

ABSTRACT

of the thesis work for conferring PhD scientific degree
in specialty 6D070900 –«Metallurgy» by

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Development of technological bases of processing of copper and molybdenum cakes

Relevance of research.

Reducing the world's reserves of copper ores and conditional increase in the extraction of ores with complex geological structure of the ore zones require finding alternative technological solutions for their use. Currently, increasingly introduced advanced technology for metals from discarded ore. The problem of their involvement in the processing, in spite of its special and increasing relevance remains intractable, that is connected to produce concentrates the poor, the need to limit the number of stages of enrichment due to the inevitable losses of target components at each stage of processing. Using the roasting process in combination with the hydrometallurgical provide an active material reacting with the gaseous reactants, primarily with atmospheric air for converting the starting materials into easily soluble compounds. This simplifies the subsequent hydrometallurgical cycle of separation and recovery of valuable components with less concentrated solvent.

The urgency of the problem of developing an effective technology for the processing of copper-molybdenum ores, due primarily to the fact that such ores constitute a significant part of explored and exploited copper - molybdenum deposits of the Republic of Kazakhstan, which include Tastan, Kounrad Sayak, ores of these deposits are enriched in factories, with using flotation to produce copper, molybdenum and magnetite concentrates, as well as calcium molybdate, ammonium perrhenate.

The paper proposes a technology of processing residues from copper and molybdenum using a more efficient and cost - reducing agent carbon and hydrogen, to produce salable products of molybdenum trioxide, molybdenum and copper.

Purpose of work - the development of technology to extract molybdenum from technological solutions in the form of copper molybdates and processing to produce marketable products of copper and molybdenum.

To achieve this goal it was necessary to solve the **following problems**:

- the technological scheme of processing of copper and molybdenum ores in order to get rougher concentrate, reduces the processing steps of raw materials.

- develop processing technology rougher concentrate, to obtain a copper-molybdenum cake.

- study thermodynamic and kinetic characteristics of the copper molybdates, to calculate an estimate of the activation energy obtained by reduction of CuMoO_4 sample, using carbon

- develop technology to the separation of molybdenum trioxide, molybdenum individual commodity products in a hydrogen stream.

Scientific novelty. For the first time the following results:

- technological scheme for recovering copper, molybdenum trioxide and molybdenum from the cake using a new reducing agent carbon and hydrogen, which allows to reduce the costs of raw material processing stage;

- the technology of rougher concentrate is an effective product for further processing steps to obtain the cake;

- the technological scheme of the extraction of copper and molybdenum from the cinders in commercial products;

- thermodynamic evaluation reduction reaction of copper molybdate;

The practical value. On the basis of the results obtained in the thesis:

- set optimal parameters of extraction of copper, molybdenum trioxide, and molybdenum from copper - molybdenum cake for industrial production;

- development of fundamental technological bases of processing of copper and molybdenum raw material with molybdate precipitation of copper from process leach solution calcine;

- study on the basic technological process copper and molybdenum cakes.

Reliability and validity of the research results presented in the thesis are confirmed:

- positive results of the industrial validation of the developed techniques and a method of copper-molybdenum raw materials conditions LLP «Metal Invest KZ»;

- high reproducibility and the analytical and experimental research.

Implementation of the work. The technological process has passed industrial tests at LLP «Metal Invest KZ». The technological process is adopted for the production program of the plant.

The main provisions the dissertation work reported and discussed on 5 international conferences

By results of work 4 published on articles, including 3 in journals recommended KKSON (3 articles - "Proceedings of the University", Karaganda, Kazakhstan, IF KazBTs - 0,062) and 1 article in the magazine that is part of the database information agencies Thomson Reuters and Scopus («Metalurgija», Zagreb, Croatia, IF 0,77),

Structure of the dissertation. The thesis consists of content, normative references, list of abbreviations, introduction, main part of 4 chapters, conclusion, two applications. The volume of the dissertation is 90 typewritten pages, contains 32 figures, 26 tables, a list of references, including 101 name.