

Facile fabrication of γ -Fe₂O₃ embedded nanocomposite of multiwalled carbon nanotubes (MWCNTs)

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Abstract

Maghemite-embedded multiwalled carbon nanotubes (MWCNTs) nanocomposite structures were fabricated and characterized through facile and reproducible wet method. The morphology, composition and phase structure of as-prepared nanocomposite materials were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Field emission scanning electron microscopy (FE-SEM). The ferrimagnetic signatures by VSM magnetometer appeared with the saturated magnetization 66 emu g⁻¹. The coercive force and remanence calculated were 36.92 Oe and 2.07 emu g⁻¹ respectively. Agglomeration, electric potential of colloids and surface activity were studied by Zeta nanosizer and BET gas adsorption measurements. Results indicated that the monodispersed maghemite nanoparticles with the size of about 13 nm were uniformly self-assembled along the surface of the carbon nanotubes. The reaction parameters controlled denseness, size and crystallinity of maghemite nanoparticles.