Claims

1. A thermal interface material comprising:

at least one polymer;

at least one phase change material including at least one hydrocarbon wax;

a first thermally conductive metal filler having a first particle size;

a second thermally conductive filler having a second particle size; where in the first particle size is larger than the second particle size; and

all thermally conductive fillers being present in a total amount of between 80 wt.% and 99 wt.%, based on the total weight of the thermal interface material, and wherein a weight ratio of the first filler to the second filler is greater than 1.

2. The thermal interface material of claim 1, wherein the first thermally conductive filler comprises aluminum particles.

3. The thermal interface material of claim 1, wherein the second thermally conductive filler comprises zinc oxide particles.

4. The thermal interface material of claim 1, wherein in the first particle size is from about 1microns to about 25 microns .

5. The thermal interface material of claim 1, wherein the second particle size is from about 0.1 microns to about 3 microns.

6. The thermal interface material of claim 1, further comprising a third thermally conductive filler having a third particle size; wherein the second particle size is larger than the third particle size.

7. The thermal interface material of claim 1, further comprising at least one coupling agent.

8. The thermal interface material of claim 7, wherein the coupling agent is a titanate coupling agent.

9. A formulation for forming a thermal interface material comprising:

at least one solvent;

at least one polymer;

at least one phase change material including at least one hydrocarbon wax;

a first thermally conductive metal filler having a first particle size;

a second thermally conducive filler having a second particle size; wherein the first particle size is larger than the second particle size; and

all thermally conductive fillers being present in a total amount of between 80 wt.% and 99 wt.%, based on the total weight of the thermal interface material, and wherein a weight ratio of the first filler to the second filler is greater than 1.

10. An electronic component comprising:

a heat sink;

an electronic chip;

a thermal interface material positioned between the heat sink and electronic chip, the thermal interface material including:

at least one polymer;

at least one phase change material including at least one hydrocarbon wax;

a first thermally conductive metal filler having a first particle size;

a second thermally conductive filler having a second particle size; wherein the first particle size is larger than the second particle size; and

all thermally conductive fillers being present in the a total amount of between 80 wt.% and 99 wt.%, based on the total weight of the thermal interface material, and wherein a weight ratio of the first filler to the second filler is greater than 1.

11. The thermal interface material of claim 1, wherein the at least one polymer includes a hydrogenated polybutadiene mono-ol.