

Abstract Submitted  
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**Intrinsic and extrinsic effects in the temperature dependent photoluminescence of semiconducting carbon nanotubes** DENIS KARAIKAI, CHAIWAT ENGTRAKUL, TIMOTHY MCDONALD, MICHAEL J. HEBEN, ANGELO MASCARENHAS, Center for Basic Science, National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, Colorado 80401, USA — The temperature dependence of the band gap of semiconducting carbon nanotubes was measured for ten different nanotube species. The unprecedented effectiveness in avoiding the effect of external strain, or any other effects originating from the surrounding environment, lead to an accurate measurement of the band gap temperature dependence, giving fundamental insight into the nanotube electron-phonon interaction. Small but reproducible energy shifts of the emission lines with temperature were observed, showing a moderate chirality dependence, well in agreement with recent theoretical calculations [1]. In addition to the energy shift, a substantial narrowing of the emission lines was also observed. The removal of the temperature shift of the band gap, allows the precise measurement of the effect of external strain on carbon nanotubes in different environments.

[1] Rodrigo B. Capaz, Catalin D. Spataru, Paul Tangney, Marvin L. Cohen, and Steven G. Louie, *Phys. Rev. Lett.* **94**, 036801 (2005).

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