

Supporting Information

Organic-vapor-induced repeatable entrance and exit of C₆₀ in/from single-wall carbon nanohorns at room temperature

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Ejection of incorporated toluene by ethanol vapor exposure

To clarify a mechanism of C₆₀ ejection by ethanol vapor exposure, we also carried out the ethanol vapor exposure experiment for Toluene@NHox (no incorporated C₆₀). After 5-h exposure to ethanol vapor, quantity of the incorporated toluene was remarkably decreased (Figure S1).

Removal of co-incorporated toluene in C₆₀@NHox(HTHV)

Heat treatment of C₆₀/tolu@NHox containing about 4% residual toluene at 150 °C in vacuum (about 1×10⁻⁵ Torr) for 30 min reduced the toluene quantity to almost zero (Figure S2).

Quantification of C₆₀ incorporated in C₆₀@NHox(HTHV)

To quantify the amount of incorporated C₆₀, we dispersed 0.33 mg of C₆₀@NHox(HTHV) in 9.5 mL of pure toluene. After 20 h, the slurry was filtered (0.2-μm pores), and the UV/vis spectrum of the filtrate in a UV quartz cell (optical path length: 10 mm) was measured (Figure S3). Using the molar absorption coefficient of C₆₀ in toluene at 336 nm, 54,000 L mol⁻¹ cm⁻¹ [1], we obtained the concentration of C₆₀ released, 5.5 μM. This corresponds to 0.13 g/g NHox. The agreement between the C₆₀ quantity released from C₆₀@NHox(HTHV) with the initial incorporated C₆₀ quantity (0.13 g/g NHox) of C₆₀/tolu@NHox confirms that degradation of C₆₀ during the heating process to remove the co-incorporated toluene did not take place.

[1] Yuge, R.; Yudasaka, M.; Miyawaki, J.; Kubo, Y.; Ichihashi, T.; Imai, H.; Nakamura, E.; Isobe, H.; Yorimitsu, H.; Iijima, S. *J. Phys. Chem. B* **2005**, *109*, 17861.

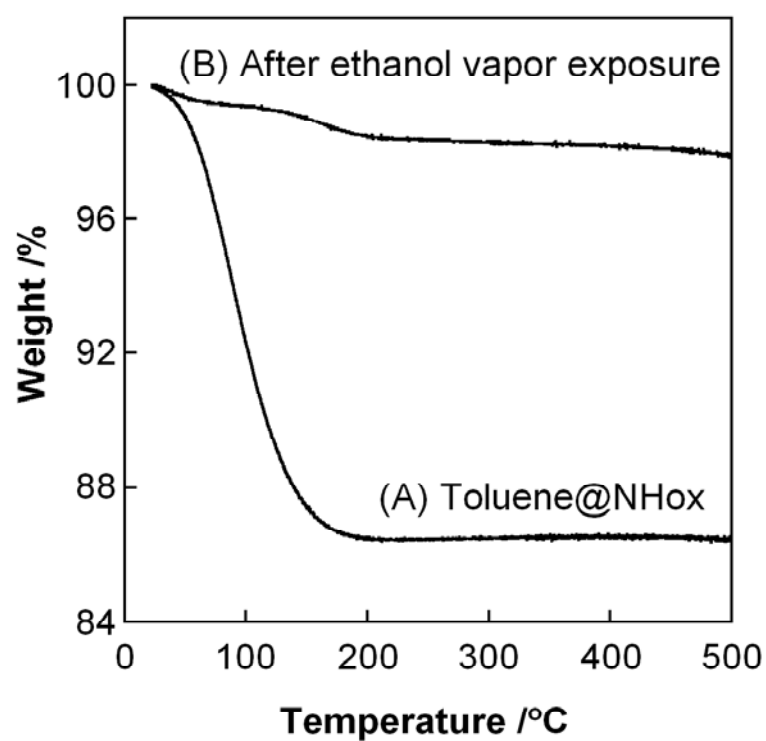


Figure S1. TGA profiles in He of Toluene@NHox before (A) and after (B) ethanol vapor exposure for 5 h. Weight loss between 110 and 250 °C was due to toluene desorption.

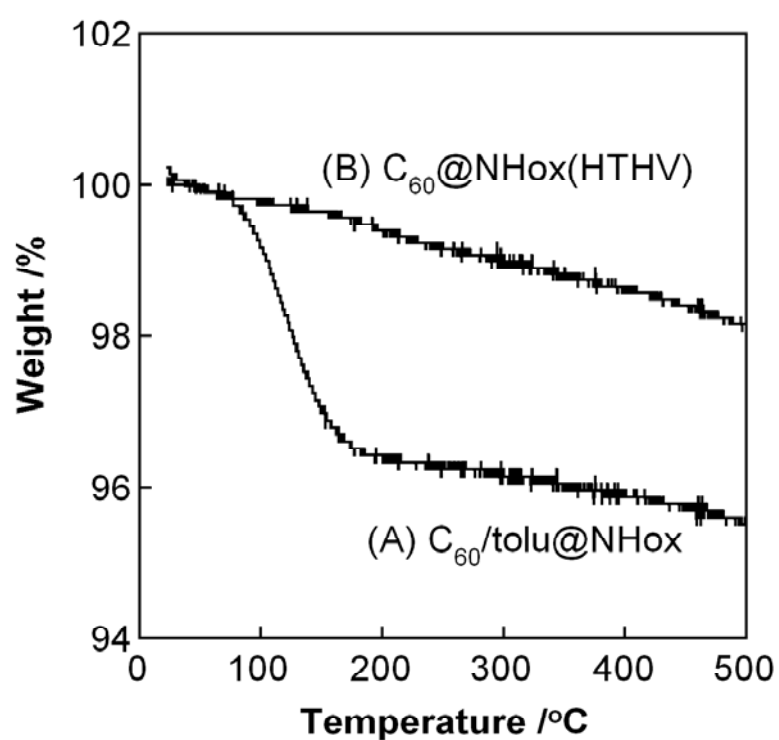


Figure S2. TGA profiles of C₆₀/tolu@NHox (A) and C₆₀@NHox(HTHV) (B) in He. Weight loss between 110 and 250 °C observed for C₆₀/tolu@NHox was due to toluene desorption.

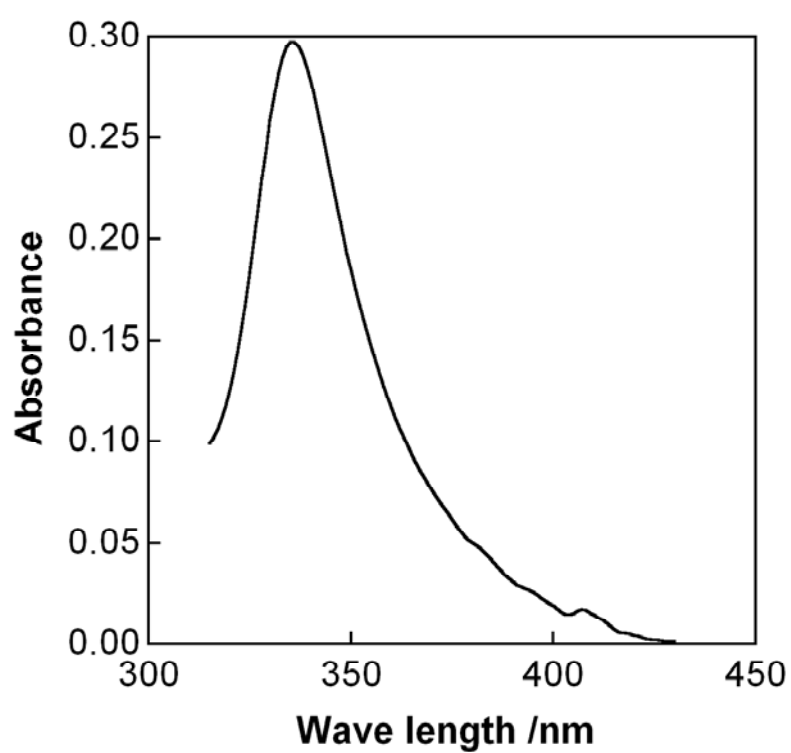


Figure S3. UV/vis absorption spectrum of C_{60} released in toluene from $C_{60}@NHox(HTHV)$.