Claims

1. A varistor comprising a solid phase of zinc oxide particles substantially uniformly dispersed within a resin media, wherein the zinc oxide is present in the varistor in a range of 50 vol% to 80 vol%, wherein the ZnO or the varistor has not been sintered, and wherein the size of the zinc oxide particles is in a range of 1 μm to 50 μm.

2. The varistor of claim 1, wherein the zinc oxide particles are substantially free of inorganic oxides other than zinc oxide.

3. The varistor of claim 1, wherein the zinc oxide particles are of a substantially uniform size, wherein at least 80 to 99% of the zinc oxide particles are 1 μm to 50 μm in size.

4. The varistor of claim 1, wherein the resin is a thermoplastic polymer.

5. The varistor of claim 4, wherein the resin is selected from the group consisting of polystyrene, polyethylene, polypropylene, polyacetal, polymethyl acrylate, polycarbonate, polyamide, polytetrafluoroethylene, tetrafluoroethylene, perfluoroalkoxyethylene and any mixture thereof.

6. The varistor of claim 1, wherein the zinc oxide is present in the varistor in a range of 65 vol% to 70 vol%.

7. The varistor of claim 1, further comprising a pair of electrodes in contact with at least one surface of the varistor, wherein said at least one surface of the varistor comprises a coating applied thereon.

8. The varistor of claim 1, wherein the varistor has a porosity of less than 5%.

9. The varistor of claim 1, wherein the varistor has a thickness in the range of 0.1 mm to 5 mm.

10. A method of fabricating a varistor, comprising:

mixing a substantially homogenous mixture of solid zinc oxide particles and a resin media, wherein the zinc oxide is present in the mixture in a range of 50 vol% to 80 vol%;
heating the mixture under conditions to melt the resin and suspend the solid zinc oxide particles therein; wherein a step of sintering is not performed; and wherein the size of the zinc oxide particles is in the range of 1 μm to 50 μm.

11. The method of claim 10, further comprising solidifying the molten resin to form a solid phase of zinc oxide particles substantially uniformly dispersed within the resin media.

12. The method of claim 10, wherein the zinc oxide particles are of a substantially uniform size, wherein at least 80 to 99% of the zinc oxide particles are 1 μm to 50 μm in size.

13. The method of claim 10, wherein the mixing step comprises kneading, wherein said kneading is performed at a kneading speed in the range of 100 rpm to 200 rpm; and wherein said mixing step is undertaken for a duration of from 0.5 to 2 hours.

14. The method of claim 10, further comprising a step of injection molding the mixture.

15. The method of claim 10, wherein the resin is a thermoplastic polymer.

16. The method according to claim 15, wherein the resin is selected from the group consisting of polystyrene, polyethylene, polypropylene, polyacetal, polymethyl acrylate, polycarbonate, polyamide, polytetrafluoroethylene, tetrafluoroethylene, perfluoroalkoxyethylene and any mixture thereof.

17. The method of claim 10, wherein the zinc oxide is present in the mixture in a range of 65 vol% to 70 vol%.

18. The method of claim 10, wherein the heating step is conducted at a temperature range of from 100°C to 300°C.