

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Diameter Recognition of Single Walled Carbon Nanotubes by Water-Soluble Proteins KOJI MATSUURA, TAKESHI SAITO, TOSHIYA OKAZAKI, SATOSHI OHSHIMA, KOHEI MIZUNO, DON FUTABA, KENJI HATA, MOTOO YUMURA, SUMIO IJIMA, Res Ctr Adv Carbon Mat, Natl Inst of Adv Indust Sci and Technol (AIST) — The hybrid of proteins and single walled carbon nanotubes (SWCNT) is a promising advanced material that possesses both functions of associated proteins and SWCNTs. Using SWCNTs of varying diameter, synthesized by two distinct methods, Direct-Injection-Pyrolytic-Synthesis [1] (0.8- 1.2 nm) and super-growth chemical vapor deposition [2] (mean diameter of 3 nm), we observed diameter-selective dispersion for two differing proteins which is driven by the sizes of the hydrophobic pockets in the proteins. Hybrid solutions of both lysozyme (LYS) and bovine serum albumin (BSA) dispersed the smaller diameter SWCNTs as observed by absorbance and photoluminescence spectroscopy. The larger diameter SWCNTs were dispersed in the BSA solution, while not dispersed by LYS. A decrease in the mean molar ellipticity observed by far-UV circular dichroism spectroscopy following the removal of unadsorbed proteins suggests a loss in α -helical contents of the proteins. These results, in addition to the difference in size of BSA and LYS (10 and 4 nm, respectively), indicate the hydrophobic pockets corresponding to the protein morphology can recognize the SWCNT diameters. [1] Saito et al. J. Phys. Chem. B (2005) 109, 10647. [2] Hata et al. Science (2004) 306, 1362.

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Date submitted: 05 Jan 2006

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