellent, a carbonation inhibitor, an emulsion, water, a defoamer, and a preservative. The carbonation inhibitor is obtained by modifying a mixture of calcium oxide and calcium montmorillonite powder by using mineral oil.

1st Main Claim

[MT] 1. A carbonizing and waterproof slurry, characterized in that it consists of two components a, B consisting of materials in the following parts by weight: A-component cement 250-600 parts quartz powder 250-500 parts redispersible latex powder 5-20 parts cellulose ether 0.5-5 parts superplasticizer 0.5-4 parts hydrophobizing agent 0.3-5 parts carbonization inhibitor 50-100 parts, and B-component emulsion 200-500 parts water 400-800 parts antifoam 0.5-10 parts preservative 0.5-10 parts.

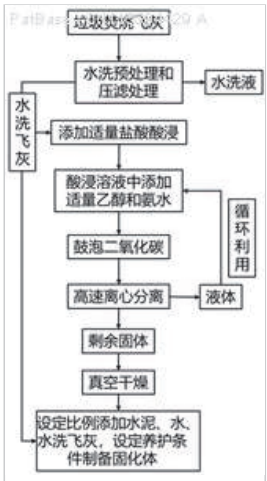
Assignees: DAVCO GUANGZHOU BUILDING MATERIAL CO LTD; PAREXDAVCO GUANGZHOU CO LTD

82. Family 95517342 (CN115594429 A)

[View in PatBase](#)

Title
[EN] METHOD FOR BUILDING MATERIAL UTILIZATION OF FLY ASH BASED ON COMBINATION OF AMINO CARBONATION MODIFICATION AND CEMENT SOLIDIFICATION

Abstract
[EN] The invention relates to the technical field of building materials, and aims to provide a building material utilization method based on combination of amino carbonation modification and cement solidification of fly ash. Comprising the following steps: carrying out water washing and filter pressing on the waste incineration fly ash, and separating water-containing solid water-washed fly ash; adding a hydrochloric acid solution for pickling, and then mixing with ethanol and ammonia water; continuously introducing CO₂ in a bubbling manner to obtain a carbonized fly ash mixture, and carrying out vacuum drying treatment to obtain a modified fly ash solid; uniformly mixing the modified fly ash solid, the solid water-washed fly ash and cement, and then mixing and stirring with water to obtain a slurry mixture; after die filling and compaction, primary curing is conducted; and after demolding, continuously curing to obtain the high-strength cement product. According to the invention, carbon dioxide can be permanently sealed and stored, calcium in fly ash is used for capturing carbon dioxide, and calcite crystals are provided for a cement hydration process; amorphous calcium carbonate is induced to be converted into calcite, and heavy metal in the fly ash is fixed through multiple stable structures of cement and calcite.



1st Main Claim
[MT] 1. A method for curing fly ash building materials based on aminocarbonation modified combined cement, comprising the steps of: Providing a composite cement having a first surface and a second surface;

- The method comprises the steps of: (1) water washing the waste incinerated fly ash, subjecting the water washed mixed solution to a pressure filtration operation to separate aqueous solid water to wash the fly ash;
- (2) adding a hydrochloric acid solution to the solid water washed fly ash, mixing and adjusting the pH to 5:7, and stirring is continued for 20 minutes to obtain a suspension solution of the acid washed fly ash;
- (3) after mixing the pickled fly ash suspension solution with ethanol in a volume ratio of 1/9 by 2/3 by volume, then adding ammonia water to the mixed solution at a mass ratio of 20 by 50 by mass ratio of 20 by 50 by mass, and stirring is continued to obtain a mixed solution;
- (4) carbon dioxide gas was continuously introduced into the mixed solution by bubbling, after 30 minutes the bubbling was stopped and stirring was continued for 10 minutes to obtain a carbonized fly ash mixture;
- (5) centrifuging the carbonized fly ash mixture and recovering the supernatant for further use;
- (6) mixing the modified fly ash solid, solid water washed fly ash and cement in a mass ratio of 1:1:2, and mixing the mixture uniformly, and mixing the mixture with water at a water ash ratio of 0.25-S.a.0.3 L/kg to obtain a slurry mixture;
- (7) after molding and tapping the slurry mixture, placing it in a thermostatic and humidity cabinet, and standing at a temperature of 25 degrees centigrade and a humidity of 100 degrees centigrade for 48 hours to obtain a preliminary conservation cement;
- (8) the initial conservation cement is demolded and removed and placed in a conservation box; and the maintenance is continued at a constant temperature of 20 and 25 degrees centigrade and 90 degrees centigrade at 98 degrees centigrade for 12 days to prepare a high strength cement article.

Assignees: ZHEJIANG UNIV; UNIV ZHEJIANG

83. Family 100730830 (JP2024005007 A2)

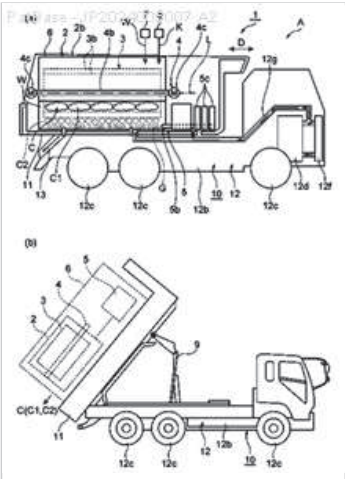
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Title
[EN] DEVICE OF FIXING CARBON DIOXIDE GAS

Abstract
[EN] To provide a device of fixing carbon dioxide gas, capable of reducing the amount of carbon dioxide gas discharged from a construction site and efficiently disposing of unused ready-mixed concrete. SOLUTION: A device 1 of fixing carbon dioxide gas according to an embodiment of the present invention, comprises a storage 2 storing water W, a cylindrical unit 3 disposed in the storage 2 to receive unused ready-mixed concrete C being fed thereinto, a rotary driver 4 rotating the cylindrical unit 3 on a shaft 4b extending in an axial direction D, i.e., in the direction along which an axial line L of the cylindrical unit 3 extends, and a carbon dioxide introduction unit 5 introducing carbon dioxide gas G into the storage 2. The cylindrical unit 3 is a mesh-like body with a plurality of through holes 3b formed thereon to connect the inside and the outside of the cylindrical unit 3. The carbon dioxide introduction unit 5 introduces the carbon dioxide gas G into the cylindrical unit 3 that stores the ready-mixed concrete C and is rotated by the rotary driver 4. SELECTED DRAWING: Figure 1

1st Main Claim
[MT] 1. A carbon dioxide gas introduction unit that introduces carbon dioxide gas into the containing portion, the carbon dioxide gas introduction unit including a containing portion containing water, a cylindrical portion provided inside the containing portion and into which unused ready-mixed concrete is charged, a rotation drive portion that rotates the cylindrical portion around a shaft portion extending in an axial direction, which is a direction in which an axis of the cylindrical portion extends, Wherein the cylindrical portion is formed in a mesh shape with a plurality of through-holes communicating the inside and outside of the cylindrical portion, and the carbon dioxide introduction portion is configured to accommodate the ready-mixed concrete and introduce carbon dioxide into the cylindrical portion rotated by the rotation drive portion, Carbon dioxide immobilization device.

Assignees: KAJIMA CORP



84. Family 100259455 (CN117209240 A)

[View in PatBase](#)

Title

[EN] METHOD FOR PREPARING PASTE FILLING BODY BY USING CARBON DIOXIDE

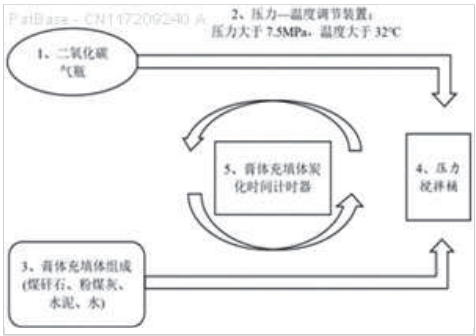
Abstract

[EN] The invention discloses a method for preparing a paste filling body by using carbon dioxide. The paste filling body is composed of coal gangue, fly ash, cement, water and carbon dioxide. The mass concentration is 80 percent, the mass ratio of coal gangue to fly ash to cement is (8-12): (3-5): 1, and the preparation method comprises the following steps: when the pressure is greater than 7.5 MPa and the temperature is greater than 32 DEG C, carrying out carbonization reaction on coal gangue, fly ash, cement, water and high-concentration carbon dioxide in a pressure stirring barrel, preparing a standard test piece from paste filling bodies carbonized for 0.5 h, 1 h and 3 h, demolding after 24 h, and maintaining for 28 d, the optimal proportion of the paste filling body is finally obtained through a uniaxial compression test and phenolphthalein alcohol test solution detection, and according to the method for preparing the paste filling body through the carbon dioxide, the emission amount of the carbon dioxide can be reduced, the strength of the paste filling body can be improved, and the application range of the paste filling body is widened. And meanwhile, the requirements of mechanical strength and carbon dioxide absorption capacity are met, and wide applicability is achieved.

1st Main Claim

[MT] 1. A method for preparing a paste filling body using carbon dioxide, characterized in that the paste filling body is composed of coal gangue, fly ash, cement, with a mass concentration of 80 percent, and the mass ratio of coal gangue: Fly ash: Cement is 8-12:3-5:1.

Assignees: LIAONING TECHNICAL UNIV; UNIV LIAONING TECHNICAL



85. Family 95242300 (CN115521086 A)

[View in PatBase](#)

Title

[EN] METHOD FOR MINERALIZING CONCRETE CO₂

Abstract

[EN] The invention relates to a concrete CO₂ mineralization method, which comprises: preparing a premix: mixing fly ash or/and tailing sand to prepare a powdery premix, and carrying out silicic acid activation treatment to obtain the premix with a particle size of 10-100 [mu] m; preparing a CO₂ mineralization liquid: preparing a 25 percent ammonia water solution, and introducing flue gas containing CO₂ at room temperature for flue gas decarburization pretreatment to obtain the CO₂ mineralization liquid; catalyst preparation: mixing the premix and the CO₂ mineralization liquid, and obtaining the catalyst after the CO₂ in the ammonia water is fully absorbed and reacted; preparing concrete: using the catalyst as a raw material for preparing the concrete; according to the method disclosed by the invention, the fly ash and the tailing sand are used as raw materials and are subjected to silicic acid activation treatment, so that generated substances can react with CO₂ in the flue gas to realize mineralization of CO₂, the content of CO₂ in the industrial discharged flue gas is reduced, and application of a carbon dioxide trapping and sealing technology is realized.

1st Main Claim

[MT] 1. A method for the mineralization of concrete CO₂, comprising the steps of:

- A. preparation of premix: Mixing fly ash or/and tailings sand and preparing premix in a powdered state, subjected to silicic acid activation treatment to obtain a premix having a particle size of 10-100 micro m;
- B. Co₂Mineralization Solution preparation: A 25-mole aqueous ammonia solution was prepared with CO-containing solution at room temperature₂The flue gas is subjected to a flue gas decarburization pre-treatment, and CO is obtained₂Mineralizing liquids;
- C. Catalyst preparation: Premix, Co₂The mineralization solution is mixed with CO in ammonia₂Sufficiently absorbing the reaction to obtain a catalyst;
- D. preparation of concrete: The catalyst is used as a raw material for the preparation of concrete.

Assignees: SHANDONG HONGCHUANG CATALYST INTEGRATION UTILIZATION CO LTD

86. Family 95231060 (CN115521107 A)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE CURED REINFORCED CONCRETE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention relates to carbon dioxide cured reinforced concrete and a preparation method thereof. The concrete comprises the following components in parts by mass: 20-35 parts of low-calcium cement, 5-15 parts of recycled micro powder, 80-100 parts of coarse aggregate, 80-100 parts of fine aggregate, 15-20 parts of water, 0.2-1 part of a water reducing agent and 2-8 parts of a reinforcing-rust inhibiting double-effect agent. According to the invention, the early strength and process efficiency of reinforced concrete are improved, and after carbonization maintenance, the rust-inhibiting component is slowly released, so that the internal pH value is increased, and the risk of later steel bar corrosion is reduced; meanwhile, the recycled aggregate obtained by processing the construction waste is reasonably matched and used, on one hand, the absorption amount of carbon dioxide in the concrete in the curing process is increased, and on the other hand, solid waste such as the construction waste is effectively absorbed.

1st Main Claim

[MT] 1. A carbon dioxide-protected reinforced concrete comprising the following parts by mass of components: 20 to 35 parts by mass of low calcium cement, 5 to 15 parts by mass of regenerated micro-powder, 80 to 100 parts by mass of coarse aggregate, Fine aggregate 80:100 parts, water 15:20 parts, water reducing agent 0.2:1 part, and reinforcing-rust bieffective 2:8 parts.

Assignees: HUAXIN CEMENT CO LTD

87. Family 103809020 (CN118405896 A)

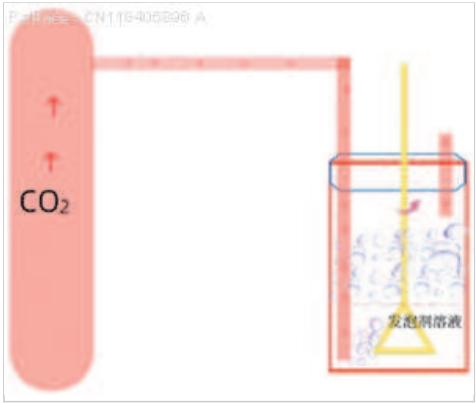
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Title

[EN] COAL-BASED SOLID WASTE FOAM CONCRETE FILLING MATERIAL TAKING CO₂ AS FOAMING GAS AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention discloses a coal-based solid waste foam concrete filling material taking CO₂ as foaming gas and a preparation method thereof. The filling material is formed by mixing CO₂ foam and a slurry material, adjusting the use amount of the CO₂ foam, so that the volume density of the filling material is 300-1500kg/m³; the slurry material is prepared from the following components in parts by weight: 13 to 74 parts of cement, 3 to 41 parts of coal-based solid waste, 0.025 to 1.4 parts of additive and 17 to 47 parts of water. CO₂ foam is prepared from a foaming agent, a foam stabilizer, water and carbon dioxide; preparing a slurry material from cement, the coal-based solid waste, an additive and water; the method comprises the following steps: uniformly mixing CO₂ foam and a slurry material to prepare concrete filling material slurry, pumping and filling the slurry into a goaf of a coal mine or a non-coal mine, and reacting and hardening to form a filling body with a supporting effect. The problems that an existing post-mining space filling material is low in carbon sequestration efficiency, not ideal in strength and the like can be solved.



1st Main Claim

[MT] In CO₂Coal-based solid waste foam concrete filler material for foaming gas, characterized by the fact that it is made of CO₂Blending of foam and slurry materials; CO₂The amount of foam is such that the bulk density of coal-based solid waste foam concrete filler material is 300 to 1500 kg/m.³Standard; the slurry material consists of 13 to 74 parts by weight of cement, 3 to 41 parts by weight of coal-based solid waste, 0.025 to 1.4 parts by weight of additive and 17 to 47 parts by weight of water.

Assignees: BEIJING CHINA COAL MINE ENG CO LTD; BEIJING CHINA COAL MINE ENG CO; BEIJING CHINA COAL MINE ENGINEERING CO LTD

88. Family 100055614 (CN117125942 A)

[View in PatBase](#)

Title

[EN] SEAWATER AND SEA SAND CONCRETE FOR CURING CARBON DIOXIDE AND PREPARATION METHOD OF SEAWATER AND SEA SAND CONCRETE

Abstract

[EN] The invention discloses seawater and sea sand concrete for curing carbon dioxide and a preparation method of the seawater and sea sand concrete. The seawater and sea sand concrete comprises the following components in parts by weight: 100-150 parts of Portland cement; 50 to 100 parts of seawater; 40 to 70 parts of sea sand; 30 to 45 parts of aggregate; 10-45 parts of a chlorine reduction material; 5-20 parts of an anti-cracking material; 2-6 parts of a thickening agent; 1-4 parts of a defoaming agent; 2-5 parts of a curing agent and 5-10 parts of a preservative. The seawater-sea sand concrete has the advantage of long service life, and solves the problems that the existing seawater-sea sand concrete has higher salt content and chlorine content, so that the fluidity of the concrete is increased, the strength is lower, the pouring and bearing capacity of the concrete are easily influenced, the seawater-sea sand concrete is easy to crack and corrode and damage when being applied to coastal areas, and the service life of the seawater-sea sand concrete is influenced. And the service life of the seawater and sea sand concrete is shortened.

1st Main Claim

[MT] 1. A carbon dioxide-cured seawater sea sand concrete, comprising, in parts by weight, the following components:

Portland cement 100-150 parts; seawater 50-100 parts; sea sand 40-70 parts; aggregate 30-45 parts; chlorine reducing material 10-45 parts; anti-cracking material 5-20 parts; thickener 2-6 parts; anti-foaming agent 1-4 parts; curing agent 2-5 parts; preservative 5-10 parts;

The diameter of sea sand is 1-5mm; aggregate is granite crushed stone, aggregate diameter is 4-16mm; chlorine reducing material is one of metakaolin and fly ash; anti-cracking material is polypropylene fiber; preservative is isobutyltriethoxysilane; thickener is sodium polyacrylate.

Assignees: QINGDAO CNQC NEW MAT GROUP CO LTD

89. Family 101602041 (JP2024032184 A2)

[View in PatBase](#)

Title

[EN] ACTIVATION METHOD, CARBON DIOXIDE ABSORPTION METHOD, CEMENT COMPOSITION PRODUCTION METHOD, MORTAR COMPOSITION PRODUCTION METHOD, CONCRETE PRODUCTION METHOD, AND PRECAST CONCRETE PRODUCTION METHOD

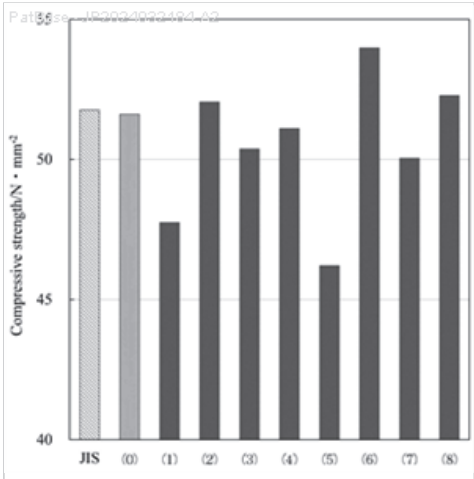
Abstract

[EN] To provide a method of activating sewage sludge incineration ash so that a larger amount of the ash can be used as a material to be mixed in concrete.SOLUTION: The method of activating sewage sludge incineration ash comprises mixing water, sand, and a saturated calcium hydroxide solution with sewage sludge incineration ash and carrying out ball mill mixing using a rotary frame, in which: balls having a density higher than a specific density, for example, a density higher than a zirconia ball are used; a plurality of zirconia balls each having a different diameter are used; the rotation speed of the rotary frame is from 30 to 50 rpm; 25 to 200 percent of water, 40 to 80 percent of sand and 20 to 80 percent of the saturated calcium hydroxide solution relative to the mass of the sewage sludge incineration ash are mixed; and the ball mill mixing is carried out for a period of 1 to 5 hours.SELECTED DRAWING: Figure 3

1st Main Claim

[MT] 1. A method for activating sewage sludge incineration ash, comprising: Mixing the sewage sludge incineration ash with water, sand, and saturated calcium hydroxide solution, An activation method comprising: Performing ball milling using a rotating frame with balls having a density greater than or equal to a specific density.

Assignees: NIPPON HUME CORP



90. Family 65272314 (KR20170032930 A)

[View in PatBase](#)

Title

[EN] A COMPOSITION OF CEMENTITIOUS BINDER WITH PROPERTIES OF LOW CO2 EMISSION STEAM CURING CONCRETE COMPRISING THE SAME

Abstract

[EN] The present invention relates to a low-carbon cement binder composition and steam curing concrete including the low-carbon cement binder composition. The low-carbon cement binder composition includes general Portland cement, a calcium aluminate compound, and granulated blast furnace slag. The present invention includes a steam curing process applied so that early hydration is promoted with the granulated blast furnace slag as a latent hydraulic material and the calcium aluminate compound promoting granulated blast furnace slag activation used in part in the general Portland cement generally used in concrete. Accordingly, the present invention is capable of reducing the use of general Portland cement during concrete product manufacturing and contributing to carbon dioxide emission reduction by reducing the use of the general Portland cement.

1st Main Claim

[MT] 1. usually 10 to 40 weight percent; Portland cement and slag Crusher with 40 to 60 weight percent; 20-30 weight percent inorganic joinery; will, which consists of the combined low-carbon cement ash composition

Assignees: SUNGJO CO LTD

91. Family 28104303 (US6264736 BA)

[View in PatBase](#)

Title

[EN] PRESSURE-ASSISTED MOLDING AND CARBONATION OF CEMENTITIOUS MATERIALS

Abstract

[EN] A method is disclosed for rapidly carbonating large cement structures, by forming and hardening cement in a mold under high carbon dioxide density, such as supercritical or near-supercritical conditions. The method is more reliable, efficient, and effective than are post-molding treatments with high-pressure CO₂. Cements molded in the presence of high-pressure CO₂ are significantly denser than otherwise comparable cements having no CO₂ treatment, and are also significantly denser than otherwise comparable cements treated with CO₂ after hardening. Bulk carbonation of cementitious materials produces several beneficial effects, including reducing permeability of the cement, increasing its compressive strength, and reducing its pH. These effects are produced rapidly, and extend throughout the bulk of the cement--they are not limited to a surface layer, as are prior methods of post-hardening CO₂ treatment. The method may be used with any cement or concrete composition, including those made with waste products such as fly ash or cement slag. Surface carbonation is almost instantaneous, and bulk carbonation deep into a form is rapid. By combining molding, curing, and carbonation into a single step, carbon dioxide is better distributed throughout the entire specimen or form, producing a uniform product.

1st Main Claim

[EN] 1. A process for making a carbonated cement, comprising the steps of:(a) placing an uncured cement comprising hydroxides of calcium into a gas-tight compartment that contains the entire uncured cement; (b) reacting the uncured cement with carbon dioxide that is introduced into the gas-tight compartment at a pressure of at least about 400 psi, until at least about 50 percent of the hydroxides of calcium have been converted to calcium carbonate; wherein the ratio of the mass of introduced carbon dioxide to the mass of the uncured cement prior to introduction of the carbon dioxide is at least about 0.08; and (c) curing the cement to form a hardened cement paste.

Assignees: UNIV LOUISIANA STATE

92. Family 46698761 (CN101806118 A)

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Title

[EN] HOLLOW SEA SAND CONCRETE COMPONENT AND PREPARATION METHOD

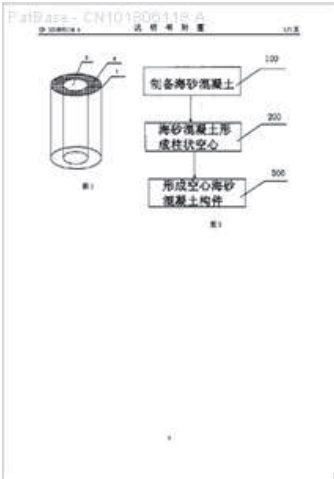
Abstract

[EN] The invention relates to a hollow sea sand concrete component, which comprises cement, water and sea sand, wherein the sea sand serves as concrete aggregate and is mixed with the cement and the water in certain proportion to form sea sand concrete. The hollow sea sand concrete component also comprises a columnar substrate which accommodates the sea sand concrete, wherein the sea sand concrete is poured into the columnar substrate to form a cylindrical hollow core attached to the inner wall of the columnar substrate, and is reacted with carbon dioxide to form the hollow sea sand concrete component after being formed in the columnar substrate. The sea sand concrete component of the invention is formed by reacting the sea sand concrete with the carbon dioxide, and the carbon dioxide and a hydration product calcium hydroxide of the cement undergo reaction to produce calcium carbonate which can improve a contact interface of the sea sand concrete aggregate and the cement paste, enhance the strength of the concrete and reduce holes of the concrete, so the durability of the sea sand concrete component is improved.

1st Main Claim

[MT] CN 1. one kind of sea sand hollow concrete elements, including cement, water and sea sand, the sea sand as concrete aggregate and cement, water formed by a certain percentage of sea sand mixed concrete, further comprising receiving The cylindrical base body of concrete sea sand, sea sand concrete poured into the column of the matrix is formed in the inner wall of the cylindrical hollow pillar-shaped paste matrix, the sea sand in the concrete forming the pillar-shaped matrix after the After the formation of hollow concrete elements of sea sand sea sand concrete reaction with carbon dioxide gas.

Assignees: HARBIN INST TECH SHENZHEN GRAD; HARBIN INST TECHNOLOGY SHENZHEN GRADUATE SCHOOL



93. Family 107570045 (CN119797840 A)

[View in PatBase](#)

Title

[EN] ALKALI RESIDUE-COAL GANGUE BASED CARBON DIOXIDE CARBONIZED COAL GANGUE CONCRETE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention discloses carbon dioxide and carbonized coal gangue concrete based on alkaline residue-coal gangue, and the carbonized coal gangue concrete comprises the following raw materials in percentage by mass: 10-20 percent of alkaline residue, 20-40 percent of coal gangue, 40-60 percent of cement, 5-15 percent of calcium sulfate and 5-15 percent of deionized water, and the total mass is 100 percent. The coal gangue has the effect of improving the strength; the effect of reducing the shrinkage rate is achieved. The preparation method comprises the following steps: 1, pretreating the raw materials; 2, preparation of coal gangue concrete slurry; 3, marking and curing the coal gangue concrete slurry; and 4, carbon dioxide carbonization of the coal gangue concrete. When the coal gangue concrete is applied as carbonized coal gangue concrete and the adding amount of the coal gangue accounts for 33 percent of the total mass, the chloride ion electric flux is 1150-1250 Coulombs, the compressive strength is 75.5-76.5 MPa, and the drying shrinkage rate is $1.20-1.30 \times 10^{-3}$.

1st Main Claim

[MT] 1. A carbon dioxide carbonized coal gangue concrete based on alkali slag-coal gangue, characterized in that the raw materials and their mass percentages of the carbonized coal gangue concrete are: alkali slag: 10-20 percent, coal gangue: 20-40 percent, cement: 40-60 percent, calcium sulfate: 5-15 percent, deionized water: 5-15 percent, and the total mass is 100 percent;

The cement is 42.5 grade ordinary Portland cement;

The coal gangue has the function of increasing strength and reducing shrinkage.

Assignees: GUILIN UNIV OF ELECTRONIC TECHNOLOGY; UNIV GUILIN ELECTRONIC TECH

94. Family 97957545 (CN116352876 A)

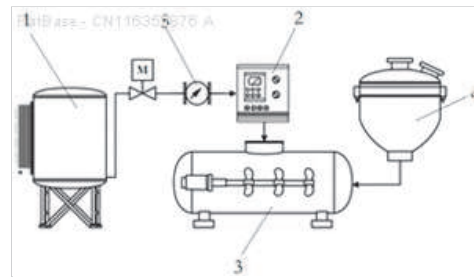
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Title

[EN] CO₂-DOPED LOW-CARBON PREMIXED CONCRETE PRODUCTION PROCESS AND PREPARATION DEVICE

Abstract

[EN] The invention provides a CO₂-doped low-carbon premixed concrete production process and a preparation device. The CO₂-doped low-carbon premixed concrete production process comprises the following steps: S1, performing reduced-pressure phase splitting on low-temperature liquid CO₂; S2, uniformly mixing aggregate, cement, an auxiliary cementing material and a carbonation aid according to a certain water-binder ratio to obtain premixed concrete; and S3, introducing CO₂ after phase splitting into the premixed concrete, and continuously stirring for a certain time to obtain the low-carbon premixed concrete. According to the invention, CO₂ is used for doping the premixed concrete containing the aggregate from the industrial waste solid, the process is simple, the reaction time is shortened, and the compressive strength of the finished product is improved.



1st Main Claim

[MT] 1. A doped CO₂ Of low-carbon ready-mix concrete production process, characterized in that it comprises the following steps:

S1, for low temperature liquid CO₂ Performing phase separation under reduced pressure;

S2, the aggregate, cement, auxiliary gelling material and carbonation aid are mixed uniformly in a certain hydrogel ratio to obtain premixed concrete;

S3, the premixed concrete through CO₂ After stirring continuously for a certain time, low-carbon premixed concrete is obtained.

Assignees: QINGPULING CARBON BEIJING TECH CO LTD

95. Family 46692198 (CN101806116 A)

[View in PatBase](#)

Title

[EN] HOLLOW RECYCLED CONCRETE COMPONENT AND PREPARATION METHOD

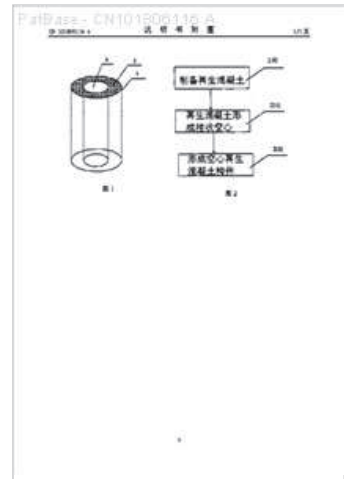
Abstract

[EN] The invention relates to a hollow recycled concrete component, which comprises concrete aggregate formed by fragmenting waste concrete, cement, water and a columnar substrate, wherein the cement and the water are stirred and mixed with the concrete aggregate formed by fragmenting the waste concrete to form recycled concrete; the columnar substrate accommodates the recycled concrete; and the recycled concrete is poured into the columnar substrate to form a cylindrical hollow core attached to the inner wall of the columnar substrate, and is reacted with carbon dioxide to form the hollow recycled concrete component after being formed in the columnar substrate. The recycled concrete component of the invention is formed by reacting the recycled concrete with the carbon dioxide, and the carbon dioxide and a hydration product calcium hydroxide of the cement undergo reaction to produce calcium carbonate which can improve a contact interface of the waste concrete aggregate and the cement paste, enhance the strength of the concrete and reduce holes of the concrete, so the durability of the concrete is improved.

1st Main Claim

[MT] CN 1. A recycled concrete hollow member comprises shredding waste concrete after the formation of concrete aggregate, cement, water, cement, water and aggregate from the concrete after the formation of waste concrete shredding stirring mixture of recycled concrete form to accommodate the concrete column matrix regeneration, the recycled concrete poured into the columnar matrix form attached to the inner wall of the cylindrical hollow cylindrical substrate, forming the recycled concrete pillar in the matrix after, will form a hollow concrete recycled concrete elements react with carbon dioxide after the regeneration.

Assignees: HARBIN INST TECH SHENZHEN GRAD; HARBIN INST TECHNOLOGY SHENZHEN GRADUATE SCHOOL



96. Family 92491918 (CN114773001 A)

[View in PatBase](#)

Title

[EN] FILLING MATERIAL CAPABLE OF ABSORBING CARBON DIOXIDE AND PREPARATION METHOD THEREOF

Abstract

[EN] The invention relates to a filling material capable of absorbing carbon dioxide and a preparation method thereof. The technical problem that an existing cemented filling body does not have the carbon dioxide absorption capacity is mainly solved. According to the technical scheme, the filling material capable of absorbing carbon dioxide is composed of fly ash, cement and basalt, and the mass ratio of the cement to the fly ash to the basalt is 1: (2-4): (8-20). The preparation method comprises the following steps: (1) firstly, selecting basalt with high contents of calcium oxide, magnesium oxide and ferrous oxide and the content of other elements close to the content of elements contained in the coal gangue; 2) testing the carbon dioxide absorption capacity of the selected basalt; 3) preparing materials in different proportions; 4) preparing cemented filling bodies with different proportions and capable of absorbing carbon dioxide, and curing; and 5) carrying out a mechanical strength test on the cured cemented filling body, and if the test result meets the mechanical strength required by engineering, determining that the ratio of the cemented filling body is the ratio of the prepared filling material.

1st Main Claim

[MT] 1. A carbon dioxide-absorbing filler material, characterized in that it consists of fly ash, cement and basalt, said cement: fly ash: basalt mass ratio being 1: 2-4: 8-20.

Assignees: TAIYUAN UNIV OF TECHNOLOGY; UNIV TAIYUAN TECHNOLOGY

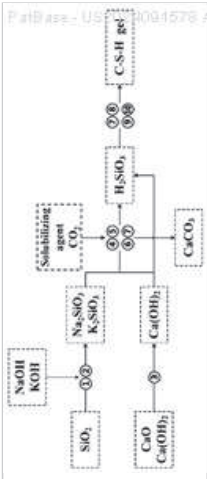
97. Family 94444294 (US2024091578 AA)

[View in PatBase](#)

Title
[EN] FLY ASH-BASED FIRE-PREVENTION AND EXTINGUISHING MATERIAL WITH CARBON DIOXIDE MINERALIZED AND STORED, AND PREPARATION METHOD THEREOF

Abstract
[EN] A fly ash-based fire-prevention and extinguishing material with carbon dioxide mineralized and stored, and a preparation method thereof are provided. The preparation method includes: separately weighing 100 parts to 120 parts of water, 1 part to 3 parts of a solid strong alkali, and 20 parts to 40 parts of a fly ash as raw materials, pouring the raw materials into a reactor successively to obtain a resulting mixture, and stirring the resulting mixture at a high rotational speed; adding 10 parts to 20 parts of a solubilizing agent to the reactor, sealing the reactor, introducing carbon dioxide to the reactor at room temperature to maintain a carbon dioxide pressure to obtain a resulting slurry, and stirring the resulting slurry at a high rotational speed; and further introducing carbon dioxide into the reactor to increase the carbon dioxide pressure, and stirring the resulting slurry at a low rotational speed.

1st Main Claim
[EN] 1. A preparation method of a fly ash-based fire-prevention and extinguishing material with carbon dioxide mineralized and stored, comprising the following steps:
step 1: separately weighing 100 parts to 120 parts of water, 1 part to 3 parts of a solid strong alkali, and 20 parts to 40 parts of a fly ash as raw materials, pouring the raw materials into a reactor successively to obtain a resulting mixture, and stirring the resulting mixture at a rotational speed of 600 rpm to 1,200 rpm for 3 min to 5 min, wherein a mass of an ash with a particle size less than or equal to 100 micro m in the fly ash accounts for 80 percent or more of a total mass of the fly ash; and in the fly ash, a silica content is 30 percent or more and a calcium oxide content is 10 percent or more;
step 2: adding 10 parts to 20 parts of a solubilizing agent to the reactor, sealing the reactor, introducing carbon dioxide into the reactor at room temperature to maintain a carbon dioxide pressure in the reactor at 1 bar to 3 bar to obtain a first resulting slurry, and stirring the first resulting slurry at a rotational speed of 600 rpm to 1,200 rpm for 3 min to 5 min, wherein the solubilizing agent is one or more selected from a group consisting of polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monolaurate sorbate, polyoxyethylene laurate, polyglyceryl fatty acid ester, fatty alcohol polyoxyethylene ether, and polyoxyethylene-polyoxypropylene block copolymer, and a concentration of the solubilizing agent is 3 wt percent; and
step 3: further introducing the carbon dioxide into the reactor to allow the carbon dioxide pressure in the reactor to reach 10 bar or more to obtain a second resulting slurry, and stirring the second resulting slurry at a rotational speed of 60 rpm to 100 rpm for 10 min to 15 min to obtain the fly ash-based fire-prevention and extinguishing material with the carbon dioxide mineralized and stored.



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

98. Family 62977151 (KR101642039 B1)

[View in PatBase](#)

Title

[EN] A COMPOSITE OF ECO-FRIENDLY BINDING MATERIALS WITH LOW CO₂ EMISSION PROPERTY BY USING WASTE RESOURCES, STEAM CURED CEMENT MORTAR AND STEM CURED CONCRETE COMPOSITE COMPRISING THE SAME

Abstract

[EN] The present invention provides an eco-friendly low CO₂ binder composition using waste resources and cement mortar and a concrete composition for steam curing, including the same, which improve compressive strength of a product group of steam cured concrete while improving field applicability, and remarkably reduce an amount of carbon dioxide emission in a manufacturing stage. The eco-friendly low CO₂ binder composition using the waste resources according to the present invention includes: based on a total weight of the binder composition, (a) 20-50 wt percent of ground blast furnace slag; (b) 20-50 wt percent of a modified cement admixture; (c) 15-30 wt percent of fly ash; (d) 10-30 wt percent of an incinerated material manufactured by incinerating at least one selected from sewage sludge, dyeing sludge, and domestic waste water sludge; 5-20 wt percent of neutralizing plaster; and (f) 0-5 wt percent of a dispersant, wherein the (b) modified cement admixture is an admixture of 70-90 wt percent of commercial ordinary Portland cement and 10-30 wt percent of 3CaO·Al₂O₃.

1st Main Claim

[MT] 1. With respect to the binder total weight of the composition, (a) 20 to 50 percent by weight of granulated blast furnace slag; (B) modified cement mixture 20 to 50 percent by weight; (C) fly ash 15 to 30 percent by weight; (D) 10 to 30 percent by weight of bottom ash produced by burning at least one member selected from the sewage sludge, sludge dyeing, and living waste water sludges; (E) neutralization gypsum 5 to 20 wt percent; (F) 0 to 5 percent by weight of a dispersing agent; Consists of, (b) the modified cement mixture is ordinary Portland cement 70 to 90 percent by weight and 3 Calcium oxide is commercially available, one of aluminum oxide (3CaO · Al₂O₃) 10 to 30 low-carbon eco steam curing the binder composition for using waste materials as characterized in that a mixture of percent by weight.

Assignees: ECOPLUS CO LTD

99. Family 58597195 (KR101498235 B1)

[View in PatBase](#)

Title

[EN] CORROSION INHIBITION SURFACE COATING COMPOSITION IN CONTAIN OF CALCIUM HYDROXIDE AND PERFORMANCE OF CORROSION AND FIXING CARBON DIOXIDE AND CHLORINE ION IN REINFORCED CONCRETE STRUCTURE

Abstract

[EN] The present invention is to provide an anticorrosive surface coating composition for containing calcium hydroxide in quantity, securing anticorrosive properties, and fixing carbon dioxide and chlorine of a reinforced concrete structure. The anticorrosive surface coating composition is spread on the surface of the reinforced concrete structure, and comprises special cement mortar powder, SBR latex, an organic anticorrosive agent, and water. Also, the composition can be used for a construction method for inhibiting corrosion of an iron bar or damage from sea wind and neutralization of the reinforced concrete structure which can be corroded due to damage from sea wind, neutralization, or complex phenomena of damage from sea wind and neutralization of the reinforced concrete structure.

1st Main Claim

[MT] 1. In the rust-inhibitive surface coating material for coating the surface of the reinforced concrete structures, special cement mortar powder, SBR latex, organic amino alcohol derivative and 77-80 percent by weight of sodium hydroxide (NaOH) aqueous solution of 15-18 percent by weight of the silane-based 2-5 weight percent in mixed organic corrosion inhibitors, and that comprises a water feature with a reinforced concrete structures containing large amounts of calcium hydroxide, ensuring protection against rust, carbon dioxide fixation, and anti-corrosive surface coating material that is fixed in the coat.

Assignees: B AND B CO LTD; UNIV SOGANG IND UNIV COOP FOUN; KUNHWA CO LTD; DOHWA ENGINEERING CO LTD; KOREA CONSTRUCTION QUALITY RES CT; COOPERATION FOUNDATION HANYANG ERICA CAMPUS IND UNIV

100. Family 69251120 (WO18151526 A1)

[View in PatBase](#)

Title

[EN] METHOD FOR PREPARING COMPOSITE CALCIUM CARBONATE THROUGH SOLUBILIZATION OF CARBON DIOXIDE OF COAL ASH FROM CIRCULATING FLUIDIZED BED POWER PLANT AND COMPOSITE CALCIUM CARBONATE PREPARED THEREBY

Abstract

[EN] An embodiment of the present invention provides a method for preparing composite calcium carbonate through the solubilization of carbon dioxide of coal ash from a circulating fluidized bed power plant, the method comprising the steps of: immersing coal ash, generated from the circulating fluidized bed power plant, in water to prepare a mixture (step 1); injecting carbon dioxide into the prepared mixture to form calcium oxide in the coal ash into calcium carbonate (step 2); and subjecting the mixture, which has calcium carbonate formed therein, to solid-liquid separation (step 3).

1st Main Claim

[MT] Circulating Fluidized bed power plant that is generated from the power generation times (ash) is immersed in the water to step (step 1) for preparing a mixture

by injecting the carbon dioxide in the resulting mixture of calcium oxide in the development times (step 2) to form a calcium carbonate, a

mixture of calcium carbonate and solid-liquid separation step is formed (step 3); including a circulating fluidized bed power plant generation conference method through the employed carbon dioxide composite calcium carbonate

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



101. Family 65427715 (KR101725519 B1)

[View in PatBase](#)

Title

[EN] NON-CEMENT FILLER FOR RECYCLED COLD ASPHALT CONCRETE IN THE ABSORPTION OF CARBON DIOXIDE AND MANUFACTURING METHOD THEREOF

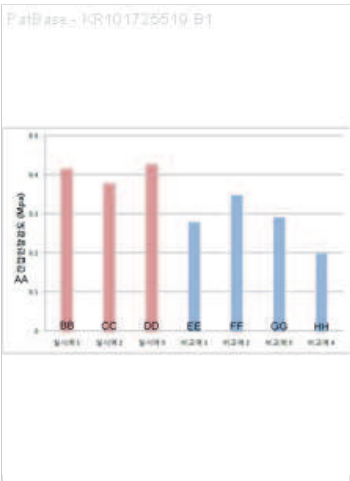
Abstract

[EN] The present invention relates to a non-cement additive composition for manufacturing of a room temperature-curing recycled asphalt mixture having a carbon dioxide absorption effect. According to the present invention, early cracking of and damage to a paved road can be prevented during room temperature-curing recycled asphalt concrete work using a room temperature-curing recycled asphalt non-cement additive composition containing no cement. In addition, carbon dioxide, which is generated in quantity during cement production, can be reduced based on a reduced cement use. Furthermore, the present invention is environment-friendly and capable of performing carbon dioxide absorption based on reforming of blast furnace slag included in the additive composition. The present invention contains no cement in asphalt concrete used for road pavement, and thus it is capable of preventing cracking of and damage to the paved road attributable to the characteristics of cement. In addition, the blast furnace slag that is an industrial byproduct is contained instead of cement in the additive composition, and thus resources recycling and environmental friendliness can be achieved.

1st Main Claim

[MT] 1. blast furnace slag 100 weight Division; The above as a slag hydraulic (hydraulic property) activate enable 21st-39 basic weight Division; And hardener part 6-14 weight; including cement does not include the effect of the absorption of carbon dioxide, which is characterized by a mixture of recycled asphalt manufacturing non-curable at room temperature cement system additive composition.

Assignees: KOREA INST OF CIVIL ENG AND BUILDING TECH; IND ACAD COOP FOUND OF SEJONG UNIV; KOREA INST CIVIL ENGINEERING AND BUILDING TECHNOLOGY; UNIV SEJONG IND ACAD COOP FOUND; ACADEMIA COOPERATION GROUP OF SEJONG UNIV IND; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY KICT



102. Family 85912483 (KR20210086742 A)

[View in PatBase](#)

Title

[EN] CARBON DIOXIDE REDUCED CEMENT AND CONCRETE COMPOSITION FOR PRECAST BY USING SLAG AND EARLY STRENGTH ADMIXTURE AND PRODUCTION METHODS THEREOF

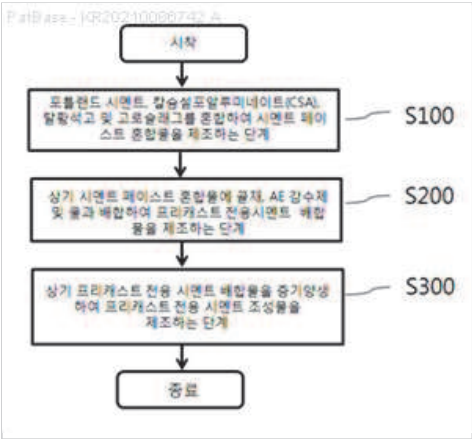
Abstract

[EN] In order to solve the problems of the prior art, the present invention provides a precast-only cement composition that can bring about the high carbon dioxide emission reduction effect of existing general cement compositions; and a carbon dioxide reduction-type precast-only cement composition and concrete by improving the compressive strength and drying shrinkage equivalent to that of conventional products with concrete. In addition, the present invention provides a carbon dioxide reduction-type precast-only cement composition and a method for producing concrete, wherein compressive strength through the alkali stimulation effect of blast furnace slag by using CSA as a mixture of blast furnace slag and high early strength, an industrial by-product generated when iron ore and limestone as raw materials in blast furnaces in the iron and steel industry that can bring compensation.

1st Main Claim

[MT] 1. Portland cement (OPC), blast furnace slag, calcium sulfo aluminate (CSA) and desulfurization gypsum is characterized in that it comprises a reduced precast dedicated cement composition to carbon dioxide.

Assignees: HANIL CEMENT CO LTD



103. Family 105186264 (JP2024158502 A2)

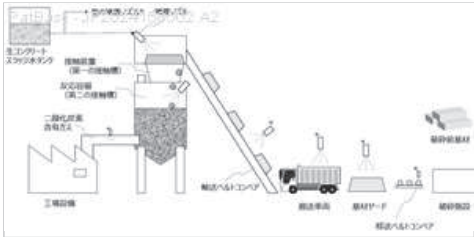
[View in PatBase](#)

Title

[EN] METHOD FOR PRODUCING ROADBED MATERIAL AND APPARATUS FOR PRODUCING ROADBED MATERIAL AND METHOD FOR RECOVERING CARBON DIOXIDE

Abstract

[EN] To provide a method and an apparatus for producing a roadbed material by a simple operation, which is highly versatile in that it can be applied to a wide variety of materials, and a method for recovering carbon dioxide.SOLUTION: The method for producing a roadbed material comprises a first contacting step in which sludge water of a ready-mixed concrete and a base material are contacted to obtain a contained component containing the sludge water of a ready-mixed concrete and the base material, and a second contacting step in which the contained component and carbon dioxide-containing gas are contacted to obtain a roadbed material containing the base material and calcium carbonate. An apparatus for producing the roadbed material comprises a contacting device with which the first contacting step is performed, and a reaction vessel with which the second contacting step is performed, and a method of recovering carbon dioxide comprises the first contacting step and the second contacting step.SELECTED DRAWING: None



1st Main Claim

[MT] 1. A method for producing a base material, comprising: A first contact step of obtaining a content containing ready-mixed concrete sludge water and a base material by contacting the ready-mixed concrete sludge water with the base material; and a second contact step of obtaining a base material containing calcium carbonate and the base material by contacting the content with a carbon dioxide-containing gas, A method of manufacturing a subgrade material.

Assignees: SUMITOMO OSAKA CEMENT CO LTD; MAEDA ROAD CONSTRUCTION CO LTD

104. Family 73789109 (KR101964386 B1)

[View in PatBase](#)

Title

[EN] COMPOSITE OF ECO-FRIENDLY BINDING MATERIALS WITH LOW CO₂ EMISSION PROPERTY FOR MANUFACTURING MARINE CONCRETE AND MARINE CONCRETE STRUCTURE WITH EPIPHYTIC PROPERTY OF MARINE PLANTS

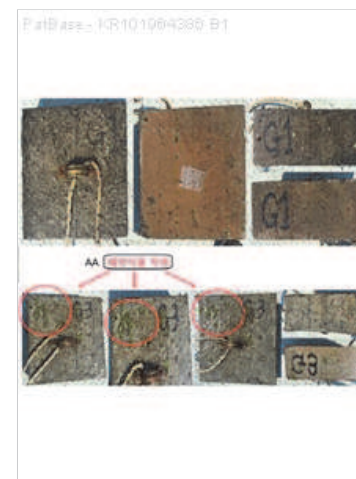
Abstract

[EN] The present invention provides an eco-friendly low carbon binding material composition for marine concrete and a marine concrete structure manufactured thereby, wherein the composition comprises 2-5 wt percent of one or more selected from a group consisting of: 10-30 wt percent of cement; 20-50 wt percent of blast furnace slag; 15-30 wt percent of fluidized-bed boiler fly ash; 5-20 wt percent of incineration ash; 3-15 wt percent of sodium sulfate; 5-15 percent of a calcium aluminate compound; 4-20 wt percent of neutralized gypsum; and molasses and fructan. According to the present invention, the eco-friendly low carbon binding material composition for marine concrete can remarkably reduce carbon dioxide emissions and can avoid causing efflorescence in the sea. In addition, the marine concrete structure manufactured by the eco-friendly low carbon binding material composition for marine concrete can provide desirable effects to ocean environment maintenance by helping marine plants to be implanted.

1st Main Claim

[MT] 1. Blast furnace slag from 20 to 50% by weight may chain fluidized bed boiler fly ash 20 to 40% by weight on the spent catalyst reduction from 20 to 40% by weight slag 4 to 15% by weight of sodium sulfate, and 4 to 20 weight percent of fossil fuels and fructose and molasses, at least one member selected from the group consisting of 2 to 5% by weight; includes, the spent catalyst Ni-mo-v spent catalyst reduction slag after pretreatment at 600 degrees Celsius 400 to melt mixture of coke again, characterized in that the reduction in the low-carbon binder composition environmentally friendly marine concrete.

Assignees: WOO SUNG IND CO LTD; ECOPLUS CO LTD



105. Family 108341979 (CN120117861 A)

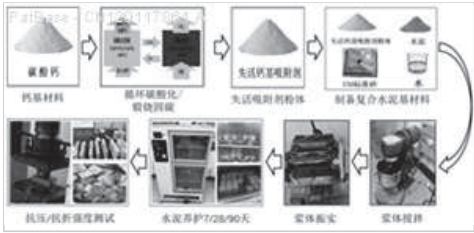
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Title

[MT] A METHOD FOR PREPARING LOW-CARBON/NEGATIVE-CARBON BUILDING MATERIALS BY PARTIALLY REPLACING CEMENT WITH A DEACTIVATED CALCIUM-BASED CO₂ ADSORBENT

Abstract

[MT] [0001] The present invention relates to the technical field of low-carbon building material preparation, and specifically, to a method for preparing low-carbon/negative carbon building materials by partially replacing cement with a deactivated calcium-based CO₂ adsorbent. The method comprises the following steps: S1, using a calcium-based CO₂ adsorbent to cyclically capture CO₂, and the adsorbent is deactivated after multiple cycles; S2, using a deactivated calcium-based adsorbent to partially replace cement to prepare mortar building materials. Since the adsorbent captures a large amount of CO₂ in a cycle before deactivation, it has negative carbon properties. The present invention uses cement with high carbon emissions partially using a deactivated adsorbent to prepare cement-based building materials with extremely low or even negative carbon footprints. It provides a solution to the problem of disposing of large quantities of deactivated adsorbents generated after large-scale commercial use of calcium cycle carbon capture technology.



1st Main Claim

[MT] 1. A method for preparing low-carbon/negative-carbon building materials by partially replacing cement with a deactivated calcium-based CO₂ adsorbent, characterized in that it comprises the following steps:

S1. The calcium-based CO₂ adsorbent is used to cyclically capture and enrich CO₂ in the flue gas of fossil fuel combustion. After multiple cycles, the activity of the calcium-based adsorbent declines, and the adsorbent whose carbon fixation performance cannot meet the requirements is a deactivated adsorbent;

S2. The deactivated adsorbent is further crushed to obtain deactivated adsorbent powder, and the deactivated adsorbent is used to replace part of the cement, and then the deactivated adsorbent powder, cement, sand and water are mixed to obtain a composite cement mortar building material.

Assignees: ANHUI JIANZHU UNIV

106. Family 53007439 (US2013036945 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] 1. A method for producing a formed building material comprising: a) producing a CO₂-sequestering component from a saltwater solution of divalent cations and a gaseous waste stream comprising CO₂; and b) forming the formed building material from the CO₂-sequestering component in a process comprising contacting the CO₂-sequestering component with freshwater, 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: CALERA CORP



107. Family 107615744 (CN119822667 A)

[View in PatBase](#)

Title

[EN] CO₂ ANTICORROSIVE AGENT, CO₂-CORROSION-RESISTANT SELF-REPAIRING CEMENT SLURRY SYSTEM AND PREPARATION METHOD AND APPLICATION OF CO₂-CORROSION-RESISTANT SELF-REPAIRING CEMENT SLURRY SYSTEM

Abstract

[EN] The invention provides a CO₂ anticorrosive agent, an anti-CO₂-corrosion self-repairing cement slurry system and a preparation method and application of the anti-CO₂-corrosion self-repairing cement slurry system. The CO₂ anticorrosive agent is prepared from the following components in parts by weight: 43 to 47 parts of calcite, 35 to 38 parts of calcium carbonate whisker and 15 to 22 parts of nano silicon dioxide. The CO₂ corrosion resistant self-repairing cement paste system is prepared from the following components: 46 to 62 parts of G-grade oil well cement, 30 to 37 parts of superfine fly ash, 8 to 17 parts of phosphoaluminate cement, 4 to 6 parts of a CO₂ self-repairing agent, 5 to 10 parts of a CO₂ anticorrosive agent, 0.4 to 0.8 part of a fluid loss agent, 0.2 to 0.5 part of a dispersing agent, 0.05 to 0.10 part of a retarder, 0.05 to 0.10 part of a de-foaming agent and water. The CO₂ corrosion resistant self-repairing cement slurry system not only has good CO₂ corrosion resistance, but also has a sensitive CO₂ response repairing function.

1st Main Claim

[MT] 1. A CO₂ anticorrosive agent, which comprises, by weight, 43-47 parts of calcite, 35-38 parts of calcium carbonate whiskers, and 15-22 parts of nano-silicon dioxide.

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

108. Family 102777137 (CN118063176 A)

[View in PatBase](#)

Title

[EN] SUPER-STABLE CO₂ FOAM CONCRETE AS WELL AS PREPARATION METHOD AND APPLICATION THEREOF

Abstract

[EN] The invention discloses ultra-stable CO₂ foam concrete as well as a preparation method and application thereof, and belongs to the technical field of building materials. The preparation method of the CO₂ foam concrete comprises the following steps: mixing a foaming agent with a nano foam stabilizer, and then dissolving the mixture in a calcium hydroxide solution to prepare a foaming solution; the preparation method comprises the following steps: uniformly mixing and stirring red mud, lime and deionized water, sequentially adding slag powder, cement and fly ash, and uniformly stirring to obtain a red mud mixture; preparing foams by using the foaming liquid, and then introducing the foams into the red mud mixture to obtain the CO₂ foam concrete. In the invention, the reaction product of the calcium hydroxide solution and CO₂ bubbles can significantly improve the stability of CO₂ foam, and the red mud and lime can adjust the setting and hardening rate of a matrix, so that the stability reduction of the CO₂ foam and the solidification enhancement of a cementing material matrix are finally dynamically balanced, and the stability, strength and thermal insulation performance of the CO₂ foam concrete are significantly improved.

1st Main Claim

[MT] A CO₂Process for the preparation of foamed concrete, characterized in that the steps are as follows:

The blowing agent is mixed with a nanostabilizing agent, and then the mixture is dissolved in a calcium hydroxide solution to prepare a blowing liquid; red mud, lime and deionized water are mixed and stirred uniformly, and then slag powder, cement, fly ash are added sequentially, and mixed uniformly, Obtain a red mud mixture; prepare the foam using a foaming liquid and introduce the foam into the red mud mixture to obtain CO₂Foam concrete.

Assignees: UNIV YANTAI; YANTAI UNIV

109. Family 56646866 (KR20140070781 A)

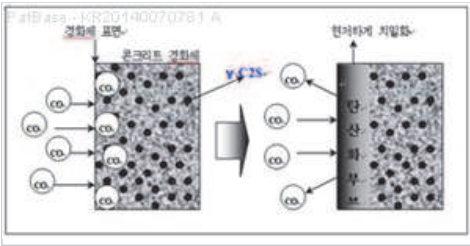
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Title

[EN] BLENDED CEMENT MIXTURES WITH SHRINKAGE COMPENSATION AND CO2 ABSORPTION

Abstract

[EN] Disclosed is blended cement with initial shrinkage compensation and CO2 absorption effects. The present invention provides a blended cement composition with shrinkage compensation and CO2 absorption effects which comprises: (a) 40-60 wt percent of Portland-based cement; (b) 20-40 wt percent of blast slag furnace; (c) 5-20 wt percent of fly ash; (d) 5-15 wt percent of sulfate; and (e) 4-20 wt percent of gamma-Ca2SiO4. The present invention is effective in preventing shrinkage crack of a concrete structure located under a poor dry environment, and drastically enhances CO2 absorption effects and concrete surface wear resistance on paved concrete directly exposed to usage environment because the surface texture of concrete becomes dense.



1st Main Claim

[MT] 1. (B) (a) 40 to 60% by weight Portland-based cement, blast furnace slag, 20 to 40% by weight; (c) 5 to 20 parts by weight of fly ash; (d) 5 to 15% by weight sulfate; and (e) 4 to 20% by weight of -CA2SiO4 γ is characterized in that it comprises a CO2 absorption function having a shrinkage compensation and mixing cement composition.

Assignees: SSANGYONG CEMENT IND CO LTD

110. Family 64049789 (US2016340261 AA)

[View in PatBase](#)

Title (EP3297973 A1)

[EN] LIGHTWEIGHT COMPOSITE MATERIALS PRODUCED FROM CARBONATABLE CALCIUM SILICATE AND METHODS THEREOF

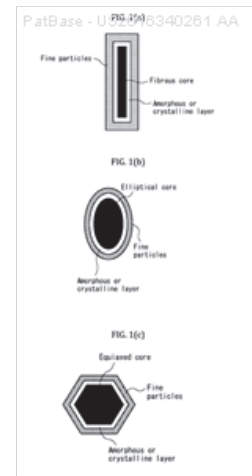
Abstract (EP3297973 A1)

[EN] An aerated composite material produced from carbonatable calcium silicate compositions (carbonation cured AAC) that has a compressive strength equivalent to autoclaved aerated concrete (ordinary AAC) at substantially the same density and a process of production of the same are provided. The composite material of the present invention comprises: a plurality of bonding elements, each including a core comprising calcium silicate, a first layer which partially or fully surrounds the core and is rich in SiO₂, and a second layer which partially or fully surrounds the first layer and is rich in CaCO₃; a plurality of filler particles having their particle sizes ranging from 0.1 μm to 1000 μm; and a plurality of voids; wherein the plurality of bonding elements and plurality of filler particles together form a bonding matrix and are substantially evenly dispersed in the matrix and bonded together, and the plurality of voids are bubble-shaped and/or interconnected channels.

1st Main Claim (EP3297973 A1)

[EN] 1. A composite material comprising: a plurality of bonding elements, each including a core comprising calcium silicate, a first layer which partially or fully surrounds the core and is rich in SiO₂, and a second layer which partially or fully surrounds the first layer and is rich in CaCO₃; a plurality of filler particles having sizes of particle sizes of 0.1 μm to 1000 μm; and a plurality of voids; wherein the plurality of bonding elements and plurality of filler particles together form a bonding matrix and are substantially evenly dispersed in the matrix and bonded together, the plurality of voids are bubble-shaped and/or interconnected channels, a pore volume with a radius of 0.004 μm to 10.0 μm in the plurality of voids is 0.30 ml/composite material 1 g or less, and an estimated compressive strength expressed by the following formula (1): Estimated compressive strength (absolute dry density=0.50) = compressive strength x (0.50÷absolute dry density)² is 2.0 N/mm² or more.

Assignees: ASAHI KASEI CONSTRUCTION MAT CORP; SOLIDIA TECHNOLOGIES INC; ASAHI KASEI CONSTR MAT CORP; SOLIDIA TECH INC; SOLIDIA TECH LTD; ASAHI CHEMICAL IND; ASAHI KASEI CORP



111. Family 86797412 (CN113321224 A)

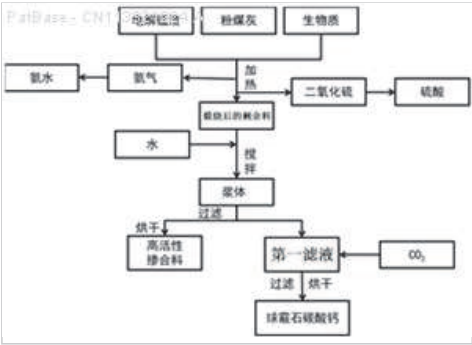
[View in PatBase](#)

Title

[EN] METHOD FOR RESOURCE UTILIZATION OF ELECTROLYTIC MANGANESE RESIDUES AND SOLIDIFICATION OF CO2

Abstract

[EN] The invention relates to a method for resource utilization of electrolytic manganese residues and solidification of CO2. The method comprises the following steps: S100, grinding the electrolytic manganese residues and fly ash into powder, carrying out uniform mixing, and carrying out compression molding on the powder to obtain a blocky mixture; S200, calcining the blocky mixture, wherein ammonia gas and SO3 gas are generated and collected respectively, the ammonia gas is used for preparing ammonia water, SO3 is used for preparing sulfuric acid, and grinding residual materials obtained after calcination into powder; S300, fully mixing the residual material with water to prepare slurry, performing filtering to obtain first filter residues and a first filtrate, and drying the first filter residues to obtain a cement admixture; and S400, introducing CO2 into the first filtrate obtained in the step S300 to obtain vaterite calcium carbonate slurry, and carrying out filtering and drying to obtain vaterite calcium carbonate.



1st Main Claim

[MT] 1. A method of making use of electrolytic manganese slag and solidification CO2, characterized in that it comprises the following steps:

S100: grinding both electrolytic manganese slag and fly ash into powder and mixing uniformly, reshaping to obtain a bulk mix, or grinding both electrolytic manganese slag, fly ash and biomass into powder and mixing uniformly, reshaping to obtain a bulk mix;

S200: calcining the bulk mix, producing and collecting ammonia gas and SO3 gas respectively, ammonia gas for the preparation of aqueous ammonia, SO3 for the preparation of sulfuric acid, grinding the calcined residue to a powder;

S300: thoroughly mixing said residual material with water into a slurry, filtering to obtain a first filter residue and a first filtrate, and fully or partially drying the first filter residue to obtain a cementitious blend;

S400: The first filtrate obtained in step S300 is passed through CO2 to obtain a maragonite calcium carbonate slurry, and after filtration drying to obtain maragonite calcium carbonate.

Assignees: UNIV BEIJING SCIENCE AND TECH; OF SCIENCE AND TECHNOLOGY BEIJING UNIV

112. Family 74105944 (WO19077390 A1)

[View in PatBase](#)

Title

[EN] METHODS FOR PRODUCING A LOW CO2 CEMENT COMPOSITION

Abstract

[EN] The present disclosure relates to improved methods for producing a low CO2 cement composition. Disclosed herein are methods for producing a cement composition comprising mixing reactants comprising a reactive powder, an activator, and a retardant in the presence of water, followed by the mixing of an accelerator into the reactants, and allowing the reactants to react to form the cement composition.

1st Main Claim

[EN] 1. A method for producing a cement composition, comprising: mixing reactants comprising a reactive powder, an activator, and a retardant in the presence of water, wherein the reactive powder comprises: portland cement and/or portland cement clinker; and slag; mixing an accelerator into the reactants, wherein the accelerator is added from 30 seconds to 60 minutes after the mixing of the reactive powder, activator, and retardant; and allowing the reactants to react to form the cement composition.

Assignees: BORAL IP HOLDINGS AUSTRALIA PTY LTD; LLOYD REDMOND RICHARD; KEYTE LOUISE MARGARET

113. Family 108238726 (CN120081631 A)

[View in PatBase](#)

Title

[MT] A SHIELD SLAG-BASED LOW-CARBON SYNCHRONOUS GROUTING MATERIAL BASED ON MICROBIAL CO₂ SOLIDIFICATION AND PREPARATION METHOD

Abstract

[MT] [0001] The present invention relates to the technical field of shield synchronous grouting materials, and in particular to a shield slag-based low-carbon synchronous grouting material based on microbial solidification of CO₂ and a preparation method thereof, comprising modified shield mud, Staphylococcus epidermidis solution, fly ash and cementing liquid, wherein the components of the modified shield mud include, by mass, 50-80 parts of shield slag or shield waste slurry, 0.5-2 parts of consistency regulator, and 20-50 parts of water. The present invention adopts the above-mentioned shield slag-based low-carbon synchronous grouting material based on microbial solidification of CO₂ and a preparation method thereof, does not need to use silicate cement as a cementitious material, and can be suitable for shield slag of various different geologies by modifying the material components.

1st Main Claim

[MT] 1. A shield slag-based low-carbon synchronous grouting material based on microbial solidification of CO₂, characterized in that it includes modified shield mud, Staphylococcus epidermidis solution, fly ash and binder. The components of the modified shield mud include, by mass, 50-80 parts of shield slag or shield waste slurry, 0.5-2 parts of consistency regulator, and 20-50 parts of water.

Assignees: OF SCIENCE AND TECHNOLOGY BEIJING UNIV



114. Family 100301594 (CN117228999 A)

[View in PatBase](#)

Title

[EN] WELL CEMENTATION CEMENT SLURRY SYSTEM SUITABLE FOR CO2 HEAT EXTRACTION TYPE GEOTHERMAL WELL AND PREPARATION METHOD OF WELL CEMENTATION CEMENT SLURRY SYSTEM

Abstract

[EN] The invention discloses a well cementation cement slurry system suitable for a CO2 heat removal type geothermal well and a preparation method of the well cementation cement slurry system. The well cementation cement slurry system is prepared from the following components in percentage by weight: 42 to 63 percent of G-grade oil well cement, 1 to 2 percent of nano boehmite, 20 to 25 percent of terrazzo waste, 20 to 25 percent of CO2 corrosion resistant thermal insulation material and 1 percent of dispersing agent. According to the invention, the CO2 corrosion resistant thermal insulation material is adopted, and inorganic materials and organic materials are combined to synergistically enhance the CO2 corrosion resistance of the material; the thermal insulation substrate is high in volcanic ash activity, low in thermal insulation coefficient and good in thermal insulation effect; the nano boehmite is adopted to promote and participate in cement hydration reaction, and the nano boehmite and the terrazzo jointly reduce the calcium-silicon ratio, so that the high-temperature strength stability of a cement slurry system is improved. And various solid wastes are utilized, so that the material is green and environment-friendly, and the cost is low.

1st Main Claim

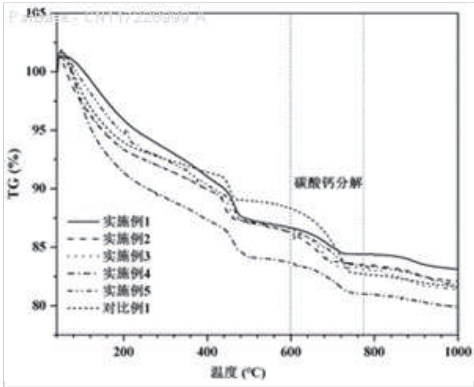
[MT] 1. A suitable CO₂Cementing cement grout system for geothermal wells of heat extraction type, characterized in that it comprises, by weight percent, the following raw materials:

- G grade oil well cement: 42 to 63 wt. %;
- Nano boehmite: 1 to 2 wt. %;
- Water-terrazing waste: 20 to 30 wt. %
- Resistant to CO₂Corrosion insulation: 15 to 25 wt. %;
- Dispersant: 1 wt. %;
- And admixture in weight percent of grade G oil well cement:
- High temperature water loss agent: 2 to 4 wt. %;
- High temperature retarder: 1 to 3 wt. %;
- Defoamer: 0.25 wt. %;

The CO resistance is described₂Corrosion insulation material is obtained by mixing the insulation matrix, aluminum titanate, sodium monofluoro phosphorus and potassium aminomethylphosphinate in parts by weight (8-13): (1-2): (3-5): (3-5);

The insulation matrix is obtained by mixing hollow ceramic beads, waste rock wool board powder, opal powder and modified polycarbonate in parts by weight 11:3:5:1.

Assignees: JIAHUA SPECIAL CEMENT CO LTD



115. Family 46413837 (KR20100085785 A)

[View in PatBase](#)

Title
[EN] STORAGE METHOD USING CONCRETE REACTION OF RAPID CARBONATION

Abstract
[EN] PURPOSE: A carbon dioxide storing method using a concrete rapid carbonation reaction is provided to minimize the environmental contamination by generating calcium carbonate during a production process of cement. CONSTITUTION: A carbon dioxide storing method using a concrete rapid carbonation reaction comprises the following steps: mixing cement, water and aggregate; inserting the mixture into a mold for molding; inserting the molded mixture into a pressure maintained chamber; inserting the carbon dioxide; carbonizing the second product; storing the carbon dioxide inside the second product; and curing the second product.

1st Main Claim
[MT] 1. Preparation of cement secondary products,

the secondary cement according to the type and form of the product, and aggregate, comprising the step of mixing water,

cement, and aggregate the mixed into water in a forming mold,

the molded form wherein steps to create maintained in a secondary products introduced in the interior of the pressure,

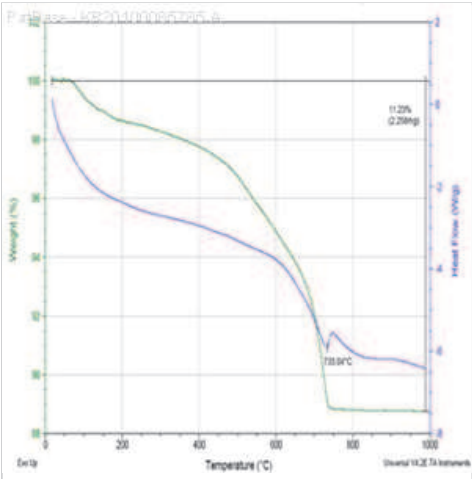
to a concentration of 6% or more charged into the secondary products comprising the steps of: injecting carbon dioxide

is injected into the secondary products within the chamber pressure of the carbon dioxide injected into 1.5~35 bar, so that the temperature inside the chamber, by heating for 5-80 degrees centigrade The hydrated cement and reacts with carbon dioxide is carbonized,

carbonized the secondary product in the form of calcium carbonate in the interior of the carbon dioxide is stored in step, and

the calcium carbonate in the form of carbon dioxide is completed by curing the secondary products

comprising the step of storing the concrete carbonation reaction using carbon dioxide to promote method



Assignees: KI SUNG CO LTD; KOREA INST CONSTRUCTION TECH; KOREA INST OF CIVIL ENGINEERING AND BUILDING TECHNOLOGY KICT

116. Family 63843054 (KR20160121120 A)

[View in PatBase](#)

Title

[EN] A COMPOSITION OF BINDER WITH LOW CO2 EMISSION BY LOW-TEMPERATURE CALCINATION FOR PORTLAND CEMENT REPLACEMENT MORTAR AND CONCRETE COMPRISING THE SAME

Abstract

[EN] The present invention relates to a binder composition for replacing low-carbon cement and mortar and cement including the same and, more particularly, to a binder composition for replacing low-carbon cement and mortar and cement including the binder composition for replacing low-carbon cement including fluidized boiler fly ash, slaked lime, reformed plaster, and an alkaline alunite compound obtained by firing a mixture of an alkaline aqueous solution, paper ash or fluidized boiler fly ash, and waste aluminum powder or waste zeolite catalyst obtained in an aluminum foundry for 30 to 60 minutes at a temperature of 900 to 1,100 degrees Celsius. [Keyword] Low-carbon binder, alkaline alunite, fluidized boiler fly ash.

1st Main Claim

[MT] 1. alkali 30-to 70-weight anodized Knight compound fluidized bed Awards boiler fly ash 20 percent; font-family: to 50 weight percent; 5 to 10 weight percent slaked lime; 5 to 10 weight percent; reforming the plaster will be composed of the low carbon joinery composition

Assignees: SONG MYONG SHIN

117. Family 56587667 (KR101403293 B1)

[View in PatBase](#)

Title

[EN] CONCRETE REPAIRING METHOD USING WATERPROOF REPAIR MORTAR USING CRYSTALLIZATION AND PROTECTOR OF CARBONATION

Abstract

[EN] The present invention relates to a concrete structure repairing construction method using a material for preventing neutralization and waterproof repair mortar using crystallization. The purpose of the present invention is to provide the concrete structure repairing construction method using waterproof repair mortar having a waterproof performance for minimizing generation of a crack and additional leakage generated after repairing by applying a waterproof performance and crack generation inhibition performance to repair mortar by filling a pore of the surface after curing and water-condensing a capillary pore by forming calcite and needle-shaped crystal. The purpose of the present invention is to provide the concrete structure repairing construction method by coating waterproof repair mortar comprising 34.0-59.0 wt percent of a binding material, 2.0-13.0 wt percent of expansive additives, 1.0-5.0 wt percent of silica fume, 1.0-2.0 wt percent of Na₂CO₃, 0.1-2.0 wt percent of an admixture, and 20.0-50.0 wt percent of aggregate with a material for preventing neutralization in layers.

1st Main Claim

[MT] 4. (Damage of the concrete structure, and removing the foreign substances, by using the high-pressure region; cleaning the repair of concrete structures using equipment; and waterproof type repair mortar pouring and can be formulated in combination with the multi-stage after supply repair mortar by mixing water for manufacturing a waterproof type; water combination mortar for casting equipment the waterproof type repair of concrete structures through the nozzle of the spray is damaged areas; pouring pouring the water comprising the steps of curing the repair mortar; curing is completed on the surface of the repair mortar waterproof material prevents the neutralization step of applying a; jidoe comprises a, the Cement 28.0 ~ 55.0 wt% neutralization preventing material is silica fume, calcium carbonate 8.0 ~ 23.0 wt% 2.0 ~ 5.0 0.1 ~ 1wt% melamine 0.1-0.5 wt percent, pigments, defoamers, 0.1 to 2.0 wt%, 7.0 ~ 20.0 wt% silica sand mixed with 15.0 to 40.0 wt percent 7 characterized in that the consisting of waterproof mortar and the vitrification using anti-neutralized repair method of repairing concrete structure using the same.

Assignees: BOOROO CONSTRUCTION CO LTD



118. Family 87459806 (AU2021105354 AD)

[View in PatBase](#)

Title

[EN] A CEMENTED FILLING METHOD BY MINERAL CARBONATION OF TAILINGS

Abstract

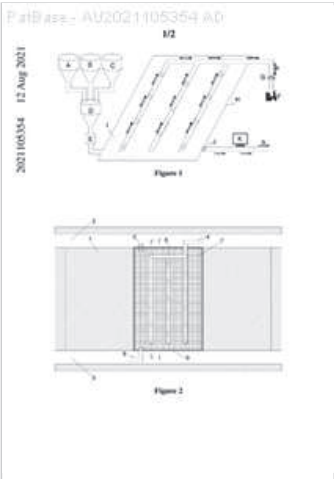
[EN] The invention provides a cemented filling method by mineral carbonation of tailings, which belongs to the technical field of industrial wastes utilization. Solid wastes with high calcium and/or magnesium content and low hydration activity were selected as cementitious materials. Firstly, the cementitious materials are crushed, ground, and fully mixed with tailings, water and additive to prepare the filling slurry. Secondly, the filling slurry is transported to the mine out area by a pipeline. After the goaf is filled, the filling area is sealed and blocked. Thirdly, CO₂ is injected into the closed filling area to curing the filling body. Finally, real time monitoring on the status of solid, liquid, and gas at the surrounding rocks and filling body is carried out during the process of carbonation curing, to make sure the stability of surrounding rocks and the meeting the requirements of back and fill mining method. The cementing materials used in this invention were solid wastes that has high calcium and magnesium content, low hydration activity and little utilization rate. It greatly reduces the cost of raw materials used in cemented filling mining method. The invention is a cemented filling method by mineral carbonation of tailings, which has the advantages in simple process, low cost and environmentally clean.

percent AF Figure 1 5 17 Hl rr _cr r r _LLIL -LLLLLL -LLLLLL -LLLLLL -L- L" LLLLLL [, _LL- LLLLLL _LHLLL _LLLLLL _LLLLLL _ LLLLLL LLLLLL _LLLLLL LLLLLL -LLLLLL,, LLLLLL LLLLLL -LLLLLL - LLLLLLL,LL -L- L _LLLLLL- _LLLLLL _LHLLL _LLLLLL LLLLLL LLLLLL LLLLLL..-LLLLLL -LLLLLL,,-LHLLL LLLLLL LLLLLL _L - ILL ',;LHLLL LLLLLL plus or minus LLLL.LL L"L LLLLLL -LLLLLL LLLLLL 'LHLLL _LLLLLL LLLLLL LLLLLL LLLLLL. LLLLLL -LLLLLL LLLLLL _LLLLLL _LHLLL _LLL _L,, _L-LL _LLLLLL LLLLLL LLLLLL LLLLLL _LLLLLL -L- L _LLLLLL -LLLLLL LLLLLL _LLLLLL LLLLLL "LHLLL LLLLLL LLLLLL -LLLLLL LLLLLL _ LLLLLL LLLLLL _L plus or minus LL-L L-LL _LLLLLL LLLLLL LLLLLL LLLLLL LLLLLL -LL-L,, LLLLLL _LLLLLL _LHLLL LLLLLL -LLLLLL LLLL L -IL LLLLLL LLLLLL LLLLLL LLLLLL LLLLLL LLLLLL LLLLLL _LL LLLLLL _LLLLLL -L-L L LLLL LLLLLL,-LHLLL LL,,LHLL, L'LL 'LHLLL LLLLLL LLLLLL LLLLLL LLLLLL LLLLLL -ii_ J L LL 'Lli 9 Figure 2

1st Main Claim

[EN] 1.A cemented filling method by mineral carbonation of tailings is characterized in that it comprises the following steps: S1: Crushed and ground cementitious material into powder. Use the whole tailings as the aggregate; S2: Prepare the filling slurry by fully stirring of the mixture containing cementitious materials, whole tailings in S1, water and additives; S3: Pipelines for injecting CO₂ gas was installed in the mine out area before the filling slurry was transported to the goaf. S4: Transport the filling slurry prepared in S2 to the filling station, and pump to the underground goaf. S5: Seal and block the filling area after the goaf is fully filled, to make sure the gas impermeability of the filling area; S6: After sealing the filling area for 24 hours, inject CO₂ gas by pipeline installed in S3 to curing the filling body, to make sure the compressive strength meets the requirements; S7: Real-time monitoring during S4-S6 for early warning, to make sure the safety of the enclosed filling area,

Assignees: UNIV BEIJING SCIENCE AND TECHNOLOGY; UNIV OF SCIENCE AND TECHNOLOGY BEIJING



119. Family 89239764 (CN113896466 A)

[View in PatBase](#)

Title

[EN] RED MUD CONSOLIDATION METHOD BASED ON CARBONATION REACTION AND OBTAINED CARBONIZED PRODUCT

Abstract

[EN] The invention relates to a red mud consolidation method based on carbonation reaction and an obtained carbonized product. The consolidation method comprises the following steps of: well mixing a carbonized cementing material with red mud to obtain a dry mixture; adding water into the dry mixture, stirring, and molding into a green body; and carbonating the green body to obtain a carbonized product. The carbonized and hardened product prepared on the basis of the method still has the characteristic of high strength under the condition of a large-dosage red mud proportion, dissolution of alkali and heavy metal in the red mud is limited to a great extent, and secondary pollution to the environment is avoided while a large amount of solidified red mud is treated.

1st Main Claim

[MT] 1. A red mud consolidation process based on carbonation reactions, characterized in that it comprises the following steps:

Step 1. homogeneously mixing a carbonized cementitious material with red mud, said carbonized cementitious material being at least one of a calcium silicate ore phase and an industrial solid waste rich in calcium silicate ore phase or calcium hydroxide ore phase;

Step 2 of mixing the dry mix with water and forming into a billet;

Step 3, carbonating the embryo to obtain a carbonized article.

Assignees: WUHAN UNIV OF TECHNOLOGY; SHANDONG HANBO YUZHOU NEW MAT CO LTD; UNIV WUHAN TECH

120. Family 54915886 (KR20130108918 A)

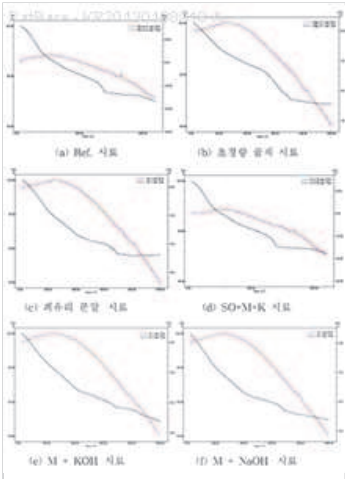
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Title

[EN] ALC COMPOSITION FOR CARBONATION RESISTANCE ENHANCEMENT AND FABRICATION METHOD OF ALC USING THIS COMPOSITION

Abstract

[EN] PURPOSE: An autoclaved lightweight concrete composition is provided to remarkably reduce the carbonation degree of autoclaved lightweight concrete by containing a melamine resin, silicon oil, or their mixture, and an alkali activator in a predetermined weight ratio. CONSTITUTION: An autoclaved lightweight concrete composition contains 0.07-0.10 parts by weight of aluminum powder, 0.3-0.6 parts by weight of alkali activator, 1.5-7.0 parts by weight of additive, and mixed water for 100 parts by weight of cement mixture containing cement, silica, and quicklime. The cement mixture contains 30-40 parts by weight of cement and 10-20 parts by weight of quicklime for 100 parts by weight of silica. The additive is selected from a melamine resin, silicon oil, or their mixture. The mixed water contains 70-80 percent of the total weight of the composition. The silica contains sand slurry and return slurry in a weight ratio of 1:0.4-0.6. [Reference numerals] (a) Ref. sample; (b) Ultralight aggregate sample; (c) Waste glass powder sample; (d) SO+M+K sample; (e) M + KOH sample; (f) M + NaOH sample



1st Main Claim

[MT] 1. Cement, sand and cement mixture comprising a powder with respect to 100 parts by weight of 0.07 to 0.10 parts by weight of aluminum, 0.3 to 0.6 parts by weight; alkali stimulant; melamine resin, silicone oils or a mixture of any one selected from the group consisting of 1.5 to 7.0 parts by weight and mixed, and the mixture can be 70 to 80% relative to the total weight of the composition, including the level characterized in that it is added to the carbonation resistance is excellent in the lightweight cellular concrete composition.

Assignees: KOREA INST CERAMIC ENG AND TECH; SYC CO LTD

121. Family 80634282 (CN111574146 A)

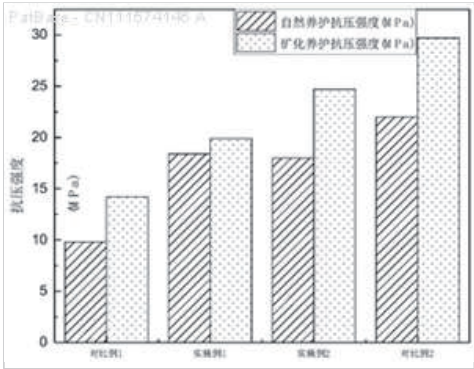
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Title

[EN] METHOD FOR PREPARING INDUSTRIAL SOLID WASTE-BASED BAKING-FREE BRICK BY COMBINING COMPOSITE CEMENTING MATERIAL WITH CARBONATION CURING TECHNOLOGY

Abstract

[EN] The invention discloses a method for preparing an industrial solid waste-based baking-free brick by combining a composite cementing material with a carbonation curing technology. The method comprises the steps that (1) the furnace bottom slag is ground and then screened and graded in a regulation and control mode, the size diameter of screen holes of screening is 4.75-150 micrometers, and grading is regulated and controlled to be 20 percent or above and is distributed within 250-425 micrometers; and (2) the dry cementing material comprising the furnace bottom slag, cement and an auxiliary cementing material is fully mixed, compression molding is performed on the mixed cementing material added with water, and CO₂ mineralization maintenance is performed after pre-maintenance to obtain the industrial solid waste-based baking-free brick. The method adapts to the CO₂ mineralization maintenance characteristic, solves the utilization problems of single utilization way and low additional value of the furnace bottom slag, and obtains the building material product with excellent performance.



1st Main Claim

[MT] A composite cementitious materials incorporated carbonation conservation techniques for preparing industrial solid waste-unburned brick, characterized in that, the method comprising:

- (1) the bottom slag grinding after sieving and regulation of grading, screening mesh size diameter of 4.75mm-150 micro m, regulatory graded to bottom slag 20% distributed in 250 microns -425 microns;
- (2) will include bottom slag, cement, and supplementary cementitious materials cementitious materials are mixed dry ingredients, add water, the water is added after mixing cementitious material after pressing, after the pre-curing after curing to obtain industrial solid waste CO₂ mineralization base unburned.

Assignees: UNIV ZHEJIANG; ZHEJIANG UNIV

122. Family 29067478 (US6620879 BA)

[View in PatBase](#)

Title (EP1154967 B1)

[EN] POWDERY POLYETHERCARBOXYLATE-BASED POLYMERIC COMPOSITIONS

Abstract (EP1154967 B1)

[EN] A description is given of pulverulent polymer compositions based on polyether carboxylates, which are characterized in that they comprise a) from 5 to 95 percent by weight of a water-soluble polymer made up of polyoxyalkylene-containing structural units, carboxylic acid and/or carboxylic anhydride monomers and, if desired, further monomers, and b) from 5 to 95 percent by weight of a finely divided mineral support material having a specific surface area of from 0.5 to 500 m²/g (determined by the BET method in accordance with DIN 66 131). These pulverulent polymer compositions, which can contain up to 90 percent by weight of polyether carboxylate, have a significantly increased sticking and caking resistance compared to spray-dried products and have further advantages when they are used in cement-containing building material mixtures.

1st Main Claim (EP1154967 B1)

[EN] 1. Pulverulent polymer compositions based on polyether carboxylates, **characterized in that** they comprise

- a) from 5 to 95 percent by weight of a water-soluble polymer made up of polyoxyalkylene-containing structural units, carboxylic acid and/or carboxylic anhydride monomers and, if desired, further monomers, and
- b) from 5 to 95 percent by weight of a fine-particle mineral support material having a specific surface area of from 0.5 to 500 m²/g (determined by the BET method in accordance with DIN 66 131) and obtainable by spraying the molten polyether carboxylate onto a mineral support material at 70 to 120 degrees centigrade

Assignees: DEGUSSA CONSTRUCTION CHEM GMBH; DEGUSSA CONSTRUCTION CHEMICALS GMBH; SKW BAUCHEMIE GMBH; KERN ALFRED; LEITNER HUBERT; ALBRECHT GERHARD; WEICHMANN JOSEF; SUEDEDEUTSCHE KALKSTICKSTOFF

123. Family 83091836 (KR20210009946 A)

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Title

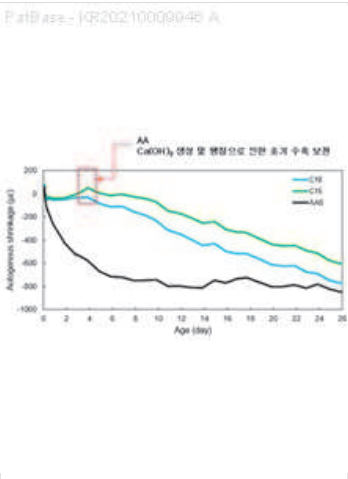
[EN] NON-CEMENT MORTAR WITH REDUCTION OF AUTOGENOUS SHRINKAGE AND CARBONATION

Abstract

[EN] The present invention relates to eco-friendly non-cement mortar in which fly ash and slag, which are industrial by-products, as a binder and calcium carbide sludge is added to the binder, such that self-shrinkage and carbonation resistance can be increased. According to the present invention, self-shrinkage and carbonation-reduced non-cement mortar comprises: a binder including 30 to 40 wt percent of slag, 30 to 40 wt percent of fly ash, 10 to 30 wt percent of red mud, and 10 to 30 wt percent of rice husk ash; 5 to 15 parts by weight of calcium carbide sludge mixed with respect to 100 parts by weight of the binder; 150 to 180 parts by weight of aggregate mixed with respect to 100 parts by weight of the binder; and 40 to 45 parts by weight of water mixed with respect to 100 parts by weight of the binder.

1st Main Claim

[MT] 1. As a binder, fly ash and slag, and wherein the binder comprising fly ash, calcium carbide sludge, self-made by mixing water, aggregate and reduce shrinkage and carbonation cement mortar-free.



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

124. Family 74876869 (US2020248055 AA)

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Title (EP3727663 A1)

[EN] USE OF AQUEOUS SOLUTION OF ORGANIC AMMONIUM CARBOXYLATE IN PREVENTING DUSTING OF FINE MATERIAL AND COMBINATION OF AN AQUEOUS SOLUTION OF ORGANIC AMMONIUM CARBOXYLATE AND FINE MATERIAL

Abstract (EP3727663 A1)

[EN] The invention relate to use of aqueous solution of organic ammonium carboxylate of formula (I): $[NR^1R^2R^3R^4]^+_n[R^5(COO)]^-_n$, in which R^1 , R^2 , and R^3 are selected from the group composing of hydrogen and methyl, R^4 is a C1-C4-alkyl substituted with a hydroxyl group, R^5 is hydrogen or methyl and n is 1, as a mist or drops in preventing dusting of fine material and in lowering the freezing point of said aqueous solution on the surface of said fine material or on the surface of dust particles obtained from said fine material by spraying said mist or drops onto fine material or onto dust particles obtained from said fine material to neutralize negatively charged dust particles or by changing negatively charged dust particles into positively charged dust particles, wherein said fine material is selected from the group composing of sand, crushed stone, stone powder, crushed expanded clay, or crushed expanded clay aggregate, crushed cement or concrete, cement or concrete powder, chopped organic material, minerals and metal powder.

1st Main Claim (EP3727663 A1)

[EN] 1. The use of aqueous solution of organic ammonium carboxylate of formula (I): $[NR^1R^2R^3R^4]^+_n[R^5(COO)]^-_n$, (I), in which R^1 , R^2 , and R^3 are selected from the group composing of hydrogen and methyl, R^4 is a C1-C4-alkyl substituted with a hydroxyl group, R^5 is hydrogen or methyl and n is 1, as a mist or drops in preventing dusting of fine material and in lowering the freezing point of said aqueous solution on the surface of said fine material or on the surface of dust particles obtained from said fine material by spraying said mist or drops onto fine material or onto dust particles obtained from said fine material to neutralize negatively charged dust particles or by changing negatively charged dust particles into positively charged dust particles, wherein said fine material is selected from the group composing of sand, crushed stone, stone powder, crushed expanded clay, or crushed expanded clay aggregate, crushed cement or concrete, cement or concrete powder, chopped organic material, minerals and metal powder.

Assignees: OY GRANULA AB LTD