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Chirality selective growth of carbon nanotubes from one-dimensional fusion of aromatic compounds HONG EN LIM, YASUMITSU MIYATA, RYO KITaura, Nagoya University, HIROMICHI KATAURA, AIST, JST-CREST, HISANORI SHINOHARA, Nagoya University — We have investigated the formation of carbon nanotubes (CNTs) from one-dimensional coalescence of various polyaromatic compounds with different edge structures within an outer tube template. Transformation of the filled precursors into an inner tube was confirmed upon high-temperature thermal annealing. These newly formed inner tubes were then extracted through ultrasonication, as reported in our previous study [1]. High resolution transmission electron microscope observations of the samples together with the photoluminescence analyses of the extracted dispersions reveal that the chirality of the inner tubes generated were greatly affected not only by the edge structures but also by the intermediates formed. In particular, graphene nanoribbon-like intermediates obtained from perylene-derivative can be preferentially converted into near-zigzag CNTs with (8,1) chirality. The present method may provide the controlled growth of chiral-specific CNTs, which has been difficult to achieve using ordinary synthesis approaches.

[1] Y. Miyata, et al., ACS Nano 2010, 4, 5807.

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