Preparation and characteristics of SiOx-CNT composites

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Silica-coated carbon nanotubes (SiO_x-CNT) are successfully prepared to provide particular composite materials with multi-functional surface properties. An easy method to synthesize SiOx coated carbon nanotubes (SiO_x-CNT) through thermal decomposition of polycarbomethylsilane adsorbed on the surface of CNTs is reported. Physical properties of SiO_x-CNT samples depending on various Si contents and synthesis conditions are examined by XRD, XPS, nitrogen isotherm, SEM, and TEM. It is confirmed that SiOx is formed in the thickness of several nanometers on the surface of CNTs. The specific surface area is significantly increased by the coating, because thin layer of SiO_x is highly porous. The surface properties such as porosity and thickness of SiOx layers are found to be controlled by SiO_x contents and heat treatment conditions.