

OPTIMISATION OF COPPER AND ZINC IONS REMOVAL FROM AQUEOUS SOLUTION BY COAL FLY ASH AS AN ADSORBENT

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Abstract

Rapid urbanization and industrialization of our world has led to accumulation of enormous number of contaminants in our environment. Heavy metal ions hold a superlative position in that list and are responsible for contaminating soil, air and water in many parts of the world. Adsorption technology is emerging as a sustainable effective solution. The possibility of using Coal fly ash as an alternative adsorbent for divalent metal ions (Zn^{2+} , Cu^{2+}) removal from simulated solutions was studied. The coal fly ash was characterised by Brunauer Emmet Teller (BET), X-ray diffraction (XRD), X-ray Fluorescence Spectroscopy (XRF) and Fourier transform infrared (FT-IR). Optimum adsorption conditions were determined as a function of pH, adsorbent dosage and contact time for Zn^{2+} and Cu^{2+} removal. The adsorption of metal ions was found to be pH dependant. Equilibrium data fitted well to the Freundlich model with R^2 values as 0.9932, 0.9971 for Cu^{2+} , Zn^{2+} , respectively. The study showed that disposed coal fly ash could be used as an efficient adsorbent material for the removal of metal ions from aqueous solution.