

Abstract Submitted
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Organic-vapor-induced repeatable movements of C₆₀ in/from single-wall carbon nanohorns at room temperature JIN MIYAWAKI, JST/SORST, MASAKO YUDASAKA, JST/SORST and NEC, RYOTA YUGE, NEC, SUMIO IJIMA, JST/SORST, NEC, and Meijo Univ. — Incorporation of functional materials inside carbon nanotubes (CNTs) has been actively investigated with the goal of improving the physical and chemical properties of CNTs. We found intriguing phenomena of repeatable movement of materials from inside to outside of CNTs and vice versa, which resulted simply by exposure to different organic vapors at room temperature. For example, C₆₀ entered inside single-wall carbon nanohorn (SWNHs), a type of single-wall CNTs, when exposed to toluene vapor at room temperature, and the incorporated-C₆₀ exited when exposed to ethanol vapor. Here the entrance and exit were evidenced by X-ray diffraction and N₂ adsorption measurements, and microscopic observations. The back-and-forth transportations of C₆₀ could be repeated. We think that the C₆₀ movements were mediated by the layers of toluene or ethanol adsorbed on the SWNH surfaces. The present findings will help in the fabrication of various nanometer-scale hybrid systems from CNTs.

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