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Thermal Properties of Vertically Aligned Carbon Nanotube-Nanocomposites Boundary Resistance and Inter-Carbon Nanotube Contact: Experiments and Modeling HAI DUONG, N. YAMAMOTO, MIT, M. PANZER, A. MARCONNET, K. GOODSON, Stanford Uni, D. PAPAVASSILLIOU, Stanford University, S. MARUYAMA, Tokyo Uni, B. WARDLE, MIT, UNIS. OF STANFORD, OKLAHOMA, TOKYO TEAM — It is very significant to experimentally and numerically examine thermal properties of aligned CNT polymeric nanocomposites (PNCs) with variable volume fraction (vol%) and controlled morphology. MWNTs having 200-1000um length synthesized by CVD are densified mechanically to achieve 1-20vol% Thermal conductivities of MWNT-epoxy along the MWNT axis with different vol% are measured by the temperature gradient with an infrared microscope. The developed random walk model with taking into account the thermal boundary resistance (TBR) at the CNT-epoxy and/or CNT-CNT interface is validated by experimental results The different vol% and CNT aligned in PNCs allows extracting the TBR values between MWNTs and epoxy or even between MWNTs by combining the developed model and experiment results. Further numerical investigation is conducted to compare systematically the thermal conductivity of both MWNT- and SWNT-epoxy with different CNT orientations under the wide range of the CNT vol% with different TBR between the CNTs and the CNT-matrix and various inter-CNT contact degrees.

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