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Study of Methods for the Formation of Zinc Chloride from Zinc Concentrate

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ABSTRACT: Introduction of zinc concentrate into acid chloride solutions to obtain zinc chloride solution. The article provides information on the importance of zinc compounds, in particular zincchloride, considers some of its properties and production technology

KEYWORDS: zinc chloride, hydrochloric acid, precipitate.

I.INTRODUCTION

During the processing of zinc kicks by rolling, most of the rare elements pass into sublimates, concentrating in the Waelz oxides. Thallium is sublimated by 70–75%, selenium by 70–80%, tellurium by 75–85%, indium by 72–74%, germanium by 92–95% of their content in the cake. When processing Waelzokis, these elements can be obtained in the form of commercial metals.

When zinc cakes are processed using hydrometallurgical technology, 85–95% of cadmium, 95–98% of indium, 86–91% each of thallium, selenium, tellurium and germanium pass into solution in the course of high-temperature leaching; from the solution, rare elements can be isolated into a rare metal cake ... 94–97% of lead and precious metals remain in the lead kick after leaching. Cadmium, together with copper, is concentrated during the cementation treatment of a zinc sulfate solution in a copper-cadmium cake.

This is due to the fact that at a temperature of 1300 ° C the vapor pressure of indium is significant. The cadmium present in the agglomerate, during distillation, almost completely passes into the vapor-gas mixture, and during condensation, the vapor is concentrated in the pusier and partially passes into the rough zinc. When crude zinc is refined by rectification, cadmium passes into the condensate of the cadmium column. Indium is concentrated in the bottoms of the lead column [1].

Analysis of the work of enterprises of the lead-zinc industry in domestic and foreign practice showed that the lead-zinc industry plays a decisive role in the production of rare metals, especially cadmium, indium, thallium, germanium, as well as tellurium, selenium.

Almost completely cadmium, about 90% of indium, 75% of germanium, 60% of thallium, 30–40% of selenium and tellurium are obtained from semi-products of lead-zinc production.

In zinc production, in order to increase the complexity of the use of valuable components of raw materials, it is necessary to organize the rational processing of zinc cakes, copper-cadmium cakes, dusts obtained during agglomerating roasting of zinc concentrates, as well as pusiers of pyrometallurgical plants, the bottom residue of a lead distillation column, cadmium condensate and, in addition, processing of slag, matte, raymovka [2].

The most important property of non-ferrous metallurgy raw materials is the ability to generate significant heat during processing. A huge amount of energy is hidden and released in the process of pyrometallurgical processing of various sulphide raw materials, which include sulphide zinc concentrates, as well as sulphide copper, nickel concentrates and intermediate products of their processing. This energy forms a significant part of the secondary energy resources. It accounts for more than 30% of the total amount of secondary energy resources in non-ferrous metallurgy.

Rational and careful use of fuel and energy resources is currently extremely important. Thus, a 1% reduction in fuel consumption across the national economy gives an economy of 10 million tons of standard fuel. The use of the heat of combustion of sulfide materials and secondary energy resources is an important reserve for saving fuel and energy resources in non-ferrous metallurgy. The problem of saving energy resources in non-ferrous metallurgy can be solved in two ways: the development and implementation of autogenous processes for the processing of raw materials, carried out at the expense of its own energy potential, and the use of secondary energy resources as a valuable property of products and intermediate products (use of heat from waste gases, slags, etc.) ... Autogenous processes include

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roasting of sulfide concentrates, oxygen-flare smelting - KIVCET-TsS process, suspension smelting, smelting in a liquid bath [3].

Non-ferrous metallurgy has significant reserves for the use of secondary energy resources. These include the generation of energy from recycling plants, the use of waste gas heat for steam production and for power generation.

The use of secondary energy resources is of no less economic importance.

To clean exhaust gases from dust, it is necessary to cool them from 1000–1200 ° C to 300–400 ° C. If the heat is not utilized, then the cooling of gases in front of the electrostatic precipitators is carried out by diluting them 3-4 times with air. Cooling gases in waste heat boilers will reduce their volume and reduce the number of installed electrostatic precipitators, which can save several million soums. In addition, part of the dust is captured in the waste heat boilers, which ensures a higher quality of gas cleaning at subsequent stages. Low dilution of exhaust gases with air makes it possible to increase the concentration of sulfur dioxide (SO_2) in the gases and to obtain a large economic effect.

The use of heated blast with exhaust gases in pyrometallurgical processes allows to reduce fuel consumption and makes it possible to organize production more efficiently [4].

The use of secondary energy resources in the processing of zinc raw materials has a great influence on the efficiency of its complex processing.

The zinc industry has significant reserves for the use of secondary energy resources as one of the elements of the complex composition of raw materials, namely, its energy properties.

An increase in the complexity of the use of components of zinc raw materials with an improvement in the technical and economic indicators of the operation of zinc enterprises largely depends on the following factors [6].

Primary and secondary raw materials must be preliminarily prepared for metallurgical processing. Preparation includes the operations of homogenization, crushing, grinding, agglomeration, drying, etc.

The extraction of zinc and lead by combined, sequential biooxidation and acid leaching of brine from crude complex sulfide ores containing sphalerite, pyrite and galena was investigated [7]. For biooxidation, the dissolution of zinc from sulfide ores by adapted bacteria was investigated. The effect on ore particle size, pH, pulp density and temperature on bacterial leaching has been studied systematically. It was shown that about 95% of the zinc was recovered after 20 days of bioleaching at 30 ° C. Subsequently, 98% of the lead was recovered from the bioleaching residues using an acidic sodium chloride solution as a lead leach at 60 ° C for 90 minutes. Leach kinetics indicated that diffusion through the product bed was a rate control process during the bioleach of zinc and the overall rate of a chemical reaction at the surface was a rate control process during a lead brine leach. It was calculated that the relative activation energies of the total rate at two different stages of leaching are 32.09 and 44.35 kJ / mol, respectively.

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