CLAIMS

1. A composition comprising:

a thermoplastic polymer melt, an amount of carbon nanotubes, and an amount of carbon fibers extrusion compounded together in the composition, the amount of carbon nanotubes and the amount of carbon fibers dispersed in the polymer melt, wherein the carbon fibers have an aspect ratio greater than 1 and less than about 5.

2. The composition of claim 1, wherein the polymer melt is a high temperature, high strength thermoplastic polymer.

3. The composition of claim 1, wherein the carbon nanotubes comprise single wall carbon nanotubes, multiple wall carbon nanotubes, or a combination thereof.

4. The composition of claim 1, wherein the polymer melt comprises polyetherimide (PEI), Polyimide (PI), Poly ether sulfone (PES), Poly phenyl sulfone (PPS), a copolymer of tetrafluororethylene and perfluoro-propylvinylether~~Per fluoro alkoxy (PFA)~~, Fluorinated ethylene propylene (FEP), Ethylene tri fluoro ethylene (ETFE) Poly sulfone, Polystyrene, Poly ether Ketone (PEK), Poly ether ketone ketone (PEKK), polybutylene terephthalate (PBT), ~~polyolefins (PO),~~ polyethylene terephthalate (PET), styrene block co-polymers, styrene-butadiene rubber, nylon in the form of polyether block polyamide (PEBA), polyetheretherketone (PEEK), poly(vinylidenefluroide), poly(tetraflurorethylene) (PTFE), polyethylene, polypropylene, poly(vinylchloride) (PVC), ethyl vinyl acetate, a blend thereof, copolymers thereof, or a combination thereof.

5. The composition of claim 1, wherein the polymer melt comprises PEEK, PI, or PEI.

6. The composition of claim 1, wherein the amount of carbon nanotubes is at least about 0.5% and less than about 5% by weight.

7. The composition of claim 1, wherein the amount of carbon nanotubes is about 3% by weight or less.

8. The composition of claim 7, wherein the amount of carbon fibers is between about 20% and about 50% by weight.

9. The composition of claim 1, wherein the amount of carbon fibers is between about 30% and about 45% by weight.

24. The composition of claim 15 wherein the amount of carbon fibers is between about 20% and about 50% by weight.

25. The composition of claim 19, wherein the amount of carbon fibers is between about 30% and about 45% by weight.

26. A molded article comprising the composition of claim 15.

27. The molded article of claim 26 wherein the article comprises a wafer carrier suitable for transporting semi-conductor wafers.

28. The molded article of claim 26 wherein the article comprises a bipolar plate.

29. The molded article of claim 26 wherein the article comprises an electrode.

30. The composition of claim 15, wherein the nanotubes comprise functional groups located on the ends of the nanotubes, along the side walls of the nanotubes, or both.

31. The composition of claim 30, wherein the functional groups comprise fluorine.

32. The composition of claim 15, wherein the nanotubes comprise single wall carbon nanotubes, multiple wall carbon nanotubes or a combination thereof.

33. A method of forming a composite for the manufacturing of an article, the method comprising

providing an extruder;

feeding an amount of a thermoplastic polymer into the extruder;

feeding an amount of nanotubes into the extruder;

feeding an amount of carbon fibers having an aspect ratio greater than 1 and less than about 5 into the extruder; and

applying shear to blend the nanotubes, the carbon fibers, and the polymer,

wherein a thermoplastic polymer melt is formed having the amount of carbon nanotubes and the amount of carbon fibers dispersed in the polymer melt.

34. The method of claim 33 wherein the nanotubes comprise single wall carbon nanotubes, multiple wall carbon nanotubes, or a combination thereof.

35. The method of claim 33 wherein the amount of the carbon fibers is between about 20% and about 50% by weight.

36. The method of claim 33 wherein the amount of carbon fibers is between about 25% and about 45% by weight.

37. The method of claim 35 wherein the amount of nanotubes is between about 0.5% and about 5% by weight.