
Dioxon Sorption by Hydroxy-Aluminum-Treated Clays

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Abstract: The treatment of smectites with a hydroxy-Al polymer produced chemically modified clays that had much greater affinities for chlorinated dioxins and biphenyls than untreated clays. For hydroxy-Al-treated kaolinite, the high affinity for chlorinated dioxins is thought to have arisen from an interaction between the hydroxy-Al polymer bound to the clay and the chlorinated dioxin in solution. Thus, the adsorption of dioxins from aqueous solution by hydroxy-Al-treated clays is similar to the adsorption of reactants from the gas phase by metals supported on mineral oxides during catalysis. In both systems, the essentially inert mineral oxide support effectively disperses the active adsorptive agent. At the concentrations of octachlorodioxin used in this study (≤ 5 ppb), hydroxy-Al-montmorillonite had a distribution coefficient of 90,000 (ml/g), corresponding to about 95% removal efficiency of the dioxin from solution per batch. For hexachlorobiphenyl, the distribution coefficient was 30,000 (ml/g), and the removal efficiency was 85%.

Key Words: Adsorption • Biphenyl • Dioxin • Hydroxy-Al • Kaolinite • Pollutant • Smectite

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