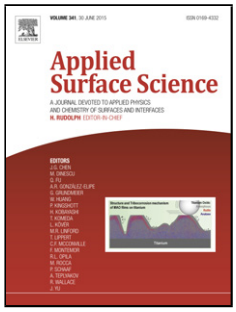

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Microwave Assisted Facile Hydrothermal Synthesis and Characterization of Zinc Oxide Flower Grown on Graphene Oxide Sheets for Enhanced Photodegradation of Dyes

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ABSTRACT

Microwave assisted hydrothermal process of synthesis of ZnO-GO nanocomposite by using $ZnCl_2$ and NaOH as precursors is being reported first time. In this investigation, a novel route to study on synthesis, interaction, kinetics and mechanism of hybrid Zinc Oxide-Graphene Oxide (ZnO-GO) nanocomposite using microwave assisted facile hydrothermal method has been reported. The results shows that the ZnO-GO nanocomposite exhibits an enhancement and acts as stable photo-response degradation performance of Brilliant Yellow under the UV light radiation better than pure GO and ZnO nanoparticles. The microwave exposure played a vital role in the synthesis process, it facilitates with well define crystalline structure, porosity and fine morphology of ZnO/GO nanocomposite. Different molar concentrations of ZnO precursors doped to GO sheets were been synthesized, characterized and their photodegradation performances were investigated. The optical studies by UV-Vis and Photo Luminescence shows an increase in band gap of nanocomposite, which added an advantage in photodegradation performance. The in-situ flower like ZnO nano particles are were densely decorated and anchored on the surfaces of graphene oxide sheets which aids in the enhancement of the surface area, adsorption, mass transfer of dyes and evolution of oxygen species. The nanocomposite having high surface area and micro/mesoporous in nature. This structure and morphology supports significantly in increasing photo catalytic performance legitimate to the efficient photosensitized electron injection and repressed electron recombination due to electron transfer process with GO as electron collector and transporter dependent on the proportion of GO in ZnO/GO composite.

Keywords: Graphene oxide (GO), Zinc Oxide (ZnO), Microwave irradiation, Hydrothermal, Photodegradation, Brilliant Yellow (BY).