CLAIMS

What is claimed is:

1. A conductive composition for a secondary battery, comprising a polymeric material, a carbon nanomaterial and an anionic stabilizing agent.

2. The conductive composition of claim 1, wherein the polymeric material comprises a copolymer comprising a structural unit derived from an acid group-containing monomer and a structural unit derived from a polar group-containing monomer.

3. The conductive composition of claim 2, wherein the polar group-containing monomer is selected from the group consisting of a nitrile group-containing monomer, an amide group-containing monomer, a hydroxyl group-containing monomer, an ester group-containing monomer, an epoxy group-containing monomer, a fluorine-containing monomer, an amine group-containing monomer, an ether group-containing monomer, a carbonyl group-containing monomer and combinations thereof; and wherein the acid group-containing monomer is selected from the group consisting of a carboxylic acid group-containing monomer, a sulfonic acid group-containing monomer, a phosphonic acid group-containing monomer, a phosphoric acid group-containing monomer, a nitric acid group-containing monomer, a sulphuric acid group-containing monomer and combinations thereof.

4. The conductive composition of claim 2, wherein the proportion of structural unit derived from an acid group-containing monomer is from about 15% to about 85% by mole, based on the total number of moles of monomeric units in the copolymer in the polymeric material.

5. The conductive composition of claim 2, wherein the proportion of structural unit derived from a polar group-containing monomer is from about 15% to about 85% by mole, based on the total number of moles of monomeric units in the copolymer in the polymeric material.

6. The conductive composition of claim 1, wherein the amount of polymeric material in the conductive composition is from about 40% to about 99.9% by weight, based on the total weight of solids in the conductive composition; wherein the carbon nanomaterial is selected from the group consisting of carbon nanotube, graphene, carbon nanofiber and combinations thereof; and wherein the amount of carbon nanomaterial in the conductive composition is from about 0.1% to about 45% by weight, based on the total weight of solids in the conductive composition.

7. The conductive composition of claim 6, wherein the carbon nanotube is selected from the group consisting of multi-walled carbon nanotube, few-walled carbon nanotube, double-walled carbon nanotube, single-walled carbon nanotube and combinations thereof; and wherein the aspect ratio (ratio of length to diameter) of the carbon nanotube is from about 1×10 to about 1×10^4.

8. The conductive composition of claim 2, wherein the weight ratio of the polar group-

containing monomer that assists in the construction of the polymeric material to the carbon nanomaterial is from about 0.1 to about 20; and wherein the weight ratio of the acid group-containing monomer that assists in the construction of the polymeric material to the anionic stabilizing agent is from about 4.5 to about 65.

9. The conductive composition of claim 1, wherein the anionic stabilizing agent is selected from the group consisting of alkyl sulfate, alkyl sulfonate, alkyl carboxylate, alkyl phosphate, alkyl phosphonate, alkyl aromatic sulfate, alkyl aromatic sulfonate, alkyl aromatic carboxylate, alkyl aromatic phosphate, alkyl aromatic phosphonate, alkyl alkoxy sulfate, alkyl alkoxy sulfonate, alkyl alkoxy carboxylate, alkyl alkoxy phosphate, alkyl alkoxy phosphonate, alkyl ester sulfate, alkyl ester sulfonate, alkyl ester carboxylate, alkyl ester phosphate, alkyl ester phosphonate and combinations thereof.

10. The conductive composition of claim 1, wherein the anionic stabilizing agent is selected from the group consisting of metal dodecyl sulfate, metal dodecyl sulfonate, metal dodecyl carboxylate, metal dodecyl phosphate, metal dodecyl phosphonate, metal dodecyl ether sulfate, metal dodecyl ether sulfonate, metal dodecyl ether carboxylate, metal dodecyl ether phosphate, metal dodecyl ether phosphonate, metal dodecyl benzene sulfate, metal dodecyl benzene sulfonate, metal dodecyl benzene carboxylate, metal dodecyl benzene phosphate, metal dodecyl benzene phosphonate, metal stearate, olefin sulfonate, alpha olefin sulfonate and combinations thereof.

11. The conductive composition of claim 1, wherein the anionic stabilizing agent is selected from the group consisting of sodium dodecyl sulphate, lithium dodecyl sulphate, sodium lauryl ether sulfate, lithium dodecyl benzene sulfonate, sodium dodecyl benzene sulfonate, paraffin sulfonate, ammonium or other alkali or alkaline-earth metal sarcosinate, ammonium or other alkali or alkaline-earth metal sulfosuccinate, ammonium or other alkali or alkaline-earth metal isethionate, ammonium or other alkali or alkaline-earth metal taurate, ammonium lauryl sulfate, ammonium laureth sulfate, triethylamine lauryl sulfate, triethylamine laureth sulfate, triethanolamine lauryl sulfate, triethanolamine laureth sulfate, monoethanolamine lauryl sulfate, monoethanolamine laureth sulfate, diethanolamine lauryl sulfate, diethanolamine laureth sulfate, lauric acid monoglyceride sodium sulfate, sodium lauryl sulfate, sodium laureth sulfate, potassium lauryl sulfate, potassium laureth sulfate, sodium lauryl phosphate, sodium tridecyl phosphate, sodium behenyl phosphate, sodium laureth-2 phosphate, sodium dilauryl phosphate, sodium ditridecyl phosphate, sodium lauroyl sarcosinate, lauroyl sarcosine, cocoyl sarcosine, ammonium cosyl sulfate, sodium cosyl sulfate, sodium trideceth sulfate, sodium tridecyl sulfate, ammonium trideceth sulfate, ammonium tridecyl sulfate, sodium cocoyl isethionate, disodium laureth sulfosuccinate, sodium methyl oleoyl taurate, sodium laureth carboxylate, sodium trideceth carboxylate, sodium lauryl sulfate, potassium cosyl sulfate, potassium lauryl sulfate, monoethanolamine cosyl sulfate, sodium tridecylbenzenesulfonate, ether sulfonate, lithium

stearate, sodium stearate and combinations thereof; and wherein the amount of the anionic stabilizing agent in the conductive composition is from about 0.6% to about 7% by weight, based on the total weight of solids in the conductive composition.

12. The conductive composition of claim 1, wherein the weight ratio of the anionic stabilizing agent to the carbon nanomaterial is from about 0.1% to about 45%; and wherein the weight ratio of the polymeric material to the anionic stabilizing agent is from about 11 to about 155.

13. The conductive composition of claim 1, wherein the weight ratio of the polymeric material to carbon nanomaterial is from about 0.5 to about 30; and wherein the conductive composition further comprises an aqueous solvent.

14. The conductive composition of claim 13, wherein the aqueous solvent is water or a solution containing a major component and a minor component, and wherein the major component is water.

15. The conductive composition of claim 14, wherein the proportion of water in the aqueous solvent is from about 51% to about 100% by weight; and wherein the minor component is selected from the group consisting of methanol, ethanol, isopropanol, n-propanol, tert-butanol, n-butanol, acetone, dimethyl ketone, methyl ethyl ketone, ethyl acetate, isopropyl acetate, propyl acetate, butyl acetate and combinations thereof.

16. A slurry for a secondary battery, comprising an electrode active material and a conductive composition as claimed in claim 1.

17. The slurry of claim 16, wherein the slurry further comprises a conductive agent.

18. The slurry of claim 17, wherein the weight ratio of the carbon nanomaterial to the conductive agent is from about 1% to about 35%.

19. An electrode for a secondary battery, comprising an electrode active material and a conductive composition as claimed in claim 1.

20. A method of preparing a conductive composition for a secondary battery of claim 1, comprising the steps of:

1) dispersing a carbon nanomaterial in an aqueous solvent to form a first suspension;

2) dispersing an anionic stabilizing agent in the first suspension to form a second suspension;

3) dispersing a polymeric material in the second suspension to form a conductive composition,

wherein the polymeric material comprises a copolymer comprising a structural unit derived from an acid group-containing monomer and a structural unit derived from a polar group-containing monomer.