

Phase composition of metallurgical slags in the aspect of the impact thereof on the hypergenic environment

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Slags formed during the refining of lead obtained in the process of pyrometallurgical extraction of zinc and lead are characterized by diverse mineral composition wherein the dominant constituents include: sphalerite, galena, anglesite, olivine which usually form multiphase conglomerates. The slag grains were also found to contain accompanying elements in the form of substituents in the crystal lattices of the main phases. It should be noted that the identified minerals constitute non-stoichiometric phases thermally transformed in high-temperature processes taking place during the ISP process.

Deposition of slags of the presented mineral composition in the environment may produce certain effects in surface and/or ground waters. One of the methods of predicting the impact of the deposited slags on the near-surface environment is geochemical modelling based on Pourbaix diagrams.

The plotted Eh-pH diagrams indicate that all mineral constituents of the slags are unstable in hypergenic environments. When these slags are deposited in landfills, changes in pH value, and particularly in the Eh value of the soil and water environment, may significantly stimulate migration of metals to groundwater causing decontamination of the latter.