

Preparation of Poly(aniline-co-*p*-phenylenediamine)/Fe₃O₄ Hybrid Nanocomposite: Electrical and Magnetic Properties

Yuvaraj Haldorai, Quang Long Pham, 심재진*
영남대학교 디스플레이화학공학부
(jjshim@yu.ac.kr*)

Conjugated conducting copolymer poly(aniline-co-*p*-phenylenediamine) [poly(Ani-co-*p*PD)] and surface modified iron oxide (Fe₃O₄) hybrid nanocomposites were prepared by ultrasonically-assisted *in situ* chemical oxidative polymerization. It was found that the aggregation of Fe₃O₄ nanoparticles could be reduced under ultrasonic irradiation. Transmission electron microscopy (TEM) confirmed that the Fe₃O₄ nanoparticles were well dispersed in the copolymer matrix. The incorporation of Fe₃O₄ in the nanocomposite was endorsed by Fourier transform infrared spectroscopy (FT-IR). Surface characterizations of hybrid nanocomposites were described by X-ray photoelectron spectroscopy (XPS). UV-visible spectra of the diluted colloid dispersion of nanocomposite particles were similar to those of the neat copolymer. The composites were also confirmed by TGA and XRD. Room-temperature conductivities of nanocomposites increase with an increasing fraction of Fe₃O₄. Magnetic property of nanocomposites indicated that the composites are superparamagnetic. (Regional Technology Innovation Program (RT104-01-04) of MOCIE)