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Thermoelectric Behavior of Carbon Nanotube-Filled Latex Composites JAIME GRUNLAN, Texas A&M University, CHOONGHO YU, YEON SEOK KIM, DASARAYONG KIM — Segregated-network carbon nanotube (CNT)-polymer composites were prepared and their thermoelectric properties were measured as a function of CNT concentration at room temperature. This study shows that electrical conductivity can be dramatically increased by creating a network of CNTs in the composite, while the thermal conductivity and thermopower remain relatively insensitive to the filler concentration. This behavior results from thermally disconnected, but electrically connected, junctions in the nanotube network, which makes it feasible to tune the properties in favor of a higher thermoelectric figure of merit. With a carbon nanotube concentration of 20 wt%, these composites exhibit an electrical conductivity of 4940 S/m, thermal conductivity of 0.4 W/m•K and a thermoelectric figure of merit (ZT) greater than 0.005 at room temperature. This study suggests that polymeric thermoelectrics are possible and provides the basis for further development of light-weight, low-cost and non-toxic polymer composites for thermoelectric applications in the future.

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