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UNITED STATES PATENT OFFICE

2,547,127

CALCIUM SILICATE OF MICROCRYSTALLINE LATHLIKE STRUCTURE

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2 Claims. (Cl. 23—110)

This invention relates to the production of a [illegible] hydrous silicate which suitable for [illegible] the field of high temperature, [illegible] and which may also be used [illegible] as insulation [illegible] a structural unit such as roof tile.

The primary object of this present invention is the production of a new hydrous silicate product [illegible] microcrystalline structure [illegible] throughout the product, thus providing a high degree of [illegible] not found in the usual hydrous silicate products.

Another object is the production of a new hydrous silicate having the properties of great [illegible] as well as [illegible] shock.

A [illegible] object is the [illegible] product [illegible] to CO_2 [illegible] and resistance to corrosion by water.

Other objects will be apparent from the following [illegible]

[illegible]

[illegible]

Apparently the general formula [illegible] silicate [illegible] the material [illegible] of light weight, having a microcrystalline fine texture and readily being of apparent homogeneity throughout the body of the material. It combines light weight and a texture [illegible] with a modulus of rupture [illegible] the material for various [illegible] structural [illegible].

It is well known in the field of hydrous silicate products that [illegible] silica and water [illegible] gel or [illegible] microcrystalline structures, and that the extent to which they are converted to crystalline [illegible] depends on their nature, the temperature employed, the time of induration and the composition of the mixture from which they are to be produced. These gels are formed at temperatures and during periods of induration used, for example, in the manufacture of sand-lime brick and low density hydrous calcium silicate products. [illegible] with calcium silicate hydrates in products produced at temperatures in excess of those used in manufacturing processes in the silicate field. A most [illegible] of these [illegible] and a [illegible] crystal structure [illegible] in which the lime [illegible] that commonly employed, and which has been indurated at certain controlled and regulated low temperatures. However, by indurating at pressures in excess of 125 pounds per square inch (125 p.s.i.) and 175° C. these "gel" phases may [illegible] and they may also [illegible] at low [illegible].

The [illegible] of this present invention is the preparation of a synthetic indurated hydrous silicate product having a microcrystalline lathlike [illegible] [illegible] fusible.

By control of variables such as temperatures, pressures, time of induration, degree of dispersion of the solids in liquid carriers, the degree of fineness of the solids, any and all deleterious gel or gel-like phases may be substantially eliminated and pure lath-like microcrystalline crystals varying in length from the submicroscopic to length easily discernible under a microscope will be the final resultant.

This microcrystalline lath structure is superior to other hydrous silicate type structures in properties such as heat insulation, modulus of rupture, shrinkage during drying and stability at elevated temperatures. This new product is superior to previously manufactured hydrous silicate products with respect to its resistance to CO_2 attack of air and resistance to corrosion by water.

It can be synthesized from high calcium quicklime, or high calcium hydrated lime, and ground quartz or various other forms of silica without

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[illegible] of water upon the mixing, regulation of the period elapsing between proportioning and mixing or subjecting

In this same slurry, these crystalline reactive solids will be found to have formed a certain uniform particle and particle relationship to each other and to the liquid in which they are suspended therethrough and dispersed therein, providing thereby a uniform dispersion and suspension of these solids throughout the dimensions of the mold. And this dispersion and suspension remains static and permanent through the curing period, resulting in a porous product in which both the suspension agents and the solids have reacted and combined with each other in and in their respective particles to become a single integral part thereof in the form of the specific and individual identity of the suspension agent so far as the human eye is concerned.

This loss of specific and individual identity of the crystals during incubation of the slurry is based upon the fact that the crystals, per se, will enter into reaction and after completion of the reaction of the mass it will be [illegible] formed and preformed crystals [illegible] formed crystals [illegible] the mass.

Thus, if the finely divided reactive silica and dispersed or dissolved lime, as lime in water, are dispersed through a large volume of water, and the particles (or solution) retained in such a wide state of dispersion with and by the preformed reacted lath-like or plate crystalline compounds of my said and the reactive therebetween to form hydrous calcium silicate in different plate or lath-like crystals of hydrous calcium silicate will be induced or compelled to grow and combine with the preformed crystals and present a dispersed, entangled mass of crystals throughout the entire volume into which the reactive agents (and such points of injection) have been held suspended during reaction. Moreover, the [illegible] forming or plate crystals in the course of their growth, have a point of [illegible] with or plate growing crystals and with the preformed crystals and thus all these crystals will become intermeshed to form an interlaced, open lattice of permanent arrangement and integrated structure following the pattern set therefor by the original suspension of the preformed crystals and solids in the slurry.

Thus the preformed crystals and the solids are continuously maintained in their original spaced relationships through the conversion period and continue to occupy the same volume and shape, in this integrated lattice system which they formed in the water dispersion alone.

Upon completion of the crystal growing phase and subsequent removal of the uncombined water, the integrated mass will present innumerable voids and air spaces which will be found to be continuous and capillary in character and intercommunicating, the result of which will be a product of continuous, filamentary, microscopically fine crystal formation having intervening small attenuated capillary air spaces between and separating them and with said spaces greater in volume than the solids.

Such a structure presents a product of low thermal conductivity and conversely of high insulating value and possessed of high form-retaining value and tensile strength and very low apparent density.

The essence of this invention resides in the formation of a liquid slurry of reactive solids, held in suspension in the liquid by a suspension agent of the similar chemical identity as the solids, wherein the water-solids ratio is greater than 1:1, reacting the slurry by heat and/or pressure to form an integrated product wherein the suspension agent will integrate with the reactive solids to become an integral part thereof but with retention of the respective relationships of the agent and solids but with the

[illegible] directly proportional to the water to solids ratio of the original slurry.

From the preceding description it should be apparent that [illegible] of other crystalline compounds or [illegible] having the characteristics and [illegible] to form a stable permanent suspension of solids in a liquid may be employed in carrying out the present invention and it should be further apparent that these suspension agents not only lose their specific and individual identities but they also integrate with the reactive solids to become an integral part of the end product without any deleterious effects thereto.

Further, it should be apparent that there is a very [illegible] between the suspension agent and the reactive solids in that the suspension agent becomes an integral part of the end product without any chemical [illegible] between it and the integrated mass as a whole, without leaving any foreign agent or converted product therein, embedded or otherwise and differing from the integrated end product and that would have a [illegible] upon the [illegible] of the integrated mass.

The terms [illegible] herein are synonymous and contemplate any crystalline compound formed from reactive lime and silica that has the necessary characteristics to carry out the invention set forth herein and in fields other than the lime-silica field.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. The method of [illegible] apparent density products from stable [illegible] finely divided reactive solids, comprising forming an aqueous slurry having dispersed therein reacted hydrous calcium silicate crystals of lath-like shape and nearly colloidal dimensions and in discrete particle form, said crystals having surface areas of approximately 45 [illegible] square meters per gram of weight, said [illegible] formed from the group consisting of [illegible] compounds which [illegible] $5CaO.5SiO_2.H_2O$, and finely divided reactive [illegible] of lime and silica, the molar ratio of lime to silica being at least 0.65:1 to about 1:1, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being greater than 1:1 and reacting the reactive solids of said slurry while in suspension by subjecting same to a temperature and pressure in excess of respectively 175° C. and 130 p. s. i. abs.

2. The method of making light apparent density products from stable suspensions of finely divided reactive solids, comprising forming an aqueous slurry having dispersed therein reacted hydrous calcium silicate crystals in discrete particle form, and finely divided reactive solids in the form of lime and silica, said discrete particles being crystals of lath-like shape, of nearly colloidal dimensions and having the chemical composition $5CaO.5SiO_2.H_2O$, said crystals having surface areas of approximately 45 to 54 square meters per gram of weight, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being in excess of 1:1 by volume and reacting the reactive solids of the said slurry while in suspension by subjecting same to a temperature and pressure in excess of respectively 175° C. and 130 p. s. i. abs.

3. The method of making light apparent density products from stable suspensions of finely divided reactive solids, comprising forming an aqueous slurry having dispersed therein reacted hydrous calcium silicate crystals in discrete particle form, and finely divided reactive solids

[illegible] the formulation will result and provide a slurry capable of conversion to end products having a molar ratio of lime to silica of about 1:1 in the integrated end product.

The conditions set forth above are also true with respect to producing xonotlite in integrated form

($6CaO \cdot 6SiO_2 \cdot H_2O$)

except that the molecular ratio will be 0.8:1 in the end product, thus requiring a different and specific regulation of the added lime and silica components.

In the light apparent density range of products herein contemplated, it will be found necessary to add to a mixture of lime, silica and water an amount of synthetic crystalline material in discrete particle form sufficient to support the solids of the granular components in a fine dispersion and suspension in the liquid medium, from the time of completion of the mixing operation until sufficient reaction has occurred thereafter retain the components in their originally dispersed and suspended relationship.

The added reacted crystalline crystals in discrete particle form [illegible] uniformly throughout a volume of liquid upon being mixed therewith in dilute proportions (e. g. not in excess of 8:1 by weight). They will acquire and maintain a random and spaced apart arrangement throughout the fluid mixture with the resultant effect of random dispersion of the lime-silica solids and will induce incipient crystal formation at and from such spaced apart points as well as from the dispersed solids under reaction temperature and pressure and form with the converted solids an integrated porous structure. These added previously reacted synthetic crystalline compounds, because of their scale or lath-like shape, nearly colloidal dimensions and high specific surface areas, will form an interlaced and interlocked laminar lattice system, capable of supporting the finely divided solids of the mixture in the liquid, and are said to form three-dimensional network or lattice system the reactive materials such as finely divided free lime and silica, or lime and silica in other forms, are capable of dispersion without destroying either the lattice system or the suspension provided by these pre-formed hydrous calcium silicate crystals.

Thus, in the production of a particular integrated product, such as, synthetic xonotlite in integrated form, there is provided an aqueous slurry composed of added unreacted lime and unreacted silica, added reacted synthetic hydrous calcium silicate crystals containing lime and silica in a molar ratio of 1:1 and added hot water (150–175° F.); the added lime and silica being mixed together with the added reacted synthetic crystals and dispersed and suspended in and upon the lattice system formed by the added reacted synthetic crystals and with a ratio of water to total solids greater than 1:1 and wherein the total CaO and SiO_2 of the added solids and that of the crystals is in a molar ratio of 1:1.

After complete mixing of the above subject slurry, it is poured into molds or otherwise shaped and subsequently subjected to reaction temperature and/or pressure for a period of time sufficient to react all of the component materials, including the silicate crystals into an integrated or combined form, and then dried.

In this particular instance, where the molar ratio of the total lime to total silica is approximately 1:1, the molded slurry is subjected to a predetermined saturating temperature and pressure in excess of 175° C. and 130 p. s. i. abs., in an autoclave for a period of time varying downwardly from approximately 15 hours depending upon the pressure being utilized.

In the lime-silica system it is necessary, in order to produce a given end product, to start with a specific slurry

[illegible] ratio and to [illegible] and temperature and of its equivalent pressure. For example:

#1. Xonotlite (crystalline compound)

Molar ratio	1:1.
Temperature	approximately 350° C.
Pressure	222# p. s. i. abs.
Time	8 hours.

#2. Lepsil (crystalline compound)

Molar ratio	.8:.825:1.
Temperature	approximately 175° C.
Pressure	130# abs.
Time	8 hours.

#3. (Tobermorite type of material)

Molar ratio	.65 :1.0:1.
Temperature	180° C.
Pressure	150# p. s. i. abs.
Time	12 hours.

As a further example of the utilization of this invention [illegible] of the crystalline compound, [illegible] the crystalline compound lepsil containing lime and silica in a molar ratio of 0.8:1, to produce either a pure compound or a combination of the particular compound and another hydrous calcium silicate.

#1 21 p. c. f.—W/S ratio=3/1

	Pounds
Suspension agent (lepsil)	350
C/S ratio 0.8:1:	
Lime	1066
Silica	1760
Water	9500

#2. 11 p. c. f.—W/S ratio=6/1

	Pounds
Suspension agent (lepsil)	225
C/S ratio 0.8:1.	
Lime	355
Silica	98
Diatomaceous earth	378
Water	6700

If the suspension agent is the crystalline compound xonotlite having lime and silica in the molar ratio of 1:1 the following composition will produce a pure crystalline product having the molar ratio of lime to silica of 1:1 therein.

#3. 7 p. c. f.—W/S ratio=8/1

	Pounds
Suspension agent (xonotlite)	1600
C/S ratio 1.0:1.0:	
Lime	2330
Silica	2500
Water	51400

Other formulations having various lime to silica ratios of at least 0.65:1 to about 1:1 may be utilized in various water to solids ratios to produce products having densities ranging from the lightest p. c. f. in integrated form up to the point where the water to solids ratio is such as to obviate the need of any suspension of the reactive solids. The quantity of the particular reacted crystalline form of suspension agent required will vary with the desired density of the end product and in the entire range of products will be in a range of from approximately 5% to approximately 30% of the total solids of the slurry by weight, i. e., the solids including the lime, silica and the suspension agent. Such products may be made as pure crystalline compounds, a combination of compounds, a combination of a compound or compounds and diverse crystal structures.

[illegible]

METHOD OF MAKING [illegible] CALCIUM SILICATE PRODUCTS

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No Drawing. Application April 3, 1952, Serial No. 280,397

9 Claims. (Cl. 106—120)

In the production of various types of products in the Lime-silica-water system, many attempts have been made to produce integrated products of light apparent density and some measure of success has been attained but in many instances, either the particular process followed or the particular materials utilized, or both, limited the degree of [illegible] values.

In the manufacture of such integrated products within this system, the art, both patent and industrial, has had recourse to various methods of retarding the settling of solids in their liquid carriers, such as the use of bentonite gels, cooling, use of starch, etc. None of these, however, provide a permanent suspension, i. e., they retard the rate of settling of the solids but never provide a slurry having a stable suspension of the solids in a liquid carrier wherein the characteristics thereof carry over into the final integrated product. It will be found in these products that density varies thru the thickness of the product thus presenting a product of nonuniform density.

The use of either bentonite or powdered aluminum permits the production of comparatively light density products but the use of these materials as retardation or levitating agents for the solids in the slurries constitutes detrimental factors that result in a limitation of the ultimate use of the products.

A new theory of suspension, as distinguished from retardation, has been described in the recent Fraser Patent 2,465,379 wherein highly specialized asbestos fibers provide a system of suspension for the solids in a liquid carrier, which suspension is permanent to the extent that the original dispersion, suspension and the suspension agent retain their respective suspended position in the final product. However, this agent, namely, finely microsized asbestos fiber is non-reactive and retains its identity thereby presenting, for some purposes, an unsightly product and a product incapable of accepting a smooth surface finish.

There are at least two distinct differences between the old retardation methods and that of the Fraser patent, supra, namely, in the old methods the agents of retardation are converted and are only present in the ultimate product in their converted form whereas in Fraser, the agent is not converted but retains its original identity and remains imbedded in the end product in its original position.

All of these above discussed methods of retardation and suspension present in the end product some detrimental characteristic, for example, bentonite when used in quantities sufficient to provide a degree of retardation capable of producing a light density product, produces a very much weakened product of nonuniform density, while the above mentioned suspension of Fraser, although capable of producing a product of extremely light and uniform density with high modulus of rupture, also produces a product wherein the exterior surfaces are fuzzy and incapable of receiving or accepting a commercially smooth surface finish.

In the present invention, the primary object is to produce a product of extremely light uniform density, high modulus of rupture and having the capacity to accept a high surface finish.

A further object is the production of an integrated product in the light apparent density range in which suspension in a slurry of the solids, namely, lime and silica is necessary and wherein the suspension agent is a crystalline compound that loses its specific or individual identity in the end product.

Other objects will be apparent from the following specification.

To obtain the product of the present invention, it is necessary to have as the agent of suspension a crystalline compound in discrete particle form, the finished crystal having specific surface areas capable of rendering a high degree of dispersion and stable suspension of the solids in a liquid medium.

A further distinctive feature in the production of this type product is that the agent of suspension becomes an integral part of the finished product and loses its specific individuality.

Although the preferred use of this present invention is the formation of a permanent suspension for making integrated products, it is not beyond the purview of the invention to use these crystalline compounds for obtaining suspensions of various other solids in liquid mediums of various types and in particular, where it is requisite that the agent of suspension should lose its specific apparent identity in the end product.

Further, it is the purpose to provide not only a stable permanent suspension of the solids in a liquid carrier but to obtain such suspension with an agent the dimensions of which are of colloidal or nearly colloidal order and which will lose its specific and individual apparent identity in the finished product and permit the final product to accept a smooth surface finish.

Such an agent may be the product in discrete particle form obtained in accordance with the invention of the corresponding application, Serial No. [illegible], filed March, 1948, now abandoned owned by a common assignee and which is directed to the manufacture of Lepisil, $4CaO.5SiO_2.5H_2O$, in discrete particle form.

Lepisil in discrete particle form, is an extremely thin scale or plate-like shape having specific surface areas ranging approximately from 48 to 55 square meters per gram of weight.

Other similar agents, such as synthetic xonotlite, $5CaO.5SiO_2.H_2O$ in discrete particle form, because of its lath-like form and also its high specific surface areas, approximately 45 to 54 square meters per gram of weight, may also be used as a suspension agent and there may be other silicate compounds or structures having the necessary attributes for this purpose but as the specific example in this present specification, xonotlite shall be referred to as the agent for suspension.

Suspension of the finely divided lime and silica solids as contemplated in this invention is only necessary in the light density field, i. e., wherein the apparent density ranges from the lightest up to approximately 40 p. c. f. or wherein the ratio of liquids to total solids is greater than 1:1 by volume.

In order to produce a particular lime-silica integrated product, for example, xonotlite ($5CaO.5SiO_2.H_2O$) in accordance with this invention, a specific molecular ratio of lime to silica must be present in the slurry, which in this instance, is 1:1.

These lath-like silicate crystals of synthetic xonotlite, which provide this basis for suspension of the solids in a liquid, each contain lime and silica in a molar ratio of 1:0 and thus provide in the slurry a predetermined weight of these two reactive components. The added lime and silica either in free or combined form must be added in

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[illegible] GEORGE L. [illegible]

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The following references are of record in the file of this patent:

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Number	Name	Date
[illegible]	[illegible]	Sept. 24, 1940
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[illegible]	[illegible]	May 16, 1949

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[illegible]	Great Britain	[illegible]
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[illegible] The [illegible] mixture is then ready for [illegible] as [illegible] to produce [illegible] for the highest [illegible] product [illegible] the 15 p. s. i. [illegible] density.

In the range from about 15 to 45 p. s. i. applied pressure the molar ratio of lime to silica will be 1:1 and water in proportion of dry [illegible] from about 4.5 to 1 lb. The [illegible] lime [illegible] will suffice to react with the [illegible] of the solids. In the range from about 20 to 45 p. s. i. applied pressure the ratio of water to solids will range from about 3.5 to .35 parts water for each part of dry [illegible]. In this manner an equivalent amount of dry powdered CaO [illegible] instead of quicklime will be used, and for pressures in excess of 45 p. s. i. the raw mix will be a plastic paste. Reaction will be hastened or forced in a manner similar to that for [illegible] mixes for short periods of time, that is, they may be hand placed, poured into molds or extruded.

As an indication of the strength obtainable in this new product, without pressing, as well as the short maturating periods required, there is listed here below a table showing the results obtained with [illegible] in their process of maturation at a temperature and pressure of [illegible] and 200# respectively.

Table I

[illegible]

From Table #1 it is apparent that the average maximum is 1200# p. s. i. with a value that is and in the most preferred [illegible] products.

In addition to the above factors, it is found that in the field of compressive strengths this new product is [illegible] in its field, as 20# density will have a compressive strength of 500# [illegible] 30# density will = [illegible] and 45 3# density will = [illegible]

The [illegible] maximum [illegible] temperature obtainable through this invention is a great factor in relation to the high temperature field and test. In determining applicability it will withstand excessively high temperatures for long periods of time without breaking or disintegrating.

For example, this material of 20# density was subjected to a series of tests wherein the surface temperature, from direct flame application, reached approximately 2000° F. and after two hours of exposure thereto was subjected to a stream of cold water under pressure without shattering and with only superficial surface cracking.

The conductance of this material is extremely low when compared to other lime-silica products and its hardness of 6.5 according to Mohs scale, together with its quality of withstanding extreme thermal shock upon quenching makes it a most desirable product for many purposes and in particular for fire resistant structures. Such a product, because of its rigid structure lends itself to various forms or methods of finishing, such as: [illegible] and [illegible] and [illegible] of the [illegible]

From the [illegible] this [illegible] in the [illegible] finishing [illegible] prior to [illegible] to produce [illegible] products.

In order to [illegible] the [illegible] of the products of formation and [illegible] ties and in particular the [illegible] contemplated, the [illegible] investigation is set forth.

The formation of this pure microcrystalline lath structure is actually a [illegible] of [illegible] mineral molecular [illegible] and water from the solid or [illegible] first to a [illegible] formation, then to an extremely fine crystalline structure but still retaining the properties of a gel, then to a combination of the last mentioned gel and crystals of lath-like structure in formed clusters, then conversion of the whole to a pure microcrystalline lath structure as formed crystals in random dispersion through the mass with approximately complete elimination of any gel formation, with the complete absorption upon drying of all uncombined water and the formation thereby of voids in an aggregate volume in excess of the [illegible] volume of the lath-like crystals, the lath crystals having parallel extinction, positive elongation, [illegible] index of refraction [illegible] the lime [illegible] being present in the crystals in the molar proportions of 5, 5, 1, respectively, this transition for practical and commercial purposes being effected through the application of [illegible] temperature which will [illegible] to complete the transition to the formation of a novel product.

The term "mole" as used herein shall be interpreted as meaning a mole ratio of 1:1 in the crystals of the finished product.

Modifications may be resorted to within the spirit and scope of my invention.

I claim:

1. A [illegible] which comprises forming an intimate reactive mixture consisting essentially of lime, silica, and water, the amount of water in the mixture being within the range of about 4.5 to .35 times the aggregate weight of the solids, the molar ratio of the reactive CaO and SiO2 being approximately 1:1, shaping the mixture, subjecting the shaped mixture to a predetermined maturating temperature and pressure in excess of 173° C. and 125 p. s. i. respectively, and thereby causing a reaction by which the lime, silica and water are converted completely to an integrated porous structure of pure microcrystalline lath crystals, having the formula 5CaO·5SiO2·1H2O, said crystals being in random dispersion and being integrated with each other and thereby maintaining said structure in integrated form independently of any other bonding medium, and drying the product to

[illegible] and [illegible] of the [illegible]

2. The method of forming an integrated product which comprises forming an intimate reactive mixture consisting essentially of lime, silica, and water, the amount of water in the mixture being within the range of about 4.5 to .35 times the aggregate weight of the solids, the molar ratio of the reactive CaO and SiO2 being approximately 1:1, shaping the mixture, subjecting the shaped mixture to a predetermined maturating temperature and pressure in excess of 173° C. and 125 p. s. i. respectively, and thereby causing a reaction by which the lime, silica and water are converted completely to an integrated porous structure of pure microcrystalline lath crystals, having the formula 5CaO·5SiO2·1H2O, said crystals being in random dispersion and being integrated with each other and thereby maintaining said structure in integrated form independently of any other bonding medium, and drying the product to

[illegible] of lime and [illegible] particles [illegible] a chemical type of finely [illegible] and having the chemical composition $4CaO \cdot 5SiO_2 \cdot 5H_2O$, said crystals having surface areas of approximately 45 to 55 square meters per gram of weight, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being in excess of 1:1 by volume, and reacting the reactive solids of the said slurry while in suspension by subjecting same to a temperature and pressure in excess of respectively 175° C. and 130 p. s. i. abs.

4. The method of making light apparent density products in integrated form from stable suspensions of finely divided reactive solids, comprising forming an aqueous slurry having dispersed therein hydrous calcium silicate crystals in discrete particle form, and finely divided reactive solids, said discrete particles being reacted crystals of lath and scale-like shape, of nearly colloidal dimensions and having a chemical composition wherein the mole ratio of lime to silica is 1:0 or less, said crystals having surface areas of approximately 45 to 55 square meters per gram of weight, said crystals being selected from the group consisting of crystals having a chemical composition of $2CaO \cdot SiO_2 \cdot H_2O$ and $4CaO \cdot 5SiO_2 \cdot 5H_2O$, and finely divided reactive lime and silica and being present in a slurry in a molar ratio within the molar range of at least 0.65:1 to about 1:1, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being in excess of 1:1 by volume and reacting the reactive components of the said slurry while in suspension by subjecting same to a temperature and pressure in excess of respectively 175° C. and 130 p. s. i. abs.

5. The product prepared in accordance with the method set forth in claim 1.

6. The method of making light apparent density products from stable suspensions of finely divided reactive solids, which method comprises forming an aqueous slurry having dispersed therein reacted hydrous calcium silicate crystals in discrete particle form, and finely divided reactive solids of lime and silica, said discrete particles being of lath-like shape and having colloidal dimensions and the chemical composition $4CaO \cdot 5SiO_2 \cdot 5H_2O$, said particles having surface areas of approximately 45 to 55 square meters per gram of weight, the molar ratio of lime to silica being 1:1, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being in excess of 1:1 by volume, and reacting the reactive solids of said slurry by subjecting same to a temperature and pressure in excess of 175° C. and 130 p. s. i. abs., respectively.

7. The product prepared in accordance with the method set forth in claim 6, said discrete particles of reacted hydrous calcium silicate being unidentifiable in said product.

8. The method of making light apparent density products from stable suspensions of finely divided reactive solids, which method comprises forming an aqueous slurry having dispersed therein reacted hydrous calcium silicate crystals in discrete particle form, and finely divided reactive solids of lime and silica, said discrete particles being of lath-like shape and having colloidal dimensions and the chemical composition $4CaO \cdot 5SiO_2 \cdot 5H_2O$, said particles having surface areas of approximately 45 to 55 square meters per gram of weight, the molar ratio of lime to silica being 1:1, mixing said slurry to uniformly disperse both the discrete particles and the solids through the liquid to thereby form a stable suspension thereof, the liquid to solids ratio being in excess of 1:1 by volume and reacting the reactive solids of said slurry by subjecting same to a temperature and pressure in excess of 175° C. and 130 p. s. i. abs., respectively.

9. The product prepared in accordance with the method set forth in claim 8, said discrete particles of reacted hydrous calcium silicate being unidentifiable in said product.

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