

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN BIOCIDAL COMPOSITIONS

(71) We, STANDARD TELEPHONES AND CABLES LIMITED, a British Company, of 190 Strand, London, W.C.2, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to coating compositions adapted to release materials into solution over a prolonged period, and in particular to antifouling paints for preventing fouling of surfaces immersed in fresh or salt water.

Our co-pending Application No. 600/75 (Serial No. 1,511,381) describes an anti-fouling paint or coating for marine and/or aquatic use, including a powdered glass composition dispersed in a resin vehicle, in which the glass composition includes a glass forming oxide, or more oxides of one or more metals whose water soluble ions are toxic to marine or aquatic life, and one or more glass modifying oxides for determining the water solubility of the glass and thereby determining the rate of release of the ions of the toxic metal or metals from the glass composition into aqueous solution.

There are some applications in which it is desirable that the rate of release of the toxic material should vary according to the condition at the surface of the coating. Thus, for example, an ocean going vessel requires a higher release rate of toxic material when stationary or steaming slowly than when travelling at maximum speed. However, with the controlled release paints so far employed the reverse situation occurs.

The object of the invention is to minimise or to overcome this disadvantage.

According to the invention there is provided a biocidal composition, including a first particulate glass comprising a glass forming oxide together with one or more glass modifying oxides, the first glass containing as a constituent a biocidal material, and a second particulate glass which, when dissolved in

water, produces a release rate control material, said release rate control material being such, when dissolved in water, as to maintain the solution conditions in a region surrounding the composition such that the biocidal material is dissolved from the first glass.

The composition may be dispersed into a resin carrier to form an anti-fouling paint, e.g. for marine use. Thus by employing two different types of active particulate glass material each uniformly distributed in the resin carrier it is possible to invert the normal behaviour of the biocidal agent in the system so that it is leached out most rapidly in still water. If, for example, the glass material is applied to the hull of a ship, the glass composition may be adjusted such that at speeds above five knots, the speed above which fouling becomes negligible, the release rate of biocidal material from the glass is substantially less than the release rate when the ship is stationary with respect to the water.

In one embodiment of the invention a coating or paint is prepared from a supporting medium containing two types of particulate glasses A and B uniformly distributed within the resin medium. Material A is the biocide-containing material the leach rate of which is proportional to the concentration of a leached product from material B in the medium in contact with the surface of the material A. In a preferred embodiment the leached product of material B, when present in sufficient concentration in the water at the glass surface A, will maintain the pH of the water at a level at which the glass A will slowly dissolve, the glass A being substantially insoluble in a neutral aqueous medium, i.e. one of pH 7. Thus the biocidal material of glass A can only dissolve in the water under conditions in which the material B is not swept away from the glass surface.

In one application the biocidal material A may be a copper borate glass which is soluble only under acid conditions. The leach rate of this material is in fact an exponential func-

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tion of the pH of the surrounding aqueous medium. The material B may then be a sodium calcium phosphate with a high phosphorus pentoxide content and which produces a high hydrogen ion concentration when it is leached from the glass.

The antifouling composition is not of course restricted to use on ships. Thus, for example, water tanks, pipelines, oil-rigs, and submarine cables may also be protected in this way. Similar compositions without a resin carrier may be employed as herbicides as they are resistant to run-off caused by excessive rainfall.

In further applications the release rate controlling material may be a chelating agent for one cation of the glass containing the active material, thus enhancing its solubility.

WHAT WE CLAIM IS:—

1. A biocidal composition, including a first particulate glass comprising a glass forming oxide together with one or more glass modifying oxides, the first glass containing as a constituent a biocidal material, and a second particulate glass which, when dissolved in water, liberates a release rate control material, said release rate control

material being such, when dissolved in water, as to maintain the solution conditions in a region surrounding the composition such that the biocidal material is dissolved from the first glass.

2. A marine or freshwater antifouling paint composition, including a resin carrier having dispersed therein first and second particulate glass materials, in which said first glass comprises a glass forming oxide together with one or more glass modifying oxides together with a biocidal material as a glass constituent, and in which said second glass is water soluble and contains an acid material, said acid material being adapted to attack the first glass in an aqueous environment so as to liberate the biocide material.

3. A paint composition as claimed in claim 2, and in which said first glass is a copper borate glass and said second glass is a sodium calcium phosphate glass.

4. An antifouling paint composition substantially as described herein.

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For the Applicants.



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