S-014

A Multifunctional Surface Fabricated by Polydimethylsiloxane Coated Multi-walled Carbon Nanotubes

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We report a facile method to fabricate superhydrophobic, transparent and conductive film using multi-walled carbon nanotubes (MWCNTs) which are coated by polydimethylsiloxane (PDMS). In order to prepare a film, PDMS coated MWCNTs were dispersed in solvents and the solution was drop-casted on substrates. It was demonstrated that the PDMS coating enhanced the dispersion of MWCNTs in diverse solvents such as dimethyl formamide(DMF) and acetone without the use of acids or surfactants, which are the common methods. In the case of DMF solvent, dispersion of MWCNT was improved by 40 % upon PDMS-coating of MWCNT. Enhanced dispersion of MWCNTs made it possible to fabricate transparent and conductive film homogeneously on the substrate and PDMS-coating on MWCNTs also made the surface hydrophobic. We can fabricate a uniform and multifunctional MWCNT film (transparent, conductive, superhydrophobic and flexible) which is applicable on large area without any physical damage and expensive equipment.

Keywords: Multi-walled carbon nanotubes, Polydimethylsiloxane, Dispersion, Superhydrophobicity, Transparency, Conductivity

S-015

ZnO/SiO_2 Prepared by Atomic Layer Deposition as Adsorbents of Organic Dye in Aqueous Solution and Its Photocatalytic Regeneration

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In this work, ZnO shell on mesoporous SiO2 (ZnO/SiO_2) was prepared by atomic layer deposition (ALD). Diethylzinc (DEZ) and H_2O were used as precursor of ZnO shell. ZnO/SiO_2 sample was characterized by X-ray diffraction (XRD), N2 sorption isotherms, X-ray photoelectron spectroscopy (XPS), Scanning electron microscopy (SEM) and Fourier-transform infrared spectroscopy (FT-IR). ZnO/SiO_2 showed higher adsorption capacity of MB than that of bare mesoporous SiO_2 and the adsorption capacities of ZnO/SiO_2 could be regenerated by UV exposure through the photocatalytic degradation of the adsorbed MB. This system could be used for removing organic dye from water by adsorption and reused after saturation of adsorption due to its photocatalytic regeneration.

Keywords: photocatalytic regeneration. Reuse of adsorbent. Recovery of adsorption capacity. ZnO on SiO_2