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The conformation of Pluronic® block copolymers adsorbed on carbon nanotubes and their interaction with water studied by small-angle neutron scattering YACHIN COHEN, MEIRAV GRANITE, Technion, Israel, WIM PYCKHOUT-HINTZEN, AUREL RADULESCU, Fz. Juelich, Germany
— Amphiphilic block copolymers are particularly useful in dispersing single-walled carbon nanotubes (SWCNT) in water. Small-angle neutron scattering measurements conducted at different D_2O/H_2O content of the dispersing medium provide quantitative information on the adsorption density and conformation of the polymer interacting with the nanotube surface. Data is presented on Pluronic® F108 - $(EO)_{132}(PO)_{50}(EO)_{132}$ and F127 $(EO)_{100}(PO)_{65}(EO)_{100}$, where EO-ethylene oxide and PO-propylene oxide, well below the critical micellization temperature of the polymer. A dense coating of the PPO blocks on the nanotube surface is determined with the PEO chains extended from the cylindrical core-shell structure. The data from the two Pluronic systems show minimal scattering at about 70% D_2O in the dispersing water, which exhibit a q^{-1} power law of the scattering vector (q). This indicates near matching of the polymer chains at a surprisingly high scattering length density. The model fit required considerations of tight association of water molecules around PEO chains and slight isotopic selectivity.

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