

## Suspended Single-Wall Carbon Nanotubes as a Sensor of Molecular Adsorption

Yoshikazu Homma\*, Tateki Hanashima and Shohei Chiashi<sup>1</sup>

Department of Physics, Tokyo University of Science, Shinjuku-ku, Tokyo 162-8601, Japan

<sup>1</sup>Department of Mechanical Engineering, University of Tokyo,  
Bunkyo-ku, Tokyo 113-8656, Japan

(Received July 27, 2009; accepted July 30, 2009)

**Key words:** carbon nanotubes, photoluminescence, environmental effect, adsorption, desorption

All the carbon atoms of a single-wall carbon nanotube (SWNT) are in the surface layer. Thus, SWNTs suffer from strong interaction with the surrounding environment. When an SWNT is suspended between mesa structures, the interactions with the substrate and other nanotubes are minimized, and the nanotube is directly exposed to ambient gas. Semiconducting SWNTs suspended in space exhibit intense photoluminescence, and their optical transition energy depends on the state of molecules absorbed onto the SWNT surface. Therefore, gas molecule adsorption/desorption can be probed by photoluminescence analysis.

\*Corresponding author: e-mail: homma@rs.kagu.tus.ac.jp