



Removal of Different Metal Ions from Aqueous Solution using Coal fly ash and Chitosan: Adsorption, Kinetic and Leaching Behavior

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Abstract: Fly ash was used for removal of Zn^{+2} , Ni^{+2} and Pb^{+2} ions from aqueous solution. The adsorbent was characterized using particle size distribution, chemical composition, scanning electron microscopy (SEM), X-ray diffraction (XRD) and zeta potential methods. Batch adsorption studies were carried out to investigate the effect of different sorption parameters using Atomic Absorption Spectroscopy (AAS) Technique. The batch equilibrium data was processed using Langmuir and Freundlich isotherm models. The pseudo first order, pseudo second order kinetic and intra-particle diffusion method was tested for adsorption phenomenon of different heavy metal ions on fly ash particles. The effect of chitosan as an admixture has been studied. Semi-dynamic method was used to study the leaching behavior of heavy metal ions from the solidified mixture of fly ash, cement and sand. In the leachate, the amount of heavy metal ions was below as per the standards values given by Environment (Protection) Rules of India. This solidified material was also tested for its compressive strength so that it can be disposed of in a safe manner. There was no considerable variation in the compressive strength of solidified cubes with variation of fly ash in the mixture.

Keywords: *Fly ash; Zn^{+2} ion; Ni^{+2} ion; Pb^{+2} ion; Adsorption isotherm; Kinetic study; Leaching study; Chitosan.*

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