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Optical Measurement of Thermal Contact Resistance in Suspended Carbon Nanotubes I-KAI HSU, RAJAY KUMAR, ADAM BUSHMAKER, MICHAEL T. PETTES, LI SHI, TODD BRINTLINGER, MICHAEL S. FUHRER, JOHN CUMINGS, STEPHEN B. CRONIN, University of Southern California — We observe the local temperature increase profile $\Delta T(x)$ along suspended carbon nanotubes (CNTs) by converting the shifts in the G-band Raman mode to temperature. By deconvolving the temperature profile using the Fourier heat transport equation, we determine the thermal contact resistance (R_c) relative to the intrinsic thermal resistance of the nanotube itself (R_{NT}). The curvature of the temperature profile is found to be dominated by the ratio of $R_{NT}$to R_c. Moreover, the difference between the left and right thermal contact resistances can also be differentiated via the offset of the temperature increase at the ends of the suspended CNT. The results show the ratio of the contact thermal resistance to the nanotube thermal resistance to range from 0.02 to 17. The measurement is also able to distinguish between ballistic and diffusive thermal transport. We find diffusive thermal transport to dominate the heat transport in all nanotubes measured in this study. The authors would like to acknowledge support from DOE Award Nos. DE-FG02-07ER46376 and DE-FG02-07ER46377. I.K. Hsu *et al.*, Applied Physics Letters (in press).

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