

PSS Resin-Fortified Polythiophene Nanoparticles For Highly Transparent Conducting Films

오기남, 이선종, 이정민, 김중현*
연세대학교
(jayhkim@yonsei.ac.kr*)

Polythiophene (PT) nanoparticles having different particle size were prepared by Fe³⁺-catalyzed oxidative polymerization in aqueous medium. They were characterized by standard four-point probe technique, gel permeation chromatography, and scanning electron microscope. In this study, more than 95% monomer conversion was achieved in various concentration of poly(styrene sulfonate) (PSS) with a trace of FeCl₃. As the concentration of PSS resin, acts as a polymeric stabilizer and a film forming polyelectrolyte, was increased, the particle size of PT nanoparticles was decreased from 130 nm to 19 nm. It was confirmed by SEM analysis. The size of PT nanoparticle was extraordinarily small enough to make transparent thin films, accordingly we have coated the plasma treated PET film with the PT nanoparticles prepared by using PSS. The PT nanoparticles-coated PET film was transparent and showed a high conductivity in a dried state. The resistivity of the film was influenced by ratio of PT to PSS. The resistivity decreased as the ratio of PT to PSS increased. The resistivity was within the range of 10⁴~10⁶ Ω/sq. The present findings showed PT nanoparticles prepared by using PSS are potentially useful in fabricating high quality optical switch for display or active layer for electroluminescence (EL) device.