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Effect on Photo-Catalytic Activity of Zinc Oxide Nanoparticles upon Doping with Silver and Sulphur in Degradation Reaction of Malachite Green

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Abstract

Zinc Oxide nanoparticles and their corresponding sulphur, silver and silver (silver + sulphur) doped variants have been prepared by mechano-chemical synthesis. These have been used as photocatalysts and were characterized by XRD, TEM, FTIR and UV-Visible spectroscopic techniques. Photocatalytic degradation of malachite green (MG) dye over these photocatalysts was studied under visible as well as UV radiations. The (Ag, S) co-doped ZnO exhibited the highest photocatalytic efficiency both under UV as well as visible radiations. It is observed that doping of Ag and S in ZnO had synergetic effect in improving its photo-catalytic activity. Photocatalytic degradation of Malachite Green (MG) dye is found to follow a pseudo first order kinetics.

Keywords: Degradation, Mechano-Chemical, Nanoparticles, Photocatalyst, XRD