

Abstract

Different concentrations of zirconium (Zr) with a fixed quantity (4 wt. %) of chitosan (CS) doped nickel cobaltite (NiCo_2O_4) nanorods (NRs) were synthesized using a co-precipitation approach. This cutting-edge research explores the cooperative effect of Zr-doped CS- NiCo_2O_4 to degrade the Eriochrome black T (EBT). Advanced characterization techniques were conducted to analyze structural textures, morphological analysis, and optical characteristics of synthesized materials. XRD pattern unveiled the spinal cubic structure of NiCo_2O_4 , incorporating Zr and CS peak shifted to a lower 2θ value. UV-Vis spectroscopy revealed the absorption range increased with CS and the same trend was observed upon Zr, showing a decrease in bandgap energy (E_g) from 2.55 to 2.4 eV. The optimal photocatalytic efficacy of doped NiCo_2O_4 within the basic medium was around 96.26 %.