

Use of a Stirred-Flow Reactor to Study Pb Adsorption and Desorption Reactions on Soil

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We investigated the adsorption and desorption behavior of Pb from a soil (pH=5.5, I=0.05) using a stirred-flow reactor. In addition we studied the effects of soil organic matter (SOM) on adsorption and desorption behavior by treating the soil to remove the SOM fraction. Lead adsorption consisted of a fast initial reaction in which all of the Pb added to the reaction chamber was adsorbed. Following this initial fast reaction, adsorption continued and appears to be rate limited (indicated by a shift in the breakthrough curve when the flow rate was varied). The total amount of Pb adsorbed for the slowest flow rate (0.4 ml/min) was 10500 and 6725 mg/kg by the untreated and treated soils, respectively. Desorption of Pb from the two soils, using the background electrolyte as the eluent, followed a similar trend for both the treated and untreated soils. In the soil containing SOM, only 42% of the total adsorbed Pb was desorbed, while 70% of the Pb was released from the soil in which SOM was removed. This suggests that the Pb sorbed on the SOM fraction of the soil is nonreversibly adsorbed.