Abstract

A micaceous mineral (MicaM) available locally in Kenya was utilized as an inexpensive and effective adsorbent for the removal of Cu^{2+} ions from aqueous solution. The effects of contact time, pH, temperature, adsorbate and adsorbent concentrations, and the concentration of electrolyte on the removal of Cu^{2+} ions were studied. Maximum removal of Cu^{2+} ions occurred over the pH range 4.0-7.0. The adsorption of Cu^{2+} ions increased with an increase in the dose ratio of mineral to Cu^{2+} ion concentration and decreased with adsorbent particle size. Isotherm analysis of the adsorption data obtained at 25°C showed that the adsorption of Cu^{2+} ions on MicaM followed both the Langmuir and Freundlich isotherms. The uptake of Cu^{2+} ions increased on increasing the pH of the solution from 1.5 to 7.0 as well as on increasing the temperature from 25°C to 60°C. An adsorption capacity of 0.850 g/g was achieved for MicaM towards the Cu^{2+} ion. This study has demonstrated that locally abundant micaceous mineral can be used as an effective adsorbent for the treatment of waters containing Cu^{2+} ions without any prior chemical pretreatment.