



STUDIES ON SORPTION AND TRANSPORT PROCESSES OF CADMIUM IN SOILS

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Abstract

Heavy metals produced and released by anthropogenic activities generate serious environmental problems. Ions of toxic metals can bind to the mineral surface in a number of ways, including absorption, adsorption, precipitation, ion exchange.

The paper shows that the fate and migration of heavy metals in soils strongly depend on the physical properties and chemical and mineralogical composition of such environments. Cadmium is one of the most toxic metals with carcinogenic and teratogenic impacts. Leaching of cadmium through soil profiles has implications for both its accumulation in subsoil or contamination of groundwater.

The main objective of the research entails the study of the transport of cadmium in soil matrix. Samples with specific amounts of carbonates, organic matter, chemical composition and various grain sizes were chosen. Solutions with different concentrations of CdSO₄ were prepared for the simulation of a contamination by Cd(II).

The sorption of cadmium on all the soil particles and the equilibrium and kinetic parameters characterizing the process of adsorption in the soil matrix were estimated by the conventional batch techniques. Experimental sorption data from batch tests were evaluated by certain isotherms, which provided main sorption characteristics of soil samples for Cd. The results showed that concentrations of total dissolved cadmium and activity of its free ions in soil solution are influenced, sorbent characteristics, that is particle dimensions in this case.

Key words: cadmium, contamination, remediation, soil, sorption

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