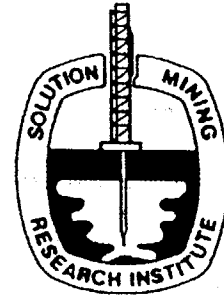


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**MEETING
PAPER**



**Experimental Results and
Geochemical Modelling of
the Interactions of Toxic Chemical
Wastes with High Saline Solutions
in Underground Repositories
in Salt Formations**

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Abstract

The complex reactions between high saline solutions and toxic chemical wastes were investigated by means of laboratory experiments and geochemical modelling. The specific boundary conditions of an underground repository in salt formations were taken into account. In order to determine the chemical equilibrium compositions of the resulting solutions a new leaching procedure was developed and successfully employed with several toxic wastes. The results for a waste stemming from a glass smelting furnace are given in detail. Zinc and cadmium are the two most prominent heavy metals, that accumulate significantly in the leachates. In order to gain an insight into the complex dissolution and precipitation processes in such multicomponent systems, geochemical modelling was performed using the computer code EQ3/6 and the Pitzer formalism for calculating the activity coefficients. The thermodynamic database used was extended and Pitzer coefficients for Zn and Cd in high saline solutions were derived from literature data and added to the database. The results of the geochemical modelling of the investigated reaction are in good agreement with the experimental data. On the basis of experimental results and geochemical modelling the concentrations that can be expected in a repository in the solutions resulting from the leaching of the investigated waste by a Mg-rich brine are predicted to lie between 0.088 and 0,181 mol/kg H₂O for zinc and between 0.0024 and 0.00317 mol/kg H₂O for cadmium.

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