

## Encapsulation of Binary Molecules into SWCNTs for Precise Carrier Density Control

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Flow of an electrolyte droplet on a single-wall carbon nanotube (SWCNT) thin film can be used for electronic power generation. The precise carrier density control of the SWCNT film is crucial for the optimization of the performance. In this study, we report a new way to control the carrier density of SWCNT precisely using chemical doping [1] by encapsulating binary organic molecules. We selected 2,4-bis[4-(N,N-diphenylamino)-2,6-dihydroxyphenyl]squaraine (DPSQ) and coronene as hole dopant and dummy molecules. SWCNTs (EC1.5, Meijo Nano Carbon, unsorted) were refluxed in 1,4-dioxane for 3 h with dopant and dummy molecules pre-dissolved therein. By adjusting the concentration ratio of DPSQ to coronene, we have prepared several SWCNTs encapsulating DPSQ molecules with different density (Fig. 1). Because the dummy molecules are expected to have ignorable effect on the electronic properties of SWCNTs, this method can be useful for precise carrier density control. We will discuss the latest results in this presentation.

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### Reference

[1] T. Takenobu et al. *Nat. Mater.* **2**, 683 (2003).

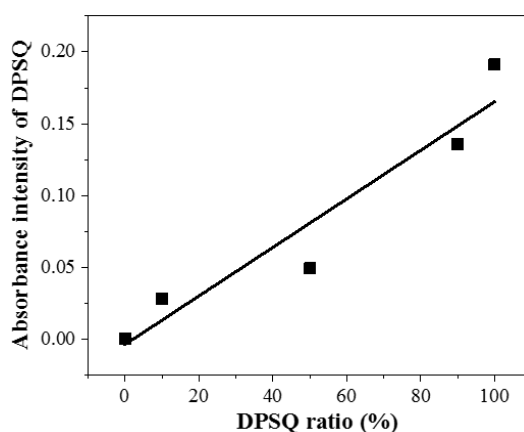


Fig. 1: The absorbance intensity of encapsulated DPSQ as a function of DPSQ ratio in the mixture of DPSQ and coronene.