

Synthesis of conjugated polymer – mesoporous TiO₂ nanocomposite particle and thin film

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Synthesis of conjugated polymer-TiO₂ nanocomposites has been attracted for their useful applications in optoelectronic devices, such as solar cells, electrochromic devices, light-emitting diodes, and charge-storage devices, which make a heterojunction between organic and inorganic semiconductors where charge transfer occurs. In this study, we propose a new method to obtain a porous nanocomposite of conjugated polymer and TiO₂ by a direct polymerization of conjugated polymer in the mother solution of mesoporous TiO₂.

We prepared two types of nanocomposites, core-shell nanoparticles of polymethineimine and mesoporous TiO₂, and nano-sized polypyrrole embedded mesoporous TiO₂ thin film. Core-shell nanoparticles of polymethineimine and mesoporous TiO₂ were synthesized using TiCl₄ as a catalyst for the polymerization of polymethineimine and as a precursor of TiO₂. And nano-sized polypyrrole embedded mesoporous TiO₂ thin films were synthesized using sonochemical polymerization of pyrrole in the mother solution of mesoporous TiO₂ thin film.