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CONDUCTIVE COATING

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2 Claims. (Cl. 252—510)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates in general to conductive coatings, and in particular to conductive coatings on non-conductive surfaces.

An object of this invention is to provide a conductive coating. A further object is to provide a conductive coating for a non-conductive surface. Another object of this invention is to provide a conductive coating that will not pulverize, flake, or peel off the coated plastics under extreme climatic conditions. A still further object of this invention is to provide a conductive coating for Teflon (tetrafluoroethylene plastic) that will not pulverize, flake, or peel off the tetrafluoroethylene plastic under extreme climatic conditions. A particular object of this invention is to provide a conductive coating for a polystyrene surface that encases an ionization chamber so that the ionization chamber can operate under adverse climatic conditions without any pulverization, flaking or peeling off of the coated polystyrene surface.

It has now been found that the aforementioned objectives can be obtained by providing a conductive coating in which a colloidal dispersion of graphite in alcohol is dispersed in a solvent consisting of toluene, acetone, and methyl ethyl ketone or ethyl ether.

In formulating the conductive coating, the graphite can be dispersed in alcohol or one can use a commercial preparation such as "dag" Dispersion No. 154 which is the name used in the trade by the Acheson Colloids Corporation for a colloidal dispersion of graphite in isopropanol having a 20 percent solids content. The colloidal dispersion of graphite in alcohol is then dispersed in the solvent. The solvent consists in parts by weight of 3 to 6 parts toluene, 1 to 3 parts acetone, and 0.5 to 1 part methyl ethyl ketone or ethyl ether. A solvent that has been found particularly effective consists in parts by weight of 4 parts toluene, 1 part acetone, and 0.5 part methyl ethyl ketone.

The amounts of the colloidal dispersion of graphite in alcohol used in formulating the conductive coating are determined by the thickness of conductive coating desired on the particular non-conductive surface. For example, if one desires a light conductive coating on polystyrene, he might use a formulation of 1 part by weight of a colloidal dispersion of graphite in alcohol having a 20 percent solids content to 3 parts by weight of solvent. If, on the other hand, he should desire a heavy conductive coating on polystyrene, he might use a formulation of 1 part weight of a colloidal dispersion of graphite in alcohol having a 20 percent solids content to 1 part by weight of solvent. At any rate, the relative amounts of colloidal graphite dispersed in alcohol and solvent to be used to coat a particular non-conductive substrate can be easily determined by the formulator in light of the end use.

Example 1.—A sheet of non-conductive Teflon (tetrafluoroethylene plastic) is spray coated on one of its surfaces with a conductive coating of 1 part by weight of a colloidal dispersion of graphite in alcohol having a 20 percent solids content dispersed in 3 parts by weight of a solvent consisting in part by weight of 4 parts toluene, 1 part acetone, and 0.5 part methyl ethyl ketone. This conductive coating provides a conductive path over the Teflon that does not pulverize, flake, or peel off under adverse climatic conditions. In this connection, it was found that if alcohol or water were used as the sole solvent for the graphite in formulating the conductive coating, the resulting conductive coating would not even adhere to the Teflon.

Example 2.—The conductive coating of Example 1 is sprayed onto the surface of polystyrene plastic that encases an ionization chamber. It is found that the ionization chamber continues to operate effectively at temperatures ranging from −80° F. to 140° F. and also, under 90 percent humidity without any evidence of pulverization, flaking or peeling off of the coated polystyrene plastic. It is found that if alcohol or water is used as the sole solvent for the graphite in formulating the conductive coating, the resulting conductive coat on the polystyrene would pulverize, flake, or peel off under the extreme climatic conditions above-mentioned.

Though spray coating is the method of application shown in Examples 1 and 2 above, other conventional methods could be used as for example, brushing, painting, roll coating, etc. Similarly, other non-conductive surfaces could be used in lieu of the plastics shown, as for example, wood, metal, glass, etc.

The function of the solvent in the above examples is not exactly known. What is believed happens is that the solvent in some manner attacks the surface of the non-conductor and deposits the conductive graphite therein prior to the evaporation of the solvent. Whatever the function of the solvent, the resulting conductive coating of graphite on the non-conductor does not pulverize, flake, or peel off the coated non-conductive surface under extreme climatic conditions.

The foregoing description is to be considered merely as illustrative and not in limitation of the invention as hereinafter claimed.

What is claimed is:

1. A coating composition for providing an electrically conductive surface on tetrafluoroethylene plastic, said composition consisting of the mixture of 1 part by weight of a colloidal dispersion of graphite in alcohol having 20 percent solid content and 1 to 3 parts by weight of a solvent, said solvent consisting by weight of 3 to 6 parts toluene, 1 to 3 parts acetone, and 0.5 to 1 part of a member selected from the group consisting of methyl ethyl ketone and ethyl ether.

2. A conductive coating composition according to claim 1 wherein the solvent consists in parts by weight of 4 parts toluene, 1 part acetone, and 0.5 part methyl ethyl ketone.

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