



Synthesis and Characterization of NiO Nanoparticles by Electrochemical Method: Photodegradation Kinetics of Indigo Carmine Dye and Study of Antibacterial Activities of NiO Nanoparticles

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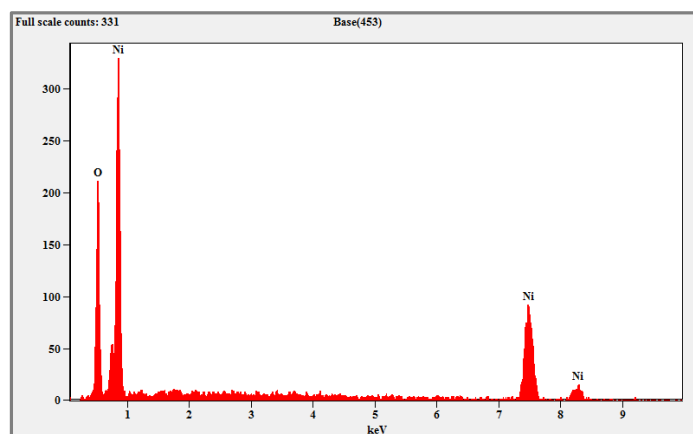
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ABSTRACT

Nickel oxide (NiO) Nanoparticles has been synthesized by electrochemical method, which is simple and in expensive method. Nickel oxide nanoparticle had been widely used in semiconductor magnetic fields due to high surface area adsorptive. The synthesized NiO nanoparticle was used as a catalyst for the photocatalytic degradation of indigo carmine dye under various experimental conditions. The synthesized nanoparticles were characterized by UV-Visible spectroscopy, SEM-EDX and X-ray diffraction studies. The UV-Vis spectroscopy study revealed that the band gap energy of NiO nanoparticles to be 3.04V. This was calculated using Tauc plot. The structure of NiO was found to be FCC structure which was confirmed from XRD data. SEM results showed the surface morphology of the nanoparticles and the presence of Ni and O in the nanoparticle is confirmed from EDX spectrum. The photocatalytic activity of the synthesized NiO nanoparticles was investigated by the kinetics of degradation of indigo carmine dye. The photocatalytic decolorization of the dye follows first order kinetics. The antibacterial activity of these nanoparticles was investigated.

Graphical Abstract



Energy dispersive X-ray analysis spectrum of NiO Nanoparticles.

Keywords: Electrochemical method, NiO nanoparticles, Indigo carmine dye, Antibacterial activity.