

ANIONIC SPECIES TRANSPORT THROUGH THE SOIL (ELECTROMIGRATION VERSUS ELECTROOSMOSIS): THE CASE OF EDTA

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The use of EDTA as a complexing agent to extract metals from soil is common. We have tested this possibility for the remediation feasibility studies of a soil contaminated with lead, collected in the mining district of Linares (Spain), a region where the mining activity has been going on for more than 20 centuries.

In this work, we have found that close to 100% of Pb is removed from the contaminated soil when EDTA is used in batch reactor experiments. However, almost no Pb is removed when EDTA is used as an enhancing agent in electrokinetic soil remediation of the same soil. The percentage of Pb removed is 0-10% and the analysis of soil after electrokinetic treatment indicates that more than 90% of Pb remains in the soil. Instead, the use of other mobilization agents that gave also good removal yields for the batch reactor experiments gave also important removals by EKR [1].

Usually it is assumed that the removal of toxic metals during EKR take place by electromigration, which is about one order of magnitude more important than any other transport process, such as electroosmosis, diffusion, etc. [2]. Nevertheless, we found that in EKR experiments enhanced with EDTA, the electroosmotic flow is very important and severely impairs the extraction of lead. The negative charge of the complex is probably the main reason for the different behavior relative to the other mobilization agents.

REFERENCES:

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- [2] Y.B. Acar, and A.N. Alshawabkeh. Principles of electrokinetic remediation Environ. Sci. Technol. 27(13), 2638-2647. (1993).