Reduction of Cr(VI) in aqueous solutions using ZnO nanoparticles

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ABSTRACT

Photocatalytic nanoparticles were used to treat water from Heavy metals, and the Zinc Oxide Nanoparticles have been widely used due to its photocatalytic activity. Such experiments used UV light were made in the laboratory due to large bandgap of ZnO, where, this study uses the direct sunlight to treat water from dissolved Toxic Hexavalent Chromium Cr(VI). ZnO synthesized using hydrothermal method, the structure and the optical properties of the samples were investigated using X-ray diffraction (XRD), Fourier transformation infrared spectroscopy (FT-IR), Ultraviolet visible (UV-Vis) spectroscopy and scanning Electron Microscopy (SEM). Characterization techniques assured the formation of zinc oxide crystalline structure with estimated particles size 70 nm and energy band gab of 3.27eV. Batch experiments were made to study the reduction of Cr(VI) in aqueous solution, results showed decrease in the concentration of Cr(VI) solution under direct sunlight by ZnO photocatalyic effect with removal efficiency of 89%, which makes it a cheap method for water treatment.