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THERMODYNAMIC ANALYSIS OF HEAVY METALS PRECIPITATION FOR THEIR RECOVERY FROM INDUSTRIAL WASTEWATERS

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Abstract

This work seeks to develop a suitable heavy metals precipitation modeling approach that could give reasonable results in mainstream use with industrial wastewater treatment. This paper is devoted to the thermodynamic analysis of the degree of precipitation of slightly soluble hydroxides and salts in industrial wastewaters in order to optimize the technological schemes of extraction and reuse of heavy metals from industrial waste. Based on the notion of the solubility product, the equations describing the dependence of the precipitation degree of the metal ion γ in the form of slightly soluble salts and hydroxides on the initial concentrations of the components, including complexing agents, and the pH of the solution, have been deduced. The thermodynamic meaning of the quantity γ has been revealed. Possibility of forming stable complexes between the metal ion and complexing agents in galvanic wastewater is taking into account. Degree of precipitation (in parentheses, %) and distribution of chemical species of metal ions (*Al* (43), *Cr* (0), *Fe* (100), *Zn* (0), *Sr* (100) and *Ba* (100)) from the multicomponent industrial effluents of an engineering company (electroplating units of the Tactical Missiles Corporation, Dubna, Russia) were analyzed at pH 6.

Key words: complex formation reaction, degree of precipitation, industrial wastewater, ion metal hydrolysis, slightly soluble compounds

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