

## Synthetic Route of Polythiophene Nanoparticles via Fe<sup>3+</sup> Catalyzed Oxidative Polymerization in Aqueous Medium

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Unsubstituted polythiophene(PT) nanoparticles with 30nm diameter was prepared using Fe<sup>3+</sup> catalyzed oxidative polymerization in aqueous medium. 99% monomer conversion was achieved by a little FeCl<sub>3</sub>, which usually deteriorates the PL property of polythiophene nanoparticles. This enhanced the processibility of these particles, which may now be effectively dispersed in both aqueous media and various organic solvents, as well. The fine dispersion state would be expected to increase the processibility of polythiophene in various electrical and electro-optical fields without introducing substituted thiophene monomers with side chains. A broad absorption, maximum wavelength of UV absorbance ~ 400 nm, was observed at all reaction times. The red-shift from 484 nm to 511 nm in maximum wavelength of PL intensity and the increase of the PL intensity around 600~650 nm of the wavelength have an effect on red-emitting PL property of the polythiophene nanoparticle emulsions. The self-absorption of the polythiophene nanoparticles caused a reduced total PL intensity, and which was also confirmed by a non-normalized PL analysis.