

Supplementary information

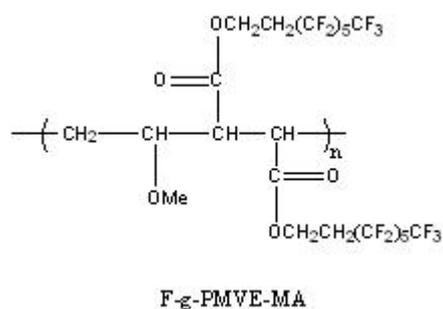


Figure S1. The structure of fluorinated graft poly(methyl vinyl ether-alt-maleic anhydride).

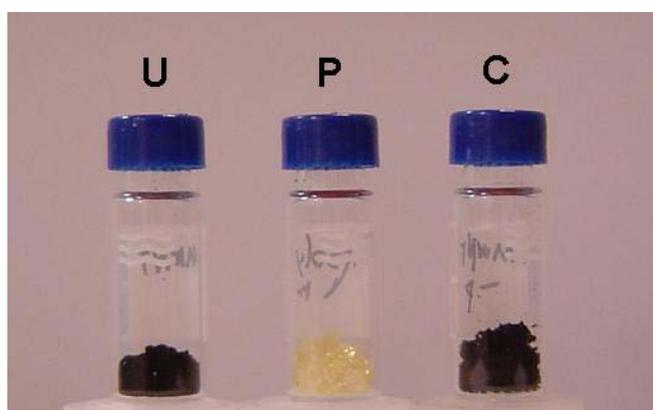


Figure S2. MWNTs coated with polymer layer (right vial, C) have similar appearance to the pristine MWNTs (left vial, U). The polymer used for coating is yellow amorphous material in the pure state (middle vial, P).

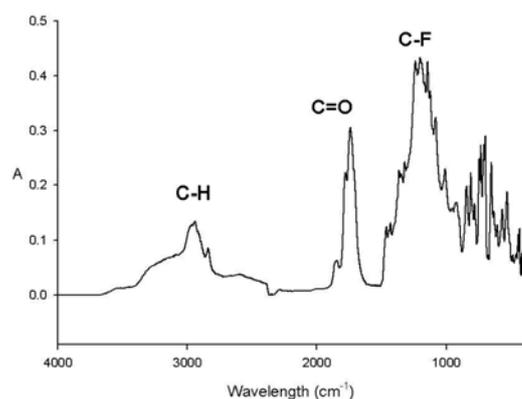


Figure S3. IR spectrum of fluorinated graft poly(methyl vinyl ether-alt-maleic anhydride)

Experimental

Coating: In a typical coating procedure, 0.5g fluorinated graft poly(methyl vinyl ether-alt-maleic anhydride) and 0.03g multi-walled carbon nanotubes (Aldrich, 95%)

were placed into a 100ml high pressure viewing cell with a sapphire window. The system was then heated up to 40 °C and pressurized with carbon dioxide to 300 bar. MWNTs were suspended by mechanical stirring during the process. Stirring was stopped and the pressure was released slowly down to 170 bar under isothermal condition through a back pressure regulator. When the pressure reached about 180 bar, the system became cloudy. The stirrer was switched on again, and the pressure and temperature were kept at 180 bar and 40 °C for one hour. The system was purged by fresh carbon dioxide over 2 hours. When the viewing cell became clear, the system was depressurized and the product was collected as a black powder.

Characterization: HRTEM imaging was performed on JEOL-JEM 4000EX LaB₆ microscope with information limit 0.12nm at 400kV and 100kV accelerating voltage. Nanotube samples (2-3 mg) were dispersed in 2 ml of methanol using an ultrasonic bath and deposited onto lacey carbon film coated TEM copper grids. Energy dispersive X-ray (EDX) spectra were collected on a JEOL JEM3000F field emission gun electron microscope, equipped with a super atmospheric thin window X-ray detector. The electron beam was typically 5-10 nm in diameter so that each EDX spectrum was taken for an isolated nanotube. IR spectra were collected for solid samples pressed in KBr disks using PERKIN ELMER 2000 FT-IR spectrometer. TGA curves were obtained under a nitrogen atmosphere on TA Instruments Hi-Res TGA 29 Thermogravimetric Analyzer in a high resolution ramp mode with a maximum ramp rate of 50 °C/min up to 1000 °C and the resolution of 3.0 °C.