CLAIMS

1. An electromagnetic interference shielding (EMI) paint composition comprising a homogeneous mixture of

   a) 20 wt% to 40 wt% of a solvent, a dispersant, and at least one additive;

   b) 50 wt% to 75 wt% of a polymeric carrier matrix, which is any one or combination of poly(acrylic acid), poly(methacrylic acid), poly(methyl acrylate), poly(methyl methacrylate), silicone, and epoxy resin; and

   c) 5 wt% to 30 wt% of a electromagnetic interference absorbing filler consisting of multi-walled carbon nanotubes being dispersed within the polymeric carrier matrix;

   wherein the polymeric matrix is miscible with the solvent for forming the paint composition applicable onto a surface of an article to create thereto an EMI coating under ambient condition against electromagnetic interference and the multi-walled carbon nanotubes are dispersed into the polymeric carrier matrix through a dispersing process carried out at a speed ranging from 5000 rpm to 20000 rpm by a disperser.

2. The paint composition according to claim 1, wherein the electromagnetic interference has a frequency of 10 MHz to 20 GHz .

3. The paint composition according to claim 1, wherein each of the multi-walled carbon nanotubes has 10 layers to 20 layers.

4. The paint composition according to claim 1, wherein each of the multi-walled carbon nanotubes has an outer diameter in the range of 5 nm to 50 nm.

5. The paint composition according to claim 1, wherein each of the multi-walled carbon nanotubes has a length in the range of 30 μm to 100 μm.

6. The paint composition according to claims 1, wherein the dispersant is structured acrylate copolymer with first pigment affinic groups and/or linear polymer with polar second pigment-affinic groups which are different from the first pigment affinic groups.

7. The paint composition according claim 1, wherein the solvent is ethanol, isopropyl alcohol, methyl ethyl ketone, and any mixtures thereof.

8. The paint composition according to claim 1, wherein the at least one additive is a wetting agent, surfactant, an adhesion promoter agent, a defoamer, a thickener, and any combinations thereof.

9. The paint composition according to claim 8, wherein the surfactant is a structured acrylate copolymer with first pigment affinic groups, linear polymer with polar second pigment-affinic groups which are different from the first pigment-affinic group, modified urea, polyether-modified polydimethylsiloxane, polyurethane with a branched structure, and any combinations thereof.

10. A method of manufacturing an electromagnetic interference shielding paint composition, the method comprising

providing 50 wt% to 75 wt% of a polymeric carrier matrix which is any one or combination of poly(acrylic acid), poly(methacrylic acid), poly(methyl acrylate), poly(methyl methacrylate), silicone, and epoxy resin;

providing 20 wt% to 40 wt% of a solvent, a dispersant, and at least one additive to form a mixture with the polymeric carrier matrix; and

dispersing 5 wt% to 30 wt% of an electromagnetic interference absorbing filler consisting of multi-walled carbon nanotubes homogeneously into the mixture using a disperser at a speed ranged from 5000 rpm to 20000 rpm to form the paint composition applicable onto a surface of an article to create thereto an EMI coating under ambient condition against electromagnetic interference,

wherein the polymeric matrix is miscible with the solvent for forming the paint composition.

11. The method according to claim 10, wherein the dispersant is structured acrylate copolymer with first pigment affinic groups, linear polymer with polar second pigment-affinic groups which are different from the first pigment affinic groups, and any combinations thereof.

12. The method according to claim 10, wherein the solvent is ethanol, isopropyl alcohol, methyl ethyl ketone, and any combinations thereof.

13. The method according to claim 10, wherein the at least one additive is a wetting agent, an adhesion promoter agent, a defoamer, a thickener, and any combinations thereof.

14. The method according to claim 10, wherein the chemical dispersant is structured acrylate copolymer with first pigment affinic groups, linear polymer with polar second pigment-affinic groups which are different from the first pigment-affinic group, and combinations thereof.

CLAIMS

1. Electromagnetic interference shielding coating composition comprising
   a) about 1 wt% to about 30 wt% of a electromagnetic interference absorbing filler consisting essentially or consisting of multi-walled carbon nanotubes;
   b) about 5 wt% to about 40 wt% of a solvent, a dispersant, and at least one additive; and
   c) about 30 wt% to about 94 wt% of a polymeric carrier matrix,

   wherein wt% of the components in the composition add up to 100 wt% and is calculated based on total weight of the electromagnetic interference shielding coating composition.

2. Electromagnetic interference shielding coating composition according to claim 1, wherein the composition comprises about 5 wt% to about 20 wt% of a electromagnetic interference absorbing filler consisting essentially or consisting of multi-walled carbon nanotubes.

3. Electromagnetic interference shielding coating composition according to claim 1 or 2, wherein the composition comprises about 20 wt% to about 30 wt% of a solvent, a dispersant, and at least one additive.

4. Electromagnetic interference shielding coating composition according to any one of claims 1 to 3, wherein the composition comprises about 50 wt% to about 75 wt% of a polymeric carrier matrix.

5. Electromagnetic interference shielding coating composition according to any one of claims 1 to 4, wherein each of the multi-walled carbon nanotubes has about 10 layers to about 20 layers.

6. Electromagnetic interference shielding coating composition according to any one of claims 1 to 5, wherein each of the multi-walled carbon nanotubes has an outer diameter in the range of about 5 nm to about 50 nm.

7. Electromagnetic interference shielding coating composition according to any one of claims 1 to 6, wherein each of the multi-walled carbon nanotubes has a length in the range of about 30 μm to about 100 μm.

8. Electromagnetic interference shielding coating composition according to any one of claims 1 to 7, wherein the polymeric carrier matrix comprises or consists of a polymer selected from the group consisting of poly(acrylic acid), poly(methacrylic acid), poly(methyl acrylate), poly(methyl methacrylate), silicone, epoxy resin, copolymers thereof, and mixtures thereof.

9. Electromagnetic interference shielding coating composition according to any one of claims 1 to 8, wherein the electromagnetic interference absorbing filler is at least substantially homonogeneously dispersed in the polymeric carrier matrix.

10. Electromagnetic interference shielding coating composition according to any one of claims 1 to 9, wherein the electromagnetic interference absorbing filler is dispersed homogeneously in the polymeric carrier matrix.

11. Electromagnetic interference shielding coating composition according to any one of claims 1 to 10, wherein the electromagnetic interference absorbing filler is dispersed in the polymeric carrier matrix without covalently bonding thereto.

12. Electromagnetic interference shielding coating composition according to any one of claims 1 to 11, wherein the dispersant is selected from the group consisting of the structured acrylate copolymer with pigment affinic groups, linear polymer with highly polar and different pigment-affinic groups, and combinations thereof.

13. Electromagnetic interference shielding coating composition according to any one of claims 1 to 12, wherein the solvent is selected from the group consisting of ethanol, isopropyl alcohol, methyl ethyl ketone, and mixtures thereof.

14. Electromagnetic interference shielding coating composition according to any one of claims 1 to 13, wherein the at least one additive is selected from the group consisting of a wetting agent, an adhesion promoter agent, a defoamer, a thickener, and combinations thereof.

15. Electromagnetic interference shielding coating composition according to any one of claims 1 to 14, wherein the at least one additive is selected from the group consisting of a surfactant with the structured acrylate copolymer with pigment affinic groups, linear polymer with highly polar and different pigment-affinic groups, modified urea, polyether-modified polydimethylsiloxane, polyurethane with a highly branched structure, and combinations thereof.

16. Method of manufacturing an electromagnetic interference shielding coating composition, the method comprising

a) providing a mixture comprising a polymeric carrier matrix, a solvent, a dispersant, and at least one additive; and

b) dispersing an electromagnetic interference absorbing filler consisting essentially or consisting of multi-walled carbon nanotubes into the mixture using at least one of a high speed dispersing process and chemical dispersant to form the electromagnetic interference shielding coating composition.

17. Method according to claim 16, wherein the polymeric carrier matrix comprises or consists of a polymer selected from the group consisting of poly(acrylic acid), poly(methacrylic acid), poly(methyl acrylate), poly(methyl methacrylate), silicone, epoxy resin, copolymers thereof, and mixtures thereof.

18. Method according to claim 16 or 17, wherein the dispersant is selected from the group consisting of structured acrylate copolymer with pigment affinic groups, linear polymer with highly polar and different pigment-affinic groups, and combinations thereof.

19. Method according to any one of claims 16 to 18, wherein the solvent is selected from the group consisting of ethanol, isopropyl alcohol, methyl ethyl ketone, and combinations thereof.

20. Method according to any one of claims 16 to 19, wherein the at least one additive is selected from the group consisting of a wetting agent, an adhesion promoter agent, a defoamer, a thickener, and combinations thereof.

21. Method according to any one of claims 16 to 20, wherein the high speed dispersing process is carried out at a speed in the range of about 5000 rpm to about 20000 rpm.

22. Method according to any one of claims 16 to 21, wherein the high speed dispersing process is carried out for a time period in the range of about 1 hour to about 8 hours.

23. Method according to any one of claims 16 to 22, wherein the chemical dispersant is selected from the group consisting of structured acrylate copolymer with pigment affinic groups, linear polymer with highly polar and different pigment-affinic groups, and combinations thereof.

24. Method of reducing electromagnetic interference through a surface of an article, the method comprising applying an electromagnetic interference shielding coating composition according to any one of claims 1 to 15 or an electromagnetic interference shielding coating composition manufactured by a method according to any one of claims 16 to 23 to a surface of an article.

25. Method according to claim 24, wherein the electromagnetic interference comprises frequency in the range of about 10 MHz to about 20 GHz.