



## Removal of toxic metal ions and their kinetic studies from aqueous solution using zeolite as an adsorbent

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### ABSTRACT

In this work, zeolites were prepared from fly ash and characterized by Fourier transform infrared spectroscopy (FT-IR), SEM and energy dispersion spectroscopy. Fly ash is a byproduct of thermal plants. It is essential to use fly ash in other applications viz preparation of cement, water purification and magnetic materials. The obtained zeolites were used for removal of Co(II), Cd(II), Ni(II), Cs(I) and Sr(II) from aqueous solution. The different factors effecting adsorption of metal ions on zeolites viz contact time, initial concentration of metal ions and pH were studied. The batch method has been employed using metal ions in solution from 1,000 to 5,000 µg/L. The obtained adsorption data were used for Freundlich and Langmuir isotherms measurement and both were found applicable for the metal ions adsorption on zeolites. The adsorption data were followed pseudo-second-order reaction kinetics. The results show that zeolites have great potential to remove Co(II), Cd(II), Ni(II), Cs(I) and Sr(II) from aqueous solutions through chemisorption and physisorption.

*Keywords:* Zeolite; Toxic metal ion; Ion exchange; Adsorption; Isotherm models

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