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Thermal Conductivity of 3D CNT-Polymer Composites with Controlled Dispersion MENA KLITTICH, XUE WANG, ALI DHINOJWALA, University of Akron — The high thermal conductivity of isolated carbon nanotubes (CNTs) has inspired its use as a thermal filler for insulative polymers. However, the performance of these composites has consistently been sub par. Extensive analyses of these complex systems have resulted in the conclusion that resistance at the CNT/polymer interface due to phonon mismatch and poor physical binding, as well as the weakly bonded tube-tube interactions restrict the effectiveness of CNTs in practice. Experimental comparisons of CNT treatments, coatings, functionalization, and interactions with various polymers have proved challenging, due to the interconnected nature of the composite properties. Here, we have reversed the paradigm and used a constant CNT structure that is then modified post-growth to allow for direct comparisons of polymer composites.

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