

Abstract Submitted
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The Structure of Amphiphilic Polymers Interacting with Carbon Nanotubes YACHIN COHEN, MEIRAV GRANITE, Technion, Israel, WIM PYCKHOUT-HINTZEN, AUREL RADULESCU, Fz. Juelich, Germany — Dispersion of single-walled carbon nanotubes, necessary for their beneficial utilization, is often based on amphiphilic copolymers. We have successfully utilized the following systems: an alternating copolymer of styrene and sodium maleate, exhibiting alternating hydrophobic and hydrophilic groups, amphiphilic block copolymers such as Pluronic F108 and a synthetic short polypeptide (FFDD)₆, containing alternating hydrophobic blocks of two phenylalanine (FF) and hydrophilic block of two aspartic acid (DD). Cryo-transmission electron microscopy images reveal isolated, very small bundles of carbon nanotubes, with diameters range from 1 to 5 nm and approximately 500 nm length. Small-angle neutron scattering experiments were conducted at different D₂O/H₂O content of the dispersing medium. The scattering patterns suggest a complex entity with an heterogeneous structure. For the alternating copolymer, loose adsorption of polymer coils is indicated, contrary to published ideas on “polymer wrapping” of nanotubes. For the Pluronic block copolymers, the data suggest that even below the critical micellization temperature there is a dense coating on the nanotube surface and the hydrophilic blocks are highly extended. The polypeptide also forms a dense coating with an apparently “spongy” structure.

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