**Thermal resistance between carbon nanothreads**

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The continuing miniaturization of electronic devices/systems (such as light-emitting diodes, integrated circuits and microprocessors) has inevitably increased their power density (~ 100 Wcm2) and led to dramatically increased heat generation.1 To ensure reliable performance and lifetime, effective and efficient heat removal is desired, which relies heavily on the high thermal conductivity of the packaging substrates and thermal interface materials (TIMs).2-4 TIMs are normally based on polymers, whose intrinsic thermal conductivity is only about 0.2-0.5 Wm-1K-1. Extensive research has been conducted to enhance their thermal conductivity by adding different types of highly (thermally) conductive fillers, such as carbon nanotube, graphene, and h-BN. A main factor that limits the enhancement effect from the nanofillers is the interfacial thermal resistance, including the filler/filler and filler/matrix interface resistances. This work proposes the usage of a new type of ultra-thin carbon nanomaterial – carbon nanothread, to promote the thermal transport in the polymer composites. Carbon nanothreads have been shown with excellent mechanical properties,5 tunable thermal transport properties.6 Compared with carbon nanotube, our *in silico* studies reveal that carbon nanothread has a much lower thermal resistance between each other. Combining with the ultra-thin nature of carbon nanothread (that can enable the establishment of effective heat transfer percolation network at a low weight/volume load), our work suggests that carbon nanothread can be an excellent alternative nanofillers for polymer composites with enhanced thermal conductivity.

**References**

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