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Thermal Conductance Measurement of metal-CNT Composites using Micron-Sized Suspended Structures. MYUNG RAE CHO, SUNG UN CHO, YOUNG DUK KIM, BYEONG GYUN O, BYUNG YANG LEE, SEUNHUN HONG, YUN DANIEL PARK, Seoul Nat'l Univ., YDPLAB TEAM, HND TEAM — We report on the thermal conductance measurements of metallic thin film/carbon nanotube nanolaminates by micron-sized suspended structures. Thermal conductances of low-dimensional materials are particularly difficult to measure due to various spurious environment effects. A proven method to characterize thermal properties of such samples is to thermally isolate and to incorporate measurement probes by micromachining techniques. Thermally isolating the measurement sample as well as incorporating heaters and thermometers allows for simple and direct characterization of thermal properties. As well as an absolute thermal conductivity values, their temperature dependence gives insight in the thermal transport process. Recently several studies have reported that when the thickness of metallic thin films approaches nanometer length-scales, its thermal conductivity is significantly reduced than its bulk value along with its decrease in value with temperature. Here we show that the absolute thermal conductivities of metal-CNT nanolaminates are enhanced compared to a similar metallic thin film without addition of CNT. But, the temperature dependence of the thermal conductivity is dominated by low-dimensional effects.

Myung Rae Cho
Seoul Nat'l Univ.

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