

Synthesis and Characterization of Solution-Stable PEDOT Coated Sulfonated Polystyrene Copolymer Particles for Heat Shielding Film

임소은, 박찬일, 김주영, 도민석, 김중현[†]
연세대학교
(jayhkim@yonsei.ac.kr[†])

We synthesized poly(3,4-ethylenedioxythiophene) (PEDOT)-coated sulfonated polystyrene copolymer particles as efficient heat-shielding agents, which showed strong near-infrared (NIR) absorption, with relatively high solid contents and good solution stability. The poly(styrene sulfonate-co-styrene) (P(SS-co-St)) copolymers were successfully synthesized via radical solution polymerization, and PEDOT-coated P(SS-co-St) (PEDOT:P(SS-co-St)) was synthesized via Fe⁺-catalyzed oxidative polymerization. PEDOT:P(SS-co-St) was characterized by nuclear magnetic resonance and Fourier transform infrared spectroscopies. The particle size and morphology of PEDOT:P(SS-co-St) were examined using transmission electron microscopy, dynamic light scattering, and zeta potential measurements. The maximum NIR-shielding efficiency of the film was 92.0% with 40% transmittance. Therefore, PEDOT:P(SS-co-St) is currently one of the best candidates for a heat insulating material in a semi-transparent heat insulation coated window due to its relatively stable solution stability.