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Fluorescence and Optical Absorption of Single-Walled Carbon Nanotubes Synthesized from Alcohol

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Near-infrared fluorescence measurements [1] were performed on single-walled carbon nanotubes (SWNTs), which were catalytically synthesized from alcohol [2] under various experimental conditions. The chirality distribution was determined by measuring the fluorescence emitted from dispersed SWNTs as a function of excitation wavelength. The chiral angle distribution of small diameter tubes was distributed predominantly in the higher chiral angle region [3]. The reason for the armchair-rich chirality distribution is discussed based on the initial cap structure satisfying the Â‘isolated pentagon ruleÂ’. The results of fluorescence measurements were compared with the optical absorption spectra and the theoretical calculations of energy gaps. Centrifuge-based separation of small diameter SWNTs was performed to prepare samples rich in near-armchair type.

[1] S.M. Bachilo et al., Science 298 (2002) 2361.
[2] S. Maruyama et al., Chem. Phys. Lett. 360 (2002) 229.
[3] Y. Miyauchi et al., Chem. Phys. Lett. 387 (2004) 198.