

Abstract Submitted
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Ultrafast Spectroscopy of Phonons in Single-Walled Carbon Nanotubes ERIK HAROZ, Rice University, DAVID HILTON, JUNICHIRO KONO, ROBERT HAUGE, Rice University, KI-JU YEE, Chungnam National University, YONG-SIK LIM, Konkuk University, STEPHEN DOORN, Los Alamos National University — Recently, we observed coherent phonons (CPs) of the radial breathing mode (RBMs) in semiconducting single-walled carbon nanotubes (SWNTs) suspended as individuals in aqueous surfactant (1). We demonstrated CP spectroscopy as a powerful method for determining phonon and exciton energies in an ensemble of SWNTs with different chiralities. Here, we extend these ultrafast optical studies on various types of nanotube samples including films and solutions. In order to provide new insight into CP decay mechanisms, we systematically investigated the temperature dependence of CP amplitude, frequency, and lifetime from 4 -300 K while changing the pump/probe photon energy. We also investigated how bundling affects CP line widths. Furthermore, we compared the intensity dependence of CPs resonant with the E_{11} and E_{22} transitions by studying the excitation profile for specific RBMs, focusing particularly on the excitation line width and shape. 1) Y. S. Lim *et al.*, Nano Letters, published electronically November 2, 2006.

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