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5583183

**CEMENT AND CEMENT COMPOSITION
HAVING IMPROVED RHEOLOGICAL
PROPERTIES**

Darwin David C; Gartner Ellis; Chun Byong-Wa; Koyata Hideo; Kuo Lawrence Columbia, MD, UNITED STATES assigned to W R Grace & Co -Conn

An improved hydraulic cement and resultant hydraulic cement composition having an imidized acrylic polymer uniformly distributed therein.

5584792

**METHOD OF STABILIZING INDUSTRIAL
WASTES AND FLY ASH COMPOSITIONS
USEFUL IN SAME**

Webster William C Auburn, AL, UNITED STATES

A method for stabilizing wet, oily petroleum refinery wastes and other similar wastes without the need for Portland cement. The waste is combined with at least 5 weight percent of a novel cementitious reagent composition comprised of Powder River Basin fly ash and circulating fluid bed combustion ash in weight ratios ranging from 1:9 to 9:1.

5584926

CEMENT COMPOSTION

Borgholm Hans E; Damtoft Jespe Lyngby, DENMARK assigned to Aalborg Portland A/S

PCT No. PCT/DK93/00132 Sec. 371 Date Jan. 4, 1995 Sec. 102(e) Date Jan. 4, 1995 PCT Filed Apr. 13, 1993 PCT Pub. No. WO93/21122 PCT Pub. Date Oct. 28, 1993. A cement composition consists essentially of (a) from 50% to 97% by weight (calculated on the total composition) of a Portland cement clinker, the sulfur content of which is from

0.5% to 10% by weight expressed as SO₃ and the fluorine content of which is from 0.13% to 1.00% by weight expressed as F, and (b) from 3% to 50% by weight (calculated on the total composition) of an extender containing a carbonate selected from calcium carbonate, magnesium carbonate, calcium magnesium carbonate and mixtures thereof as its main constituent and having a median particle size (d₅₀) of below 14 μ m. Preferably, the total content of C₃S and C₂S in the Portland cement clinker is at least 65%. A preferred carbonate is electrostatic precipitator dust extracted from cement kiln exhaust gases. The cement composition may be mixed with further components such as other extenders, retarding agents and aggregate.

5585141

**METHOD FOR LINING PIPE WITH
CALCIUM ALUMINA CEMENT**

Loving C Gilme; Farkas Steven Madison Heights, VA, UNITED STATES assigned to Amsted Industries Incorporated

Cast iron pipe and other elongated hollow articles are lined with a cementitious mortar for certain applications, such as the transmission of potable water or sewage. To improve the resistance to attack from acids and to provide a crack and void spot free cement lining, a calcium alumina cement is used to line the article. A plasticizer such as fireclay is added to the calcium alumina cement prior to its application. The cement lined article is then coated with an asphaltic based coating and then cured in a high humidity environment.

5587012

**COMPOSITION FOR AND METHOD OF
PUMPING CONCRETE**

Montgomery Daniel Mesquite, TX, UNITED STATES assigned to Fritz Industries Inc

A composition for and a method of promoting the

flow of a concrete slurry through a pump and a conduit is provided. The composition is a dry particulate mixture comprised of a water soluble, inorganic material and a solvatable, organic polymer. The composition, when mixed with a suitable quantity of water, is useful in a method of priming a pump used to pump a concrete slurry. The composition, when mixed with a concrete slurry, is useful to improve the flow of the slurry through a conduit.

5588990

**POZZOLAN CEMENT COMPOSITIONS
AND ADMIXTURES THEREFOR**

Dongell Jonathan E Scottsdale, AZ, UNITED STATES assigned to Universal Cement & Concrete Products Inc

Blended cement compositions for mixture with aggregate and water to prepare cementitious products. Such blended cement compositions contain cement, calcined diatomaceous earth, calcined kaolin, and about 0.5% to about 4% (w/w) of potassium, with or without talc and/or bentonite or their functional equivalents. Admixtures for blending into cement to create such blended cements or their read-mix equivalents contain calcined kaolin, calcined diatomaceous earth, and potassium, with or without talc and/or bentonite or their functional equivalents.

5591259

**RAPID SETTING CEMENTITIOUS
COMPOSITIONS AND METHOD**

Huang Lan; Farrington Stephen A Cleveland, OH, UNITED STATES assigned to Sandoz Ltd

Rapid setting cementitious compositions comprise hydraulic cement and at least 4% by weight based on the weight of the cement of a water-soluble malate or citramalate such as an alkali metal malate or alkali metal citramalate.

5593493

**METHOD OF MAKING CONCRETE
FROM BASE METAL SMELTER SLAG**

Krofchak David Oakville, Ontario, CANADA

A method of making concrete from base metal smelter slag includes grinding the slag to a size within the range of from about -250 to about 425 mesh to produce ground slag cement, mixing the ground slag cement with Type 3 high early strength Portland cement in a ratio of at least about 0.5:1 by weight, and adding sand and stone to produce a concrete.

5594050

**CEMENT COMPOSITION CONTAINING
CHEMICALLY CROSSLINKED
POLYVINYL ALCOHOL (PVA)**

Audebert Roland; Janca Joseph; Maroy Pierre; Hendriks Hugo Saint Leu La Foret, FRANCE assigned to Dowell Schlumberger Incorporated

The invention relates to a new, chemically crosslinked PVA. Its application is that of a fluid loss control agent in fluids used in the oil industry, in particular cement slurries, separating fluids, or spacers, and drilling muds. Its advantages are that it does not delay the setting of the cement, that it has high temperature properties that are relatively insensitive to external conditions.

5595595

**AQUAGEL-BASED LIGHTWEIGHT
CONCRETE**

Glenn Gregory M American Canyon, CA, UNITED STATES assigned to The United States of America as represented by the Secretary of Agriculture

The present invention is directed to concrete

compositions prepared using firm aqueous gels (aquagels) as all or part of the aggregate in a concrete mix. The concrete sets around the aquagels in the initial set stage. Because the aquagels maintain the pore structure of the concrete while it sets, a concrete product can be obtained that has substantially uniform density regardless of depth. During the curing and/or drying stages, the moisture migrates out of the concrete and the aquagels, and the aquagels dry to a fraction of the size of the original aquagel in the cell or pore in the concrete. This results in cellular, lightweight concrete having reduced density, reduced weight, reduced thermal conductivity, and reduced sound transmission compared to concrete prepared without using aquagels.

5595596

CEMENT COMPOSITION AND ITS USE FOR THE PREPARATION OF LIGHTWEIGHT CONCRETES

Marcotullio Armando; Santori Massimo S Donato Milanese, ITALY assigned to Eniricerche S p A

The present invention relates to a cement composition containing water, hydraulic cement, inert products and a foaming agent obtained by reacting ethylene oxide with a substrate deriving from the production of synthetic alcohols by the oxosynthesis of normal-olefins, sulfating the ethoxylate compound thus obtained with sulfuric anhydride and neutralizing the sulfated acid product with a base of an alkaline, earth-alkaline metal or ammonia. The cement composition can optionally contain conventional additives such as stabilizers, set retarders or accelerators and dispersing agents suitable for lowering the viscosity of the composition. This cement composition has improved processability characteristics and enables the production of lightweight concretes having greater mechanical resistance and durability and lower thermal conductivity particularly appropriate for the building industry.

5597514

CORROSION INHIBITOR FOR REDUCING CORROSION IN METALLIC CONCRETE REINFORCEMENTS

Miksic Boris A; Chandler Christophe; Kharshan Margarita; Furman Alla; Rudman Barry; Gelner Larry North Oaks, MN, UNITED STATES assigned to Cortec Corporation

A corrosion inhibitor formulation for use in reinforced concrete structures, the inhibitor reducing the rate of corrosion in metallic reinforcing rods placed within the structures. The formulation comprises a mixture of benzoic acid, aldonic acid, and a triazole such as benzotriazole or tolyltriazole.

5599597

CONCRETE MOLDING WITH IMPROVED ACID RESISTANCE

Berg Volkmar; Rinno Helmut Graben, GERMANY assigned to Hoechst Aktiengesellschaft

Unreinforced or reinforced concrete moldings, for example concrete pipes, with improved corrosion resistance to acids and acidic sewage, improved permeation resistance to inorganic and organic liquids and gases and improved mechanical stability, produced by molding with machines, for example in press molding machines or extrusion machines or concrete pipe pressing machines, and allowing to harden plastic-viscous concrete mixtures of hydraulic inorganic binders, preferably cement, aggregates and water, where, in the preparation of the plastic-viscous concrete mixtures, to the latter has been added in a positive mixer an effective amount of an aqueous plastics dispersion based on anionic and hydrolysis-resistant copolymers of ethylenically unsaturated monomers, the minimum film forming temperature (MFT) of which is above the setting temperature of the concrete mixture, preferably above 23°C Use of the concrete moldings as concrete precast parts for many various

applications, preferably as construction elements in building construction, road building, bridge building, civil engineering, in particular in sewage pipeline construction for underground sewer lines and service water lines.

5599599

**FIBER REINFORCED PLASTIC
(FRP)-CONCRETE COMPOSITE
STRUCTURAL MEMBERS**

Mirmiran Amir; Shahawy Mohsen Orlando, FL, UNITED STATES assigned to University of Central Florida

Fiber reinforced plastic FRP formed about concrete piles and columns. The FRP components generally includes an exterior shell and an interior pultruded component. The exterior shell can include multilayers of fibers wrapped in straight hoop patterns in single sheets with or without longitudinal axial fibers. Alternatively the exterior shell can include angled wrapped fibers. The interior FRP pultruded component comes in various forms such as pultruded ribs, crossed attached ribs, interior co-axial concentric cylinders and additional shapes such as ones having an H cross-shaped pattern. The FRP materials can consist of fiber and resin such as a preferred embodiment of approximately 60% glass and 40% polyester. Other fiber type materials include but are not limited to glass, carbon, Kevlar, combinations thereof, and the like. Types of resin include but are not limited to polyester, vinylester, epoxy, combinations thereof, and the like. The invention has the effect of waterproofing and insulating the exposed concrete columns and piles of infrastructure supports and protecting any steel/metal reinforcing bars and cages in the the cement cores from the effects of corrosion. The invention further increases the ductility of concrete support columns and piles without the use of additional steel reinforcing bars and cages. The invention can additionally enhance the compressive, flexural and shear strengths of concrete support columns and piles especially for infrastructures such as bridges, buildings and the

like used in hurricane and seismic zone locations.

5601643

**FLY ASH CEMENTITIOUS MATERIAL
AND METHOD OF MAKING A PRODUCT**

Silverstrim Thomas; Rostami Hossein; Larralde Jesus; Samadi Anamolah Collingdale, PA, UNITED STATES assigned to Drexel University; By-Products Development

Rapid curing, high strength cementitious binder mixtures are provided containing fly ash and an alkali metal or alkaline earth metal silicate binder that has a weight ratio of SiO₂:M₂O of about 0.20:1 to about 0.75:1 wherein M is selected from the group consisting of Li, Na, K, 1/2Ca and 1/2Mg. The cementitious binder mixtures can be mixed with aggregates to provide mortar and concrete mixtures. Any of the binder, mortar and concrete mixtures can be cured under elevated temperatures to yield high strength products.

5604273

**DRYING SHRINKAGE CEMENT
ADMIXTURE**

Kerkar Awdhoot V; Gilbert Brian S Columbia, MD, UNITED STATES assigned to W R Grace & Co -Conn

The subject invention is directed to a cement admixture composition composed of certain alkylene glycols and copolymers of alkenyl ether and maleic anhydride. The present admixture provides a means to inhibit drying shrinkage of cement compositions while enhancing the compressive strength of the set composition.

5607527

**METHOD OF MAKING FABRIC
REINFORCED CONCRETE COLUMNS TO
PROVIDE EARTHQUAKE PROTECTION**

Isley Frederick P Tracy, CA, UNITED STATES
assigned to Hexcel Corporation

Reinforced concrete columns wherein the exterior surface of the concrete column is wrapped with a composite reinforcement layer. The composite reinforcement layer includes at least one fabric layer which is located within a resin matrix. The fabric layer has first and second parallel selvages which extend around the circumferential outer surface of the column in a direction substantially perpendicular to the column axis. Specific weave patterns are disclosed. The composite reinforcement layer provides a quick, simple and effective means for increasing the resistance of concrete columns to failure during the application of asymmetric loads.

5609681

**WORKABLE CEMENTITIOUS
COMPOSITIONS**

Drs Josef F; Melbye To; Tjugum Odd M; Valenti Salvator Vienna, AUSTRIA assigned to Sandoz Ltd

A process for modifying the slump of a concrete or mortar by the addition at different times of a water-soluble poly(alkylene oxide) and a beta-naphthalene sulphonate-formaldehyde condensate, a plasticizer or superplasticizer which is selected from lignosulphonates, melamine sulphonate formaldehyde condensates, carboxylates and selected styrene-maleic anhydride copolymers. The poly(alkylene oxide) is preferably partially replaced by a (hydroxy)alkyl cellulose. The process is advantageously used in shotcreting.

5609748

**ANODE FOR CATHODIC PROTECTION
AGAINST CORROSION**

Kotowski Stephan; Bedel Reinhard; Busse Bernd Seligenstadt, GERMANY assigned to Heraeus Elektroden GmbH

For cathodic protection against corrosion of steel reinforcements in reinforced steel constructions, a prefabricated anode is provided which has a core of titanium expanded metal provided with an activation layer and with a cement-containing ion-conductive jacket; the prefabricated anode is immovably secured to the reinforced concrete construction in an ion-conductive bond; after that, the reinforcement of the concrete construction and the core of the anode are connected to the poles of a direct voltage source.

5613334

**LAMINATED COMPOSITE
REINFORCING BAR AND METHOD OF
MANUFACTURE**

Petrina Petr Ithaca, NY, UNITED STATES
assigned to Cornell Research Foundation Inc

The invention presents a non-metallic laminated composite reinforcing rod for use in reinforced or prestressed concrete. The rod is made by creating a sheet of core material comprising a number of layers of pre-preg material. Ribs are formed on top of the core from additional layers of pre-preg material laid with the fibers transverse to those in the core. The ribs are then covered by additional layers of pre-preg laid with fibers parallel to the core fibers. The material is heated to fuse the layers. Finally, the sheets of laminated reinforcement are cut parallel to the core fibers to the width desired. The resulting reinforcing rod is superior to steel in corrosion resistance, flexibility, durability, and strength. The reinforcing rod may be used as a prestressing tendon in prestressed concrete after encasing the ends of the rod in an attachment formed of a sleeve filled with

grouting material such as mortar or epoxy. The glass-fiber embodiment is non-conductive. If carbon prepreg made of high modulus fibers is used, then the Young modulus of the LCRs is approximately equal to that of steel.

5614017

CEMENT ADDITIVES

Shawl Edward T Wallingford, PA, UNITED STATES assigned to ARCO Chemical Technology LP

Substances useful as water reducing and superplasticizer additives for cement compositions are formed by reaction of carboxylic acid polymers with polyethers of C2-C4 epoxides wherein partial cleavage of the polyether and esterification of the polyether and the cleavage products thereof by the other reactant are achieved. In one embodiment, a sulfonic acid is used to catalyze the reaction of poly(acrylic acid) and a monofunctional ethylene oxide-propylene oxide copolymer at a temperature in excess of 140°C

5618344

CEMENT COMPOSITION

Kerkar Awdhoot; Berke Neal; Dallaire Michael P Columbia, MD, UNITED STATES assigned to W R Grace & Co -Conn

A cement admixture composed of a mixture of certain lower alkyl ether oxyalkylene adducts with certain higher alkylene diols to provide cement compositions of mortar and concrete which inhibit drying shrinkage while permitting substantial air entrainment and enhanced compressive strength.

5622556

LIGHTWEIGHT, LOW WATER CONTENT CEMENTITIOUS COMPOSITIONS AND METHODS OF THEIR PRODUCTION AND USE

Shulman David M Littleton, CO, UNITED STATES

An improved lightweight cementitious product made up of an aqueous cementitious mixture that can incorporate fly ash, portland cement, sand, lime, and the weight saving component, which is micronized polystyrene particles having particle sizes in the range of 50 to 2000 microns, and characterized by having very low water contents, in the range of from about 0.5% to 5% v/v. The ultra low water compositions can be extruded and can be molded under high pressure.

5622558

DRYING SHRINKAGE CEMENT ADMIXTURE

Berke Neal S; Dallaire Michael P Chelmsford, MA, UNITED STATES assigned to W R Grace & Co -Conn

A cement admixture composition composed of a mixture of alkylene glycol and fume silica to provide a means of inhibiting drying shrinkage and enhancing compressive strength.

5624489

CONVERSION-PREVENTING ADDITIVE FOR HIGH ALUMINA CEMENT PRODUCTS

Fu Yan; Ding Jia; Beaudoin James J Hull, CANADA assigned to National Research Council of Canada

Additives for high alumina cement compositions are proposed. The additives are effective to reduce

or prevent the deleterious conversion of hexagonal calcium aluminate hydrates to cubic hydrogarnet in the high alumina cement compositions. The additives comprise 80-99 wt. % of a siliceous pozzolan and 1-20 wt. % of an inorganic sodium or potassium salt.

5626663

**COMPOSITION AND METHOD FOR
INHIBITING DRYING SHRINKAGE OF
CONCRETE**

Berke Neal S; Dallaire Michael P; Kerkar Awdhoot Chelmsford, MA, UNITED STATES assigned to W R Grace & Co -Conn

A concrete composition capable of inhibiting shrinkage of structural concrete structures is disclosed. The concrete is formed with an admixture composed of at least one secondary/tertiary alkanediol.

5630301

**ANCHORAGE ASSEMBLY AND METHOD
FOR POST-TENSIONING IN
PRE-STRESSED CONCRETE
STRUCTURES**

Sieg Lyle D Delta, CANADA assigned to Harris P/T A Division of Harris Steel Limited

An anchorage assembly for post-tensioning a tendon in a pre-stressed concrete structure, comprises an anchor having a bore for receiving the tendon, the bore comprising a first bore portion which is convergent inwardly of the anchor and a second bore portion. Wedges are in wedging engagement between the first bore portion and the tendon to retain the tendon, and a seal is engaged between the second bore portion and the tendon, the seal having a wedge-shaped cross-section and being compressed by a wedging action between and into sealing engagement with the second bore portion and the tendon.

5633298

**CEMENT ADMIXTURE PRODUCT
HAVING IMPROVED RHEOLOGICAL
PROPERTIES AND PROCESS OF
FORMING SAME**

Arfaei Ahmad; Darwin David C; Gartner Ellis; Chun Byong-Wa; Koyata Hideo; Kuo Lawrence Chelmsford, MA, UNITED STATES assigned to W R Grace & Co -Conn

The present invention is directed to an imidized polycarboxylic acid polymer useful as a cement admixture, to improved cement compositions containing said polymer and to a process of forming the same.

5635263

**REINFORCING FIBER SHEET AND
CONCRETE STRUCTURE USING SAME**

Saito Makoto Saitama ken, JAPAN assigned to Tonen Corporation

The present invention has an object to provide a reinforcing fiber sheet which permits sufficient reinforcement of a concrete structure with a smaller number of layers than in the conventional cases, without causing fracture of the sheet within a range of yielding of reinforcing bars. The reinforcing fiber sheet 1 of the invention comprises high-elasticity and high-elongation carbon fibers 4 having a modulus of elasticity of at least 35 ton/mm² and a fracture elongation of at least 0.9%, arranged in an amount of at least 250 g/m² in one direction through an adhesive layer 3 on a substrate sheet 2. The object of the invention can be achieved by providing the carbon fibers 4 of the reinforcing fiber sheet 1 with the above-mentioned properties.

5639358**CATHODIC PROTECTION SYSTEM FOR
A STEEL-REINFORCED CONCRETE
STRUCTURE**

Bennett John E; Pohto Gerald R; Mitchell Thomas
A Painesville, OH, UNITED STATES assigned to
ELTECH Systems Corporation

An anode for cathodically-protected steel-reinforced concrete is embedded in an ion-conductive overlay on the concrete structure. The anode comprises at least one sheet of highly expanded valve metal mesh having a pattern of voids defined by a network of valve metal strands connected at a multiplicity of nodes. This provides a redundancy of current-carrying paths through the mesh which ensures effective current distribution throughout the mesh even in the event of possible breakage of a number of individual strands. The surface of the valve metal mesh carries an electrochemically active coating. At least one current distribution member is welded to the valve metal mesh. The entire area of the structure to be protected, excluding non-protected openings for obstacles and the like, is covered by a single piece of the mesh, or several pieces in close proximity with one another.

5640704**PROCESS FOR SOLIDIFICATION AND
IMMOBILIZATION OF HARMFUL
WASTE SPECIES**

Snyder Thomas S; Grant David; Hallman James T;
Brownstein Martin; Goad Dwight; Kelly Carol;
West Lori Oak Ridge, TN, UNITED STATES

The present invention provides methods and processes for immobilizing and solidifying harmful heavy metal and radioactive species within a waste material. The processes of the present invention are also particularly advantageous for immobilizing and solidifying nitrate compounds with a waste material. One embodiment of the present invention is a method that can be carried out by admixing the

waste material with cement and a complexant compound to form a grout admixture. Preferably, the complexant compound is an iron compound that can form a hydrated iron oxide in the presence of an aqueous solution. This grout admixture is then allowed to cure and solidify. The grout admixture is placed within a suitable containment vessel for final storage and disposal.

5643359**DISPERSION OF PLANT PULP IN
CONCRETE AND USE THEREOF**

Soroushian Parviz; Hsu Jer-Wen Okemos, MI,
UNITED STATES assigned to DPD Inc

Pulp fibers derived from wood or non-wood plants or recycled paper products, which are about 0.1-30 mm long and about 0.001-0.1 mm in diameter with length-to-diameter ratio of about 30-3000, are dispersed in conventional concrete mixtures using conventional mixing equipment for effectively improving fresh and hardened concrete properties at relatively low cost. Dispersion is achieved by individualizing the plant pulp fibers so that they are not fully bonded to each other, and dispersing the individual fibers in concrete at relatively low dosages of about 0.3-30 kg per cubic meter. Once individualized, the affinity of plant pulp fibers for water facilitates their dispersion in conventional concrete mixtures. Fresh concrete mixtures incorporating the dispersed individualized plant pulp fibers possess desirable workability, resistance to segregation and bleeding, pumpability, finishability, and reduced rebound when pneumatically applied. Hardened concrete materials incorporating the dispersed individualized plant pulp fibers provide improved crack resistance, toughness characteristics, impact resistance, fatigue life, abrasion resistance, and other mechanical, physical and durability characteristics. Precast and cast-in-place concrete as well as plain and reinforced concrete and shotcrete benefit from such improvements in fresh and hardened material properties rendered by dispersed plant pulp fibers.

5643978

**CEMENT ADMIXTURE PRODUCT
HAVING IMPROVED RHEOLOGICAL
PROPERTIES AND PROCESS OF
FORMING SAME**

Darwin David Charles; Gartner Ellis Martin; Chun Byong-Wa; Koyata Hideo; Kuo Lawrence Lu
Columbia, MD, UNITED STATES assigned to
W R Grace & Co -Conn

The present invention is directed to an imidized polycarboxylic acid polymer useful as a cement admixture, to improved cement compositions containing said polymer and to a process of forming the same.

5645773

**METHOD FOR PLACING CONCRETE
FOR CONSTRUCTION OF A MASTER
CONCRETE STRUCTURE**

Ichikawa Yasuaki Nagoya, JAPAN assigned to E R C Co Ltd

A method for placing concrete on a rock foundation to construct a massive concrete structure, such as a dam, a bridge pier or a foundation of a building, precludes development of cracks in the concrete by thermal stress. According to the method, stress exceeding an allowable limit for crack initiation and propagation is controlled by the following steps: (a) determining a temperature influence function to enable calculation of a thermal stress distribution under a temperature change by using results of a numerical analysis; (b) identifying a portion of the structure at which a crack will develop, by using said temperature influence function and a function of thermal change in said structure; (c) partially heating/cooling the vicinity of the identified portion and redistributing the excess stress predicted to cause cracking in the structure; and (d) reducing thermal stress in the structure by transmitting excess heat generated in the structure to another portion of the structure, at a location at

which crack development is not predicted. Preferably, a heat pump system is used for transferring the excess generated heat to another portion of the structure to control the excess stress.

5647899

**SEALING COMPOSITION FOR
CONCRETE**

Lightcap Donald Victor Woodburn, IN, UNITED STATES assigned to Midwest Biologicals Inc

An improved sealing composition for concrete which is effective for sealing a concrete surface to prevent the passage of water therethrough comprising a non-refined vegetable oil such as coconut oil, corn oil, cottonseed oil, palm oil, rapeseed (canola) oil, soya oil, sunflower oil, and mixtures thereof; an emulsifier effective for providing a oil-in-water emulsion, and water. A preferred composition comprises a pre-emulsion concentrate comprising essentially of about 95% to about 50% by weight of a non-refined vegetable oil, about 5% to about 50% of an emulsifier comprising a 3 mole ethylene oxide adduct of C12 and C14 alcohols; and water.

5650060

**IONICALLY CONDUCTIVE AGENT,
SYSTEM FOR CATHODIC PROTECTION
OF GALVANICALLY ACTIVE METALS,
AND METHOD AND APPARATUS FOR
USING SAME**

Huang Haitao; Hartman Richard B; Dietz Timothy Woodbury, MN, UNITED STATES assigned to Minnesota Mining and Manufacturing Company

An ionically conductive agent having means for reducing passivation of metal subject to anodic dissolution is disclosed. The ionically conductive agent is interposed between metal to be protected from corrosion and metal to be sacrificed to provide cathodic protection. An electrical connection between the two metals completes a

galvanic circuit. The means for reducing passivation can be either a complexing agent for ions of the metal to be sacrificed or can be a membrane to inhibit flow of ions that would affect the ability of the ionically conductive medium to support continued anodic metal dissolution. The ionically conductive agent and a system for cathodic protection using the ionically conductive agent is particularly suitable for a galvanic circuit to cathodically protect reinforcement bars in concrete structures such as transportation bridges, transportation highways, parking facilities, and balconies exposed to corrosive environments.

5653796

ADMIXTURE FOR CEMENT

Kawai Masaru; Igarashi Shuji Tokyo, JAPAN assigned to Dipsol Chemicals Co Ltd

An admixture for cement comprises phosphorous acid and/or a salt thereof or a waste fluid originated from an electroless nickel-plating process which contains phosphorous acid and/or a salt thereof. The admixture is used as a setting accelerator, a rust proofing agent for reinforcing steel or a frost resistive agent for concrete and mortar as hydraulic cement blends. The admixture not only permits improvement of the resulting concrete in the setting-accelerating effect, but also can maintain the compressive strength at a high level while maintaining the bleeding rate at a low level.

5656075

CONTROL OF EXPANSION IN CONCRETE DUE TO ALKALI SILICA REACTION

Gaidis James Michael; Gartner Ellis Martin Woodbine, MD, UNITED STATES assigned to W R Grace & Co -Conn

A cement composition including spodumene which has been heated to at least 1000°C which is capable of inhibiting expansion of the concrete due to the

alkali-silica reaction. The present invention also provides a method of reducing expansion in cement compositions.

5660620

WATERPROOFING COMPOSITION

Flores-Garza Rogelio Coahuila, MEXICO

The present invention refers to a waterproofing composition to be applied on any surface desired to be protected or on damaged surfaces in order to avoid moisture or water leakages to the inside of the rooms. The composition comprises or consists essentially of 30 to 40% Portland cement or Kaolin; 20 to 30% marble dust or silica sand, 25 to 35% lime and 3 to 12% ground salt, alum stone or calcium chloride. The resulting talcum texture powder is mixed with water and applied as paint.

5660624

SELF-REPAIRING, REINFORCED MATRIX MATERIALS

Dry Carolyn M Champaign, IL, UNITED STATES

Self-repairing, fiber reinforced matrix materials include a matrix material including inorganic as well as organic matrices. Disposed within the matrix are hollow fibers having a selectively releasable modifying agent contained therein. The hollow fibers may be inorganic or organic and of any desired length, wall thickness or cross-sectional configuration. The modifying agent is selected from materials capable of beneficially modifying the matrix fiber composite after curing. The modifying agents are selectively released into the surrounding matrix in use in response to a predetermined stimulus be it internal or externally applied. The hollow fibers may be closed off or even coated to provide a way to keep the modifying agent in the fibers until the appropriate time for selective release occurs. Self-repair, smart fiber matrix composite materials capable of

repairing microcracks, releasing corrosion inhibitors or permeability modifiers are described as preferred embodiments in concrete and polymer based shaped articles.

5660626

CEMENT DISPERSING AGENT

Ohta Akira; Sugiyama Tomomi; Tanaka Yoshio
Chigasaki shi, Kanagawa ken, JAPAN

A shrinkage-reducing dispersing agent for use in cementitious compositions such as concrete and mortar comprising a graft polymer which is a polycarboxylic acid or a salt thereof, having side chains derived from at least one species selected from (a) oligoalkyleneglycol and/or polyalcohol and (b) polyalkylene glycols or derivatives thereof.

5667340

CEMENTITIOUS COMPOSITION FOR UNDERWATER USE AND A METHOD FOR PLACING THE COMPOSITION UNDERWATER

Bury Jeffrey Macedonia, OH, UNITED STATES
assigned to Sandoz Ltd

A method for placing concrete underwater comprising pumping a flowable cementitious mixture comprising cement, water and one of either BNS or a cellulosic polymer to the underwater point of discharge of the cementitious mixture from a delivery tube and adding into the flowable cementitious mixture at the point of discharge, the other of the BNS or a cellulosic polymer resulting in a cementitious mixture having zero flow characteristics.

5667581

QUICK-HARDENING HYDRAULIC BONDING AGENT

Unsin Joachim; Braunbach Hans Peter; Tax Manfred
Heidelberg, GERMANY assigned to
Heidelberger Zement AG

The present invention relates to a quick-hardening hydraulic bonding agent consisting of calcium silicate cement, particularly Portland cement, as well as additives and/or common admixtures which is characterized by a content of: 94.70 to 99.79% in weight of calcium silicate cement; 0.01 to 2.0% in weight of an organic and/or inorganic accelerator for the hydration of the calcium silicates; 0.1 to 3.0% in weight of an organic and/or inorganic retarding agent which inhibits the hydration of the calcium silicates, possibly having a liquefying effect; 0.01 to 0.30% in weight of an inhibiting agent with respect to the formation of the calcium aluminate sulfate hydrates.

5668195

FLUIDIFYING AGENTS FOR CEMENTITIOUS COMPOSITIONS BASED RANDOM COPOLYMERS, COMPOSITIONS COMPRISING THE SAME, AND METHODS FOR THEIR USE

Leikauf Bernhard Linn, SWITZERLAND
assigned to MBT Holding AG

A random copolymer corresponding to Formula I in free acid or salt form having the following types and numbers of monomer units; (*See Patent for Chemical Structure*) wherein A is selected from the moities (i) and (ii); (*See Patent for Tabular Presentation*) PS wherein R1 and R3 are selected from substituted benzene, C1-8alkyl, C2-8alkenyl, C2-8alkylcarbonyl, C1-8alkoxy, carboxyl and hydrogen, or R1 and R3 can together with R2 and/or R4 form a ring; and R2 and R4 are selected from hydrogen and C1-4alkyl; and (*See Patent for Chemical Structure*) (ii) wherein R1 and R3 are as

for (i) and R7, R8, R9 and R10 are individually selected from hydrogen and C1-6alkyl, or R1 and R3 together with R7 and/or R8, R9 and R10 form a continuous C2-8 hydrocarbon chain joining the carbon atoms to which they are attached, the hydrocarbon chain optionally comprising at least one hetero atom and the ring optionally having at least one anionic group, preferably sulphonic; M is selected from hydrogen and the residue of a hydrophobic polyalkylene glycol or a polysiloxane, with the proviso that when A is (ii) and M is the residue of a hydrophobic polyalkylene glycol, M must be different from the group $-(R5O)mR6$ R5 is a C2-8alkylene radical; R6 is selected from C1-20alkyl, C6-9cycloalkyl and phenyl; n, x and z are numbers from 1 to 100; y is 0 to 100; m is 2 to 100; and the ratio of x to (y+z) is from 1:10 to 10:1 and the ratio of y:z is from 5:1 to 1:100. The copolymers are useful as fluidifying agents in cementitious compositions such as concrete and mortar.

5669969

PROCESS FOR FORMING AGGREGATE; AND PRODUCT

Meade William Delber; Pearson John William
Brooklyn Park, MN, UNITED STATES assigned
to Greengrove Corporation

A process for forming an ash aggregate is provided. The process involves mixing a cellulose sludge material with an ash component. The ash component may comprise fly ash or sanitary waste ash in combination with fly ash. The sludge component preferably comprises paper mill sludge or pulp mill sludge. The hard lightweight aggregate may be utilized in a variety of manners, for example, to provide lightweight concrete and lightweight concrete mixes.

5670578

CEMENT ADDITIVES

Shawl Edward Wallingford, PA, UNITED STATES assigned to ARCO Chemical Technology L P

Substances useful as water reducing and superplasticizer additives for cement compositions are formed by reaction of carboxylic acid polymers with a mixture of monofunctional and difunctional polyethers derived from C2-C4 epoxides wherein partial cleavage of the polyethers and esterification of the polyethers and the cleavage products thereof by the other reactant are achieved. In one embodiment, a sulfonic acid is used to catalyze the reaction of poly(acrylic acid), a monofunctional ethylene oxide-propylene oxide copolymer, and a difunctional poly(propylene glycol), at a temperature in excess of 140°C

5671581

WATER CUT-OFF PROCESS FOR CONCRETE STRUCTURE

Nagahama Shigeo Hiyama Gun, Hokkaido, JAPAN

A method of preventing water leakage through a concrete substrate on the ground into an inner space of an underground structure. Underground structures located adjacent water tables maybe sealed against the intrusion of water as by drilling an opening to the outer side of the concrete substrate. A pipe possessing a valve is then inserted with the valve in a cut-off position to stem the flow of water leaking through the substrate. Cement slurry is then inserted through the pipe into the opening until a portion of the cement is in place along the outer side of the concrete substrate adjacent the ground. An inner end of the pipe is then cut away with the cement slurry being allowed to dry for approximately one day. Unhardened cement is removed from the pipe from which water is still leaking. A cement powder is heaped upon the opening and is compacted into the opening via

an impacting hammer. After necessary repeated filling and impacting of the cement powder the inner side of the concrete substrate is finished with a cement paste.

5672214

CONCRETE SOLAR CELL

Arthur John; Graupner Robert K; Monson Tyrus K; Van Vechten James A; Wolff Ernest G Corvallis, OR, UNITED STATES assigned to State of Oregon acting by and through the State Board of Higher Education on behalf of Oregon State University

An inexpensive, robust concrete solar cell comprises a photovoltaic material embedded in and extending beyond front and rear major surfaces of a matrix layer. The matrix layer typically comprises a high-strength, cementitious material, such as a macrodefect-free cement, reinforced with electrically nonconductive fibers distributed throughout the matrix layer. The photovoltaic material comprises particles of high-resistivity single crystal silicon, typically ball milled from ingot sections unsuitable for slicing into silicon wafers. An aluminum sheet attached to the rear major surface provides electrical contact to one of two electrical region of the semiconductor particle, and a translucent conductive layer on the front major surface provides electrical contacts to the second electrical region. Overlapping electrically conductive reinforcing fibers are embedded at the front major surface of the matrix layer to decrease the sheet resistivity of the surface and to inhibit the formation of surface cracks. Digitated electrode further improves surface conductivity for conducting current off the cell. A voltage is generated between the two conductive layers when light incident on the semiconductor particles through the translucent conductive layer creates charge carriers that are propelled toward the conductive layers by a built-in field.

5675085

METHOD AND APPARATUS FOR MEASURING DEPTH OF CRACK FOR REINFORCED CONCRETE CONSTRUCTION

Hayashi Masano; Kimura Masatoshi; Motegi Kaoru; Tsuchikawa Jiro; Hirose Masayuki; Taya Koudo Tokyo, JAPAN assigned to H & B System Inc; Imperial Consultant I

By arranging a pair of an ultrasonic wave transmitting sensor and an ultrasonic wave receiving sensor in opposition across a crack in a reinforced concrete construction. An ultrasonic wave is transmitted from the ultrasonic wave transmitting sensor at a first position. A reflected wave is then received by the ultrasonic wave receiving sensor at the first position. Also, the ultrasonic wave is transmitted from the ultrasonic wave transmitting sensor at a second position. A reflected wave is then received by the ultrasonic wave receiving sensor at the second position. The received waves at two positions are provided mutual phase shift for a predetermined period and summed in reversed phase for deriving a rise time of the wave reflected from the crack. By this, even when reinforcement is arranged in the concrete, the noise component superimposed on the received wave due to presence of the reinforcement can be eliminated to permit high precision measurement of the depth of the crack irrespective of the presence of the reinforcement at high density.

5676749

HIGHLY FLUIDIZED CONCRETE COMPOSITION

Takagi Yoshihiko Takefu, JAPAN assigned to Marutaka Concrete Industry Co Ltd; Takagi Corporation Nissan Chemical Industries Ltd

A concrete composition contains, per 1 m³ of the concrete composition, powders of normal portland cement, high-early strength Portland cement, and an inorganic material, in a total weight of from 400

to 600 kg; a formalin condensation product of melamine sulfonate in an amount of from 0.1 to 2.5 wt % based on the total weight of the powders; a hardening accelerator in an amount of from 0.01 to 1.50 wt % based on the total weight of the powders; and water, fine aggregate and coarse aggregate. The mixing ratio of the powders is so specified that the powder of high-early strength portland cement is in a range of from 20 to 500 parts by weight and the powder of an inorganic material is in a range of from 20 to 500 parts by weight on the basis of the powder of normal portland cement of 100 parts by weight. The water, fine aggregate and coarse aggregate are mixed in such a mixing ratio as to give a slump flow value ranging from 50 to 70 cm to the concrete composition. The concrete composition exhibits a high initial strength and enables preferable concrete placing or molding without compactness using a vibrator, tamper, wooden hammer or the like.

5678234

PROCESS FOR THE ENCAPSULATION AND STABILIZATION OF RADIOACTIVE, HAZARDOUS AND MIXED WASTES

Colombo Peter; Kalb Paul D; Heiser John H Patchogue, NY, UNITED STATES assigned to Associated Universities Inc

The present invention provides a method for encapsulating and stabilizing radioactive, hazardous and mixed wastes in a modified sulfur cement composition. The waste may be incinerator fly ash or bottom ash including radioactive contaminants, toxic metal salts and other wastes commonly found in refuse. The process may use glass fibers mixed into the composition to improve the tensile strength and a low concentration of anhydrous sodium sulfide to reduce toxic metal solubility. The present invention preferably includes a method for encapsulating radioactive, hazardous and mixed wastes by combining substantially anhydrous wastes, molten modified sulfur cement, preferably glass fibers, as well as anhydrous sodium sulfide or calcium hydroxide or

sodium hydroxide in a heated double-planetary orbital mixer. The modified sulfur cement is preheated to about 135 degrees \pm 5°C, then the remaining substantially dry components are added and mixed to homogeneity. The homogeneous molten mixture is poured or extruded into a suitable mold. The mold is allowed to cool, while the mixture hardens, thereby immobilizing and encapsulating the contaminants present in the ash.

5678372

SYSTEM FOR BUILDING CONSTRUCTION USING PREFORMED, REINFORCED CONCRETE PANELS

Thomson Donald W; Nichols Frank B San Jose, COSTA RICA assigned to Constr-Plus Internacional S A

Adjacent reinforced, preformed wall panels are joined to one another by a wet-knit joint. The confronting edges of the wall panels are formed to have an undulating pattern of alternating convex, concave segments having ends of reinforcement bars extending from the concave segments. The reinforcement bar ends are connected to an arrangement of elongate bars and a zig-zag reinforcement bar, that knits the wall panels together. The wet-knit joint is completed by the introduction of concrete, or other pourable material, that, when cured, creates a strong connection between the wall panels.

5679119

FIBER-REINFORCED MAGNESIUM OXYCHLORIDE BOND

Freeman Stephen M; Hanson David B Roscoe, IL, UNITED STATES assigned to Western Atlas

Magnesium oxychloride cement bonds reinforced with selected fibers have improved resistance to cracking and disintegration in use. Particular embodiments include fiber-reinforced abrasive tools based on these bonds which have improved

bond integrity in dry-grinding applications.

5679150

**DRYING SHRINKAGE CEMENT
ADMIXTURE**

Kerkar Awdhoot Vasant; Dallaire Michael Paul
Columbia, MD, UNITED STATES

A cement admixture composition composed of an oxyalkylene compound and betaine. The betaine permits air entrainment in the presence of the oxyalkylene compound, which is used as a shrinkage reduction aid.

5681384

**METHOD FOR INCREASING THE RATE
OF COMPRESSIVE STRENGTH GAIN IN
HARDENABLE MIXTURES CONTAINING
FLY ASH**

Liskowitz John W; Wecharatana Methi;
Jaturapitakkul Chai; Cerkowicz Anthony E
Belle Mead, NJ, UNITED STATES assigned to
New Jersey Institute of Technology

The present invention relates to concrete, mortar and other hardenable mixtures comprising cement and fly ash for use in construction. The invention provides a method for increasing the rate of strength gain of a hardenable mixture containing fly ash by exposing the fly ash to an aqueous slurry of calcium oxide (lime) prior to its incorporation into the hardenable mixture. The invention further relates to such hardenable mixtures, e.g., concrete and mortar, that contain fly ash pre-reacted with calcium oxide. In particular, the fly ash is added to a slurry of calcium oxide in water, prior to incorporating the fly ash in a hardenable mixture. The hardenable mixture may be concrete or mortar. In a specific embodiment, mortar containing fly ash treated by exposure to an aqueous lime slurry are prepared and tested for compressive strength at early time points.

5681385

**METHOD FOR RETARDING
EFFLORESCENCE IN BUILDING
MATERIALS AND BUILDING MATERIAL
THAT EXHIBITS REDUCED
EFFLORESCENCE**

Beckenhauer Thomas Federal Way, WA,
UNITED STATES

Efflorescence of building material, such as portland cement based building products, masonry, brick, concrete, and mortar, can be retarded by contacting the building material with polyvinylalcohol (PVOH). The PVOH may be dissolved in solvent, preferably water, and either applied to a surface of the building material, or added to the components that form the building material. The PVOH has a hydrolysis percentage above about 90%.

5683344

**METHOD FOR SOLIDIFICATION AND
STABILIZATION OF SOILS
CONTAMINATED WITH HEAVY
METALS AND ORGANIC COMPOUNDS
INCLUDING EXPLOSIVE COMPOUNDS**

Channell Michael G; Fleming Beth Vicksburg,
MS, UNITED STATES assigned to The United
States of America as represented by the Secretary
of the Army

A method for solidification and stabilization of soils contaminated with heavy metals and organic compounds removable by activated carbon includes the steps of placing a selected weight of the contaminated soil in a vessel, adding water to the contaminated soil in the vessel, mixing the soil and the water in the vessel, adding activated carbon to the mixture of soil and water in the vessel, mixing the soil, water and carbon in the vessel, adding cement and fly ash to the mixture of soil, water and carbon in the vessel, mixing the soil, water, carbon, cement and fly ash in the vessel and pouring the mixture of soil, water, carbon, cement

and fly ash into a mold and curing the mixture therein.

5683503

COMPOSITION FOR AND METHOD OF PUMPING CONCRETE

Montgomery Daniel P Mesquite, TX, UNITED STATES assigned to Fritz Industries Inc

A composition for and a method of promoting the flow of a concrete slurry through a pump and a conduit is provided. The composition is a dry particulate mixture comprised of a water soluble, inorganic material and a solvatable, organic polymer. The composition, when mixed with a suitable quantity of water, is useful in a method of priming a pump used to pump a concrete slurry. The composition, when mixed with a concrete slurry, is useful to improve the flow of the slurry through a conduit.

5685902

CARBON FIBER-REINFORCED CONCRETE AND METHOD FOR PREPARING THE SAME

Tezuka Mitsuharu; Awata Mitsuru; Shiraki Akira Aoba ku, JAPAN assigned to Mitsubishi Chemical Corporation

A carbon fiber-reinforced concrete containing a cement, a coarse aggregate, a fine aggregate, a carbon fiber and water, the carbon fiber having an average length not less than the maximum size of the coarse aggregate and also a tensile strength of at least 300 kgf/mm².

5685903

CEMENTITIOUS GYPSUM-CONTAINING COMPOSITIONS AND MATERIALS MADE THEREFROM

Stav Elisha; Burkard Edward A; Finkelstein Ronald S Amherst, NY, UNITED STATES assigned to National Gypsum Company

A cementitious composition useful for water-resistant construction materials, including floor underlayments, backing boards, self-leveling floor materials, road patching materials, fiberboard, fire-proofing sprays, and fire-stopping materials includes about 20 wt. % to about 75 wt. % calcium sulfate beta-hemihydrate, about 10 wt. % to about 50 wt. % Portland cement, about 4 wt. % to about 20 wt. % silica fume and about 1 wt. % to about 50 wt. % pozzolanic aggregate. The Portland cement component may also be a blend of Portland cement with fly ash and/or ground blast slag.

5686181

CARBON FIBERS FOR REINFORCEMENT OF CEMENT AND CEMENT COMPOSITE MATERIAL

Takano Katsumi; Katsuta Yasushi; Nakajima Hideyuki; Nagata Yoshikazu; Ohno Sadatoshi; Kakizawa Tadahiro; Yonezawa Toshio; Ida Junichi; Iwata Masaki Ibaraki ken, JAPAN assigned to Petoca Ltd; Takenaka Corporation

There are here disclosed carbon fibers for reinforcement of cement which are obtained by applying, onto the surfaces of carbon fibers, esters of oleic acid and aliphatic monovalent alcohols, esters of oleyl alcohol and monovalent fatty acids, polyoxyalkylene bisphenol ethers or polyether esters as sizing agents, and a cement composite material having a bending strength of 300 kgf/cm² or more which contains cut carbon fibers having a fiber length of 10 to 50 mm at a mixing volume ratio of the cut carbon fibers to the cement matrix in the range of 1 to 5%. According to the present invention, there are provided the carbon fibers for

reinforcement of cement which have excellent adhesive properties to the cement, good process passage properties through a direct spray gun and good bundling properties and which are suitable for a direct spray method, and the cement composite material using the carbon fibers and having high bending strength.

5691050

**CONCRETE MOLDING WITH IMPROVED
ACID RESISTANCE**

Berg Volkmar; Rinno Helmut Graben, GERMANY
assigned to Hoechst Aktiengesellschaft

Unreinforced or reinforced concrete moldings, for example concrete pipes, with improved corrosion resistance to acids and acidic sewage, improved

permeation resistance to inorganic and organic liquids and gases and improved mechanical stability, produced by molding with machines, for example in press molding machines or extrusion machines or concrete pipe pressing machines, and allowing to harden plastic-viscous concrete mixtures of hydraulic inorganic binders, preferably cement, aggregates and water, where, in the preparation of the plastic-viscous concrete mixtures, to the latter has been added in a positive mixer an effective amount of an aqueous plastics dispersion based on anionic and hydrolysis-resistant copolymers of ethylenically unsaturated monomers, the minimum film forming temperature (MFT) of which is above the setting temperature of the concrete mixture, preferably above 23°C Use of the concrete moldings as concrete precast parts for many various applications, preferably as construction elements in building construction, road building, bridge building, civil engineering, in particular in sewage pipeline construction for underground sewer lines and service water lines.



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