

Photocatalytic Degradation of Organic Pollutants Using Strontium Titanate Synthesized by Electrospinning Method

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Abstract : To date, photocatalytic wastewater treatment using solar energy has attracted considerable attention. In this study, strontium titanates with various morphologies, i.e., nanofibers and cubic-like particles, were prepared as photocatalysts using the electrospinning (ES), solid-state (SS), and sol-gel (SG) methods. X-ray diffraction (XRD) analysis showed that ES and SS can be assigned to pure phase SrTiO₃, while SG was referred to Sr₂TiO₄. These samples displayed optical absorption edges at 385-395 nm, indicating they can be activated in UV light irradiation. Scanning electron microscope (SEM) analyses revealed that ES SrTiO₃ has a uniform fibrous structure with length and diameter of several microns and 100-200 nm, respectively. After loading of nanoparticulate Ag as a co-catalyst onto the surface of strontium titanates, ES sample exhibited highest photocatalytic activity to degrade methylene orange dye solution in comparison to that of SS and SG ones. These results indicate that Ag-loaded ES SrTiO₃, which has a desirable SrTiO₃ phase and a facile electron transfer along the preferential direction in fibrous structure, can be a promising photocatalyst.

Keywords : photocatalytic degradation, strontium titanate, electrospinning, co-catalyst

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