

INNOVATIVE MANGANESE OXIDES AND THEIR USE FOR SORPTION OF Pb, Zn AND Cd IN CONTAMINATED SOILS

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Abstract

The studied amorphous manganese oxide (AMO) has been already successfully tested as an efficient agent for decreasing the mobile fraction of risk elements in soil. However, its application is accompanied with an unsolicited phenomenon of increased dissolution of this agent related to oxidation of soil organic matter. For that reason, surface modification of the studied Mn oxide with the layer of MnCO_3 (Sm-AMO) has been proposed. The results of preliminary testing of the stability of both materials in demineralized water confirmed that Sm-AMO is less soluble than the original AMO. Adsorption kinetics of Cd, Pb and Zn onto AMO and Sm-AMO was performed to compare the adsorption properties of both materials. The affinity of these metals was generally higher towards AMO, but the recorded equilibrium time was similar for both sorbents. Additionally, the adsorption of the target metals increased with higher pH. Based on modelled Langmuir isotherm parameters, the Sm-AMO proved to have higher maximum adsorption capacity for the whole pH range studied and also higher affinity of Zn towards this material.

Key words:

Amorphous manganese oxide (AMO), soil contamination, metals, immobilization, adsorption