

Effect of Doping Ag and N on the Photo-Catalytic Activity of ZnO/CuO Nanocomposite for Degradation of Methyl Orange under UV and Visible Radiation

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Abstract : Nano-size Ag-N co-doped ZnO/CuO composite photo-catalyst has been synthesized by chemical method and characterized using XRD, TEM, FTIR, AAS and UV-Vis spectroscopic techniques. Photo-catalytic activity of as-synthesized nanomaterial has been studied using degradation of methyl orange as a probe under UV as well as visible radiations. Ag-N co-doped ZnO/CuO composite showed higher photo-catalytic activity than Ag- or N-doped ZnO and undoped ZnO-CuO composite photo-catalysts. The observed highest activity of Ag-N co-doped ZnO-CuO among the studied photo-catalysts is attributed to the cumulative effects of lowering of band-gap energy and decrease of recombination rate of photo-generated electrons and holes owing to doped N and Ag, respectively. Effects of photo-catalyst load, pH and substrate initial concentration on degradation of methyl orange have also been studied. Photo-catalytic degradation of methyl orange follows pseudo first order kinetics.

Keywords : degradation, nanocomposite, photocatalyst, spectroscopy, XRD

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