

Experimentally evaluated (n,m) dependence of photoluminescence efficiency of single-walled carbon nanotubes

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Photoluminescence (PL) mapping measurement is a powerful tool to evaluate (n,m) population in single-walled carbon nanotube (SWNTs) materials [1]. However, the efficiency of PL of SWNTs has been predicted to be dependent on (n,m) , especially type-I ($2n + m \bmod 3 = 1$) or type-II ($2n + m \bmod 3 = 2$) [2]. In order to evaluate (n,m) population accurately, a correction with PL efficiency is necessary. In this study, we have experimentally evaluated (n,m) dependence of PL efficiency by measuring the number of SWNTs and PL intensity. The sample used in this study was SWNTs suspended on a grating structure formed on a quartz substrate. The number of SWNTs with a particular (n,m) was counted by means of micro-PL technique. The PL efficiency was evaluated by dividing the macroscopic PL intensity by the number of nanotubes. The obtained result well agrees with the theoretical prediction [2].

[1] Y. Miyauchi *et al.*, Chem. Phys. Lett. **387**, 198 (2004)

[2] Y. Oyama *et al.*, Carbon **44**, 873 (2006)