

Reactivity of Lead on Solid Mn Minerals.

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In this study, the reactivity of lead on naturally occurring manganese oxides was evaluated using kinetic, thermodynamic, and spectroscopic investigations. Lead was more strongly adsorbed to birnessite than manganite under all experimental conditions. The isotheric heat of lead adsorption on birnessite was 94 kilojoules per mole and decreased with increasing surface loading, indicating an endothermic process and heterogeneous sites of reactivity for lead. X-ray absorption fine structure spectra revealed a greater number of second shell manganese scatterers in lead-birnessite when compared to lead-manganite, where lead was found to adsorb as an inner-sphere bidentate surface complex. The difference in lead surface coordination apparently explained the contrasting desorption behavior. These results have significant implications for lead partitioning in soil environments containing solid phase manganese oxide minerals.

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