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Eu^{3+} Ions Doped-SnO_2 for Effective Degradation of Malachite Green Dye

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Abstract : Visible light sensitive Eu^{3+} doped-SnO_2 nanoparticles were successfully synthesized via the hydrothermal method and extensively characterized by a combination of X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM) and N_2 adsorption-desorption isotherms (BET). Their photocatalytic activities were evaluated using Malachite Green (MG) as decomposition objective by varying the concentration of Eu^{3+} in SnO_2. The XRD analysis showed that lanthanides phase was not observed on lower loadings of Eu^{3+} ions doped-SnO_2. Eu^{3+} ions can enhance the photocatalytic activity of SnO_2 to some extent as compared with pure SnO_2, and it was found that 3 wt% Eu^{3+} -doped SnO_2 is the most effective photocatalyst due to its lowest band gap, crystallite size and also the highest surface area. The photocatalytic tests indicate that at the optimum conditions, illumination time 40 min, pH 65, 0.3 g/L photocatalyst loading and 50 ppm dye concentration, the dye removal efficiency was 98%.

Keywords : photocatalyst, visible light, lanthanide, SnO_2
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