

Photocatalytic Activity of Pure and Doped CeO₂ Nanoparticles

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Abstract : Pure CeO₂, Sm and Gd doped CeO₂ were successfully prepared via hydrothermal method. The effect of hydrothermal temperature, reaction time and precursors were investigated. The prepared nanoparticles were characterized using X-ray diffraction (XRD), FT-Raman Spectroscopy, transmission electron microscope (TEM) and field emission scanning electron microscope (FESEM). The prepared pure and doped CeO₂ nanoparticles were used as photo-catalyst for the degradation of Methylene blue (MB) dye under UV light irradiation. The results showed that Gd doped CeO₂ nano-particles have the best catalytic degradation effect for MB under UV irradiation. The degradation pathways of MB were followed using liquid chromatography (LC/MS) and it was found that Gd doped CeO₂ was able to oxidize MB dye with a complete mineralization of carbon, nitrogen and sulfur heteroatoms into CO₂, NH₄⁺, NO₃⁻ and SO₄²⁻.

Keywords : CeO₂, doped CeO₂, photocatalysis, methylene blue

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