

## Heterogeneous Sedimentation Polymerization of Polythiophene in Supercritical Carbon Dioxide and Water Phase

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Polythiophene is synthesized by oxidation polymerization using FeCl<sub>3</sub> and heterogeneous sedimentation polymerization in compressed fluid solvents with supercritical carbon dioxide and water phase. This experiment uses polythiophene's insoluble property in supercritical carbon dioxide.

The polymerization in supercritical CO<sub>2</sub> has several advantages. Supercritical CO<sub>2</sub> is environmental friendly process. Possibly, it can make the reaction rate faster because supercritical fluid is six times higher enthalpy more than liquid phase. The control of high temperature is also easy because it is closed system. Thiophene monomers were initiated by the FeCl<sub>3</sub> as an oxidant dissolved in MeOH/cocatalyst and monomer mixture, and polymerization was completed after few hours. Photoemission property of PT/MeOH solution is occur at 350~370nm wavelength. From SEM analysis, particle size of polythiophene was determined to be about 800nm. Oxidation polymerization in the supercritical process is raising expected to noble method by polymerization of polythiophene and applies polymeric methodology for optical and conductive polymers.