

Photoluminescence of carbon nanotubes grown over trench

Shinya Iwasaki¹, Yutaka Ohno², Yoichi Murakami³, Shigeru Kishimoto⁴,
Shigeo Maruyama³, Takashi Mizutani⁵

¹ Department of Quantum Engineering, Nagoya University

² Department of Quantum Engineering, Nagoya University, PRESTO, Japan Science and Technology Agency

³ Department of Mechanical Engineering, The University of Tokyo

⁴ Department of Quantum Engineering, Nagoya University, Venture Business Laboratory, Nagoya University

⁵ Department of Quantum Engineering, Nagoya University, Institute for Advanced Research, Nagoya University

Contact e-mail: si_iwasa@echo.nuee.nagoya-u.ac.jp

The optical properties of single-walled carbon nanotubes (SWNTs) grown over trench are sensitive to environmental atmosphere [1, 2]. We have compared E_{11} and E_{22} of the SWNTs over trench with those of SDS-wrapped SWNTs reported by Weisman et al. [3] for 20 chiralities of semiconducting SWNTs with branch index 23-32. The energy difference depends on the chirality, in particular, on the chiral angle. This can be explained by the chiral angle dependence of effective mass. We have also investigated the time evolution of E_{11} and E_{22} after the growth of SWNTs, which showed step-like shifts after several days.

[1] J. Lefebvre *et al*. Appl. Phys. A78 (2004) 1107. [2] P. Finnie *et al*. Phys. Rev. Lett. 94 (2005) 247401. [3] R. B. Weisman *et al*. Nano Lett. 3 (2003) 1235.