

Sorption Reversibility of Cadmium from Aqueous Solutions on Natural Firoozkoh Zeolite

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Abstract

Sorption hysteresis in soil constituents has important environmental implications such as pollutant transport and bioavailability. This research was carried out to study sorption reversibility of cadmium (Cd) on natural zeolite. Sorption isotherms were derived by sorption of Cd (II) from solutions containing different concentrations of Cd in the range of 1 to 10 mg L⁻¹ using a 24h batch equilibration experiment. Desorption of Cd(II) was studied with the clay samples initially treated with the metal loadings of 50 and 100% maximum sorption capacity (SCmax) during the sorption study. Sorption isotherms of Cd were well described by the Freundlich and Coble-Korrigan models ($R^2=0.96$). Desorption isotherms of Cd from zeolite showed little deviation from sorption data indicating reversible sorption. On the other hand, the results revealed no hysteresis. The average amount of 71.75 % of the initially sorbed Cd was desorbed from zeolite after five successive desorption steps. Release of such a relatively high proportion of sorbed Cd indicates that zeolite is an effective sorbent for the repeated purification of polluted water and wastewater.

Keywords: Cadmium, Sorption, Desorption, Natural zeolite, Hysteresis.

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