



Contribution ID: 174

Type: **Invited Speaker**

Photocatalytic Activity of the Binary Composite CeO₂/SiO₂ for Degradation of Dye

Monday 28 November 2016 15:20 (20 minutes)

In this study, CeO₂ photocatalyst was modified by composite with SiO₂ to increase efficiency and improve photocatalytic activity. The as-prepared SiO₂ particles have been incorporated into the precursor mixture of CeO₂ by homogeneous precipitation and subsequent calcination process. The phase compositions of CeO₂ before and after compositing with SiO₂ were identified by X-ray diffraction (XRD). The morphology and particle size of CeO₂/SiO₂ composite was analyzed by high resolution transmission electron microscopy (HRTEM) and field emission scanning electron microscopy (FESEM). The results showed SiO₂ spheres with the particle size approximately 100–120 nm, and a uniform layer of CeO₂ nanoparticles with a diameter of about 5–7 nm that were fully composite to the surfaces of SiO₂. The X-ray photoelectron spectroscopy (XPS) technique was carried out in order to characterize the change in valence state and composite characteristic by shifted peaks of binding energies. The photocatalytic activity was studied through the degradation of Rhodamine B in aqueous solution under visible light exposure. The highest photocatalytic efficiency of CeO₂/SiO₂ composite was also obtained. To explain the high photocatalytic efficiency of CeO₂/SiO₂ composite, the proposed mechanism involves the high surface properties of the CeO₂/SiO₂ composite, as measured by Brunauer–Emmett–Teller (BET) method.

Keywords: Composite materials, CeO₂, Rhodamine B, Silica, Photocatalysis

Primary author: Dr PHANICHPHANT, Sukon (Materials Science Research Center, Faculty of Science, Chiang Mai University)

Presenter: Dr PHANICHPHANT, Sukon (Materials Science Research Center, Faculty of Science, Chiang Mai University)

Session Classification: Falcon 1

Track Classification: Nanomaterials & nanostructures