Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Investigation of Optical Absorption and Thermal Transport in Suspended Carbon Nanotube Bundles I-KAI HSU, Department of Materials Science and Electrical Engineering, University of Southern California, ADAM BUSHMAKER, MEHMET AKYOL, STEPHEN CRONIN, Department of Materials Science and Electrical Engineering, University of Southern California, MICHAEL PETTES, LI SHI, Department of Mechanical Engineering and Center for Nano and Molecular Science and Technology, Texas Materials Institute,University of Texas of Austin — The optical absorption in suspended carbon nanotube (CNT) bundles is measured using Raman spectroscopy and two platinum resistance thermometers (PRTs), located at both ends of the suspended CNTs. The power absorbed from an incident focused laser is determined from the thermal power flowing through both ends of the CNT, detected by resistance changes in the PRTs. The results show 0.03 to 0.44% absorption of a focused 532nm laser with a 0.4μm diameter spot size incident on CNT bundles with diameters and lengths varying from 7.1-8.2nm and 11.7-14.3μm, respectively. The thermal conductance of the suspended CNT bundles can also be obtained by measuring the temperature difference between the incident laser spot and both ends of the suspended CNT. Here, temperatures in the center of the nanotube are extracted from the temperature-induced downshifts of the G band Raman mode.

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Date submitted: 30 Nov 2008 Electronic form version 1.4