Abstract 11 – Paper ID: 035

ZnO Bionanocomposites in Wastewater Treatment

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Abstract

Detrimental water is the challenging threat to human civilization in 21st century. Bionanocomposites are the ideal alternative to conventional technique in water purification. ZnO nanocomposites (ZnO NCs) were synthesized using the plant extracts of *Phragmites australis* as reducing and capping agents and chitosan as stabilizing agents. To confirm the shape, size, optical properties, thermal properties, stability and involvement of phytochemicals and chitosan in the synthesis and stabilization of NCs Transmission Electron Microscope (TEM), Scanning Electron Microscope (SEM), X–Ray Diffraction (XRD), UV–Visible, Thermo gravimetric Analysis (TGA), Dynamic Light Scattering (DLS), Zeta potential and Fourier Transform Infrared (FTIR) analysis were performed respectively. Photo–reduction of organic pollutants was carried out in presence of ZnO NCs to examine the photocatalytic activity of NCs. Kinetics of the dye degradation, effects of concentration of ZnO NCs, reusability and heterogeneity of ZnO NCs in the dye degradation were studied. Hence, *Phragmites australis*/cellulose/ZnO NCs will be novel innovative multifunctional materials for treatment of wastewater for safe drinking water.

Keywords: Bionaocomposites, Chitosan, *Phragmites australis*, Wastewater, ZnO nanocomposites (ZnO NCs)

ISBN: 978-81-989164-2-6; DOI: 10.21467/abstracts.8.1