

Photo-Catalytic Activity of Ag-N Co-Doped ZnO/CuO Nanocomposite for Degradation of Methyl Orange

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Abstract

Nano-size Ag-N co-doped ZnO-CuO composites have been synthesized and tested for their photo-catalytic activity towards degradation of methyl orange in aqueous solution under visible as well as UV radiations. Crystal structure, surface functional groups, metallic composition and band structure of as-synthesized nano-material were investigated using XRD, FTIR, AAS and UV-Vis spectroscopic techniques, respectively. Ag-N co-doped ZnO-CuO photocatalyst showed higher photo-catalytic activity than Ag- or N-doped and undoped composite photocatalysts. 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, solution pH and substrate initial concentration on the degradation of methyl orange have also been studied.

Keywords: Band-Gap, Degradation, Nanocomposite, Photocatalysts, Rate Constant, Spectroscopy