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Removal of copper, lead and cadmium ions in a fluidized bed

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Abstract: In this study, the recovery of copper from synthetic wastewaters prepared from CuSO_4 was studied using a fluidized bed containing hydrogen-based solid Amberlite. The effects of operating parameters including liquid flow rate, initial copper ions concentration, pH of the influent solution, and Amberlite weight on the breakthrough curves were investigated. It was found that the copper uptake increased with the increase in Amberlite weight, the decrease in initial copper concentration, and decrease in liquid flow rate, but there was no affect with solution influent pH. The recovery of cadmium and lead ions prepared from CdSO_4 and $\text{Pb}(\text{NO}_3)_2$, respectively, was also investigated. Comparison between the adsorption of Cu^{2+} , Cd^{2+} and Pb^{2+} showed that the adsorption capacity followed the following order: $\text{Pb}^{2+} > \text{Cd}^{2+} > \text{Cu}^{2+}$. It was found that the order of adsorption was independent of the flow rate or the initial feed concentration.