

NIR Fluorescence Spectroscopy and Structure Control of SWNTs

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Near infrared fluorescence measurements of single-walled carbon nanotubes (SWNTs) were performed. In addition to Raman scattering and absorption spectroscopy, the fluorescence spectroscopy would be a convenient and powerful method for the determination of the structure distribution of bulk SWNTs sample [1]. The structure distribution of SWNTs synthesized by Alcohol CCVD technique (ACCVD) [2, 3] and other various generation techniques were determined by measuring fluorescence emitted from isolated SWNTs in aqueous suspension. In the case of ACCVD, the SWNTs had a dominant distribution in higher chiral angle region close to so-called armchair type and the chirality distribution tended to be more armchair side when diameters of SWNTs were smaller. Especially, the ACCVD sample at 650 °C shows only two dominant peaks of chiral indices (6, 5) and (7, 5) as shown in Fig. 1. This narrower chirality distribution suggests that a strict control of diameters of thin SWNTs is a first step towards the chirality control of SWNTs.

[1] S. M. Bachilo et al., *Science*, **298** (2002) 2361-2366.

[2] S. Maruyama et al., *Chem. Phys. Lett.*, **360** (2002) 229-234.

[3] Y. Murakami et al., *Chem. Phys. Lett.*, **374** (2003) 53-58.

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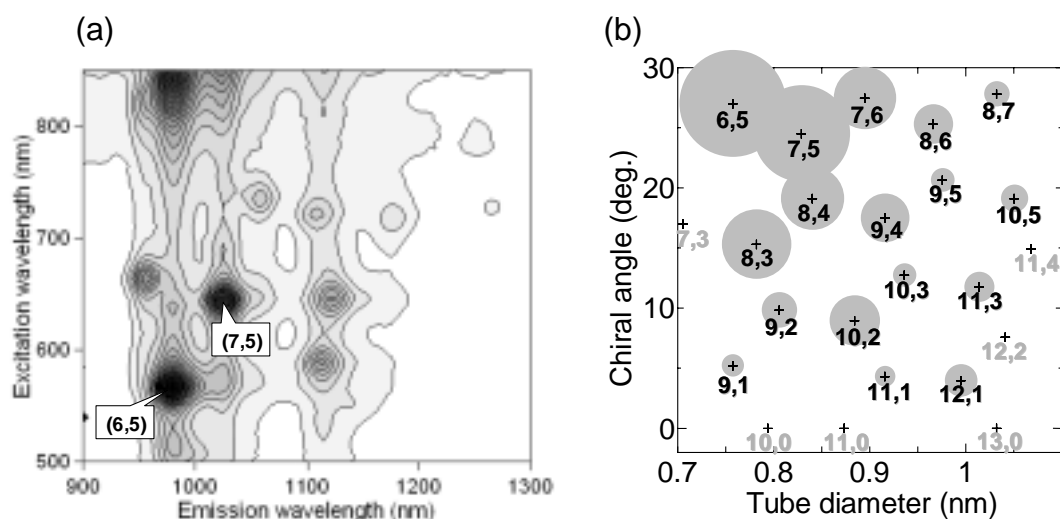


Fig.1 (a) Contour plot of fluorescence intensities and (b) chirality distribution of ACCVD SWNTs synthesized at 650 °C. The area of the circle at each (n, m) point denotes the relative intensity of the corresponding fluorescence peak.