coating, the method comprising:
reacting a multifunctional silicone acrylate or silicone methacrylate having a reactive functionality greater than 3 and one or more multifunctional acrylate or methacrylate monomers in the presence of an initiator to form a methyl phenyl silicone polyester having a thixotropic index from 6 to 9; and
applying the methyl phenyl silicone polyester to the object in an amount to provide an insulating coating having an R-value of 2 to 8 ft2·°F·h/BTU,
wherein the methyl phenyl silicone polyester gels in 30 to 60 seconds and cures within 40 to 80 total seconds, when cured at ambient temperatures, and wherein the applying includes spraying.

[0007] In an embodiment, the multifunctional silicone acrylate or silicone methacrylate is the product of a reaction between a multifunctional silicone polyol with a reactive functionality of greater than about 3 to about 8 and acrylic or methacrylic acid at a temperature from about 80°C to about 150°C, and in other approaches, 100°C to about 120°C and in the presence of a catalyst and stabilizer to provide a controlled reaction. In one approach, the catalyst is one or more organic acids and the stabilizer is one or more phenolic compounds. In other approaches, the catalyst includes a strong acid and a weak acid. In yet another approach, the one or more phenolic compounds include t-butyl hydroquinone.

CLAIMS

We claim:

1. A method of applying an inorganic and organic insulating polymer to an object to provide an insulating coating, the method comprising:
reacting a multifunctional silicone acrylate or silicone methacrylate having a reactive functionality greater than 3 and one or more multifunctional acrylate or methacrylate monomers in the presence of an initiator to form a methyl phenyl silicone polyester having a thixotropic index from 6 to 9; and
applying the methyl phenyl silicone polyester to the object in an amount to provide an insulating coating having an R-value of 2 to 8 ft2·°F·h/BTU,
wherein the methyl phenyl silicone polyester gels in 30 to 60 seconds and cures within 40 to 80 total seconds, when cured at ambient temperatures, and wherein the applying includes spraying.

2. The method of claim 1, wherein the methyl phenyl silicone polyester has a weight average molecular weight of 2,000 to 6,500.

3. The method of claim 1, wherein the multifunctional silicone acrylate or methacrylate is the product of a reaction between a multifunctional silicone polyol with a reactive functionality of greater than 3 to 8 and acrylic or methacrylic acid at a temperature from 80 to 150°C and in the presence of a catalyst and stabilizer.

4. The method of claim 3, wherein the catalyst is one or more organic acids and the stabilizer is one or more phenolic compounds.

5. The method of claim 4, wherein the catalyst includes a strong acid and a weak acid.

6. The method of claim 4, wherein the one or more phenolic compounds include t-butyl hydroquinone, methyl hydroquinone, tert-butyl catechol, phenothiazine, or combinations thereof.

7. The method of claim 1, wherein the one or more multifunctional acrylate or methacrylate monomers are selected from a cyclic ether acrylate, a cyclic ether methacrylate, alkoxy acrylates, alkoxy diacrylates, alkoxy methacrylates, alkoxy dimethacrylates, and combinations thereof.

8. The method of claim 7, wherein the one or more multifunctional acrylate or methacrylate monomers are selected from 1,4-butanediol diacrylate or dimethacrylate, tetrahydrofurfuryl acrylate or methacrylate, and combinations thereof.

9. The method of claim 1, wherein the initiator is a peroxide.

10. The method of claim 9, wherein the initiator is benzoyl peroxide, methyl ethyl ketone peroxide, cumene hydro peroxide, or combinations thereof.

11. The method of claim 1, comprising 10 to 30 weight percent silicone