

Facile Synthesis of P(EDOT-Ani):PSS with Enhanced NIR Shielding Efficiency via Two-Stage Growth

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Poly(3,4-ethylenedioxythiophene-aniline):poly(styrene sulfonate), P(EDOT-Ani):PSS, with enhanced absorption of near infrared light, was prepared by oxidative polymerization. We demonstrated that a two-stage shot growth process optimizes the absorption of the polymer in the near infrared region via a controlled monomer addition time. In other words, the optical properties of the polymer complex were improved by controlling the time intervals of aniline monomer addition. P(EDOT-Ani):PSS was characterized by Fourier transform infrared spectroscopy (FT-IR) and X-ray photoelectron spectroscopy (XPS). The heat shielding efficiency of the P(EDOT-Ani):PSS films was calculated by using data from ultraviolet, visible, and near infrared (UV-vis-NIR) spectroscopy. The introduction of polyaniline to PEDOT increased the absorption in the near infrared area. The maximum NIR shielding efficiency (SENIR) of the film is 92.7% and the transmittance is 46.5%. P(EDOT-Ani):PSS prepared by two-stage shot growth system can be used in the energy savings field and has excellent potential as a heat shielding material.