

Preparation and Characterization of TiO₂-SiO₂ Composite Films on Plastics Using Aqueous Peroxotitanium Acid Solution

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Abstract : Aqueous peroxotitanium acid solution was prepared by the reaction between H₂O₂ solution and TiO₂ fluorinated using F₂ gas. The coating of TiO₂/SiO₂ multilayer on the surface of polycarbonate (PC) resin was carried out step by step using the TEOS solution and aqueous peroxotitanium acid solution. We confirmed each formation of SiO₂ and TiO₂ layer by scanning electron microscopy and energy-dispersive X-ray spectroscopy, and x-ray photoelectron spectroscopy results. The formation of a TiO₂ thin layer on SiO₂ coated on polycarbonate (PC) was carried out at 120 °C and for 15 min ~ 3 h with aqueous peroxotitanium acid solution using a hydrothermal synthesis autoclave reactor. The morphology TiO₂ coating layer largely depended on the reaction time, as shown in the results of SEM-EDS analysis. Increasing the reaction times, the TiO₂ layer expanded uniformly. Moreover, the surface fluorination of the SiO₂ layer can promote the formation of the TiO₂ layer on the surface.

Keywords : aqueous peroxotitanium acid solution, photocatalytic activity, polycarbonate, surface fluorination

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