

Title of Invention

A MANUFACTURING PROCESS FOR HEAT AND RADIATION RESISTANT COATING

FIELD OF INVENTION

This present invention relates generally to a manufacturing process for a coating, and more particularly, to a manufacturing process of a heat and radiation resistant coating for use in the exterior and interior of a building to reduce the temperature of the building by reducing heat and radiation onto the building.

BACKGROUND OF THE INVENTION

It is well known that UV curable organic coating compositions, such as a UV curable organic material, a UV curable organosilicon material, or a mixture thereof, in combination with a photoinitiator in the form of an acylphosphorus compound is capable of being activated by light and is selected from the class consisting of acylphosphine oxides, acyl phosphonates and acylphosphine sulphides, and up to about 20% by weight of the UV curable coating composition of a UV screen.

U.S. Pat. No. 4,027,073 discloses heat curable silicone hard coat formulations were available which could be applied to a variety of thermoplastic substrates, such as a polycarbonate or polyester in the form of film or sheet. Although useful results can be obtained by employing such heat curable coating compositions, an organic solvent is used which is environmentally unattractive. In addition, long process times are required to make a satisfactory abrasion and weather resistant composite of a thermoplastic substrate and hard coat.

US Patent No. 8932737, entitled "Durable UV blocking transparent coating" discloses a coating, comprises a UV blocking layer; and a hard coating layer disposed above the UV blocking layer; wherein the hard coating layer has the general formula SiOxCy , wherein the UV blocking layer comprises a first layer having the general formula SiOxCy , and a second layer, wherein the first layer provides UV blocking and the second layer provides a soft coating layer between the first layer and the hard coating layer.

US Patent Publication No. 20100239870, entitled "Durable uv blocking transparent coating" discloses a coating and associated method for coating is disclosed. The coating provides a hard, transparent, UV blocking coating for a substrate. A UV blocking layer is first deposited upon the substrate, and a hard coating is deposited above the UV blocking layer. A soft coating layer may be deposited between the UV blocking layer and the hard coating.

The soft and hard coating layers may both have the general composition SiO_xC_y . the soft and hard coating layers may be deposited by a plasma vapour deposition process.

US Patent No. 5156882 entitled "Method of preparing UV absorbent and abrasion-resistant transparent plastic articles" relates to a method of preparing transparent plastic articles having an improved protective stratum thereon. The protective stratum provides protection from UV light and abrasion. The article includes a polycarbonate substrate and multi-layered coating applied by plasma enhanced chemical vapor deposition on surface of the substrate.

A cenosphere is a lightweight, inert, hollow sphere made largely of silica and alumina and filled with air or inert gas, typically produced as a by-product of coal combustion at thermal power plants. The color of cenospheres varies from grey to almost white and their density is about 0.4–0.8 g/cm³ which gives them a great buoyancy.

Cenospheres are hard and rigid, light, waterproof, innoxious, and insulative. This makes them highly useful in a variety of products, notably fillers. Cenospheres are now used as fillers in cement to produce low-density concrete. Recently, some manufacturers have begun filling metals and polymers with cenospheres to make lightweight composite materials with higher strength than other types of foam materials. Such composite materials are called syntactic foam. Aluminum-based syntactic foams are finding applications in the automotive sector. Microparticles are particles between 0.1 and 100 micro meter in size. Commercially available microparticles are available in a wide variety of materials, including ceramics, glass, polymers, and metals. Microparticles encountered in daily life include pollen, sand, dust, flour, and powdered sugar.

Microparticles have a much larger surface-to-volume ratio than at the macroscale, and thus their behavior can be quite different. For example, metal microparticles can be explosive in air.

SUMMARY OF THE INVENTION

Accordingly, it is a main object of the present invention to provide a manufacturing process for a heat and radiation resistant coating comprising the steps of

(i) heating hollow cenospheres or microspheres in an oven or a furnace to a temperature ranging from 300 to 350 degree C;

(ii) cooling the powered product obtained in step (i) until the product is at room temperature; and

(iii) adding the product obtained in step (ii) to a paint to enhance radiation properties.

Another main object of the present invention is to provide a manufacturing process for a UV resistant coating comprising the steps of

- 5 (i) heating hollow cenospheres or microspheres in an oven or furnace to a temperature ranging from 300 to 350 degree C;
- (ii) cooling the powered product in step (i) until the product is at room temperature; and
- (iii) adding an asphalt or concrete to the product obtained in step (iii) to increase the insulation properties of the coating.

10 Yet still a further object of the present invention to provide a manufacturing process for a heat and radiation resistant coating, wherein the heating step is used is to evaporate carbonaceous substance present in cenospheres or glass microspheres.

A further object of the present invention is to provide a manufacturing process for a heat and radiation resistant coating, wherein the mass loss is ranging from 5-12% of total mass of the cenospheres or microspheres.

15 Yet still a further object of the present invention is to provide a manufacturing process for a heat and radiation resistant coating, wherein a temperature of at least 15 degree C is obtained if the product is used in radiation paint.

20 Still a further object of the present invention is to provide a manufacturing process for a heat and radiation resistant coating, wherein a temperature of at least 6 degree C is obtained if the product is used in asphalt.

Yet another object of the present invention is to provide a manufacturing process for a heat and radiation resistant coating, wherein the obtained product is weather and abrasion resistant.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

25 In the present invention, cenospheres and or glass microspheres are obtained from coal blast furnace.

In a preferred embodiment of the present invention, cenospheres or microspheres are used in a wide variety of materials, from paints and finishes to plastics and caulking. Cenospheres have a variety of uses in concrete countertops, including as a lightweight

aggregate, a workability enhancer and extra-fine aggregate, and a bulk filler and shrinkage reducer in cement grouts.

A cenosphere, like fly ash, cenospheres are naturally occurring by-products of the burning process at coal-fired power plants. Unlike fly ash though, cenospheres are lightweight, inert, hollow spheres comprised largely of silica and alumina and filled with air and/or gases. Since they are inert, they are not considered a pozzolan. And because they are very small and have high compressive strengths, cenospheres can be used as a structural lightweight filler. Following are some of the general properties of cenospheres.

The chemical Properties of cenospheres:

Silica: 48% – 74% , Alumina: 26% – 45% and Iron: 1.5% – 4.0% . The physical properties of cenospheres are : Size: 75-400 microns ,Bulk Density: 0.20-0.25 grams per cubic centimeter (g/cc) , Specific Gravity: <0.4 g/cc, Compressive Strength: ~90% survival @ 2500psi, Softening Point: 1040 degrees C, Color: Light tan.

The present invention relates to a manufacturing process for a heat and radiation resistant coating . First, cenospheres or glass microspheres are heated. One kg of cenospheres or glass microspheres is heated in an oven or furnace to a temperature ranging from 300 to 350 degree C until a powdery form matter is obtained. The product is left to cool to at room temperature.

After the product is cooled to room temperature, it is added to paint so as to enhance radiation properties of the paint. In accordance with the preferred embodiment of the present invention, for 5 liters of paint, 100 gm of the product obtained above is used.

In another preferred embodiment, a manufacturing process for a heat and radiation resistant coating is disclosed. The method comprises the steps of

(i) heating hollow cenospheres or microspheres in an oven or furnace to a temperature ranging from 300 to 350 degree C;

(ii) cooling the powdered product obtained in step (i) until the product is at room temperature; and

(iii) adding an asphalt or concrete to the product obtained in step (iii) to increase the insulation properties of the coating.

In the preferred embodiment, 30% by volume is used to be added to asphalt or concrete.

In the manufacturing process for a heat and radiation resistant coating, the heating step is used to evaporate carbonaceous substance present in cenospheres or glass microspheres. There is a loss of mass of cenospheres or microspheres, and is estimated to be about 5-12%. In accordance with the present invention, if the product is used on paint, and is then coated on building, a temperature of at least 15 degree C is obtained if the product in step (iii) is used in radiation paint. If the product is used in asphalt, a temperature of at least 6 degree C is obtained.

EXAMPLES

The present invention will be further understood from the illustration of specific examples which follow. These examples are intended for illustrative purposes only and should not be construed as limitation upon the broadest aspects of the invention.

EXAMPLE 1

100 g of cenospheres are dissolved in 5 liters at room temperature whilst stirring. The homogeneous mixed solution is then cooled. The mixture is applied to a concrete plate. A heat source is applied to the concrete and the temperature at the other side of the concrete is measured. A temperature difference of 10-15 degree C is obtained if the mixture is applied at the exterior concrete for reflective paint or radiation paint used.

The temperature is around 26 deg C.

EXAMPLE 2

30% by volume dry powder from cenospheres to asphalt or concrete are dissolved, whilst mixing. The mixed asphalt is applied to the exterior. A temperature difference of 4-6 degree C is obtained if the mixture is applied to the concrete wall.

EXAMPLE 3

30% by volume dry powder from cenospheres to asphalt or concrete are dissolve whilst mixing. The mixture is applied to interior of concrete wall as wall plastering material. As compared to without the material, a temperature difference is 3 to 5 degree C.

it is intended that the disclosure not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this disclosure, but that the disclosure will include all embodiments falling within the scope of the appended claims. It is therefore intended that the following appended claims and claims hereafter introduced are
5 interpreted to include all such modifications, permutations, additions, and sub-combinations as are within their true spirit and scope.

CLAIMS

1. A manufacturing process for a heat and radiation resistant coating comprising the steps of
 - (i) heating hollow cenospheres or microspheres in an oven or furnace to a temperature ranging from 300 to 350 degree C;
 - (ii) cooling the powdered product obtained in step (i) until the product is at room temperature; and
 - (iii) adding the product obtained in step (ii) to a paint to enhance radiation properties.
2. A manufacturing process for a heat and radiation resistant coating comprising the steps of
 - (i) heating hollow cenospheres or microspheres in an oven or a furnace to a temperature ranging from 300 to 350 degree C;
 - (ii) cooling the powdered product obtained in step (i) until the product is at room temperature; and
 - (iii) adding an asphalt or concrete to the product obtained in step (ii) to increase insulation of the coating.
3. The manufacturing process for a heat and radiation resistant coating as set forth in Claim 1, wherein the heating step in (i) is to evaporate carbonaceous substance present in cenospheres or glass microspheres.
4. The manufacturing process for a heat and radiation resistant coating as set forth in Claim 1, wherein the mass loss in step (i) is ranging from 5-12% of total mass of the cenospheres or microspheres.
5. The manufacturing process for a heat and radiation resistant coating as set forth in Claim 1, wherein a temperature of at least 15 degree C is obtained if the product in step (iii) is used in radiation paint.
6. The manufacturing process for a heat and radiation resistant coating as set forth in Claim 2, wherein a temperature of at least 6 degree C is obtained if the product in step (iii) in Claim 2 is used in asphalt.