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Preparation and Characterization of TiO_2-SiO_2 Composite Films on Plastics Using Aqueous Peroxotitanium Acid Solution

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Abstract : Aqueous peroxotitanium acid solution was prepared by the reaction between H_2O_2 solution and TiO_2 fluorinated using F_2 gas. The coating of TiO_2/SiO_2 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 SiO_2 and TiO_2 layer by scanning electron microscopy and energy-dispersive X-ray spectroscopy, and x-ray photoelectron spectroscopy results. The formation of a TiO_2 thin layer on SiO_2 coated on polycarbonate (PC) was carried out at 120 ℃ and for 15 min ~ 3 h with aqueous peroxotitanium acid solution using a hydrothermal synthesis autoclave reactor. The morphology TiO_2 coating layer largely depended on the reaction time, as shown in the results of SEM-EDS analysis. Increasing the reaction times, the TiO_2 layer expanded uniformly. Moreover, the surface fluorination of the SiO_2 layer can promote the formation of the TiO_2 layer on the surface.

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