

Synthesis of conducting polyaniline/ ZrO_2 composites via in-situ γ -radiolysis oxidative polymerization

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Zirconia (ZrO_2) particles were synthesized by sol-gel method and formation of hybrid composites with conducting polyaniline [PANI] via *in situ* gamma radiation-induced chemical oxidative polymerization method. Transmission electron microscopy (TEM) confirmed the core-shell morphology in which ZrO_2 particles were well dispersed in the PANI matrix. The incorporation of ZrO_2 in the composite was endorsed by Fourier transform infrared spectroscopy (FT-IR). UV-visible spectra of the diluted colloid dispersion of composite particles were similar to those of the neat copolymer. Thermogravimetric analysis revealed that the composites have a higher degradation temperature than PANI. X-ray diffraction (XRD) patterns of PANI/ ZrO_2 composites were similar to that of the PANI alone, indicating that no additional crystalline order or chain arrangement had been introduced. Room-temperature conductivity of composites decreases with an increasing fraction of ZrO_2 .