

Optimization of the charging process in zinc hydrometallurgy

KCM AD

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KCM AD is part of the holding structure of KCM 2000 AD, Plovdiv. The company is a leading producer of nonferrous and precious metals in Southeast Europe and the Black Sea Region, working actively for the environmental recognition of metals as efficient market products. KCM's annual production capacity of lead is 65 000 t., and of zinc – 80 000 t.

The charging is a process of mechanically mixing raw materials in various quantities to obtain suitable charge for subsequent processing (in hydrometallurgy - a mixture of the different zinc sulfide concentrates). The charge is considered as suitable if it satisfies some restrictions on the production technology and organization. The production technology determines the chemical composition of the charge (useful and harmful components in the production process), and the organization - the route of dosing (quantization) at mixing of various raw materials

One possible criterion for optimization is to determine the suitable charge with minimal cost.

The stages for solving the task are:

1. Creating a database for chemical composition of zinc sulfide concentrates in KCM AD (about 20 components of a concentrate) and restrictions associated with the technology of hydrometallurgical production.

2. Determination of "technology" cost of individual concentrate (by a given algorithm, depending on its composition and the current price of zinc in the international markets –www.lme.co.uk).

3. Formulation of linear optimization model for charge with minimum 'technology' price.
4. Formulation of discrete optimization problem, taking into account the particular organization of production.
5. Choice of software to solve the problems.
6. Numerical experiments and discussion of results.