

The effect of Si and Fe impurities on the removal of Cu^{2+} and Co^{2+} from Co/Cu aqueous solutions using natural clinoptilolite as an ion-exchanger

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ABSTRACT

In this study, the impact of Si and Fe impurities on the removal of Cu^{2+} and Co^{2+} from aqueous solutions was investigated using Southern African clinoptilolite as an ion-exchanger in a multi-component system. The extent of the cation-exchange process was investigated, whereby mixed Co/Cu aqueous solutions of concentrations 0.0020 M, 0.0698 M and 0.2000 M of Co^{2+} and Cu^{2+} were analyzed using atomic absorption spectroscopy (AAS). These Co/Cu mixed solutions were used as “control” solutions in determining the impact of the presence of impurities such as SiO_2 and FeCl_2 in mixed Co/Cu aqueous solutions on the removal efficiencies of copper and cobalt from the solutions. It was found that both SiO_2 and FeCl_2 greatly reduced the removal efficiency of Cu^{2+} , especially where there were high amounts of SiO_2 in the Co/Cu solution. There was however a significant enhancement in the removal efficiency of Co^{2+} with increased concentration of SiO_2 .

Keywords: Clinoptilolite; Ion-exchange; Copper; Cobalt; Si/Fe impurities

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