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PERSPECTIVE TECHNOLOGIES OF RECEIPT VANADIUM IN UKRAINE

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Promising methods for producing vanadium from alternative raw mate-rials are analyzed. The basic processing methods not traditional for Ukraine vanadium products are writed. The principal possibility of obtaining vanadium from their own raw materials, without the involvement of imported ores is showen.

Keywords: vanadium, slag, burning, anthracite coal, shales, technology

Presently in Ukraine there are the real prospects for creation of production of vanadium and its connections on the base of inherent raw mineral-material potential, using the deposits of other minerals, where vanadium is as a passing component. The basic is based of extraction of vanadium are titanimagnetites, magnetites and some other minerals of iron [1].

Along with natural geological objects, on territory of Ukraine the large masses of technogenic raw material, containing the meaningful concentrations of vanadium are accumulated [2].

The problem of industrial receipt of vanadium is mainly decided by the use of the scattered vanadium, meeting in iron ores. At the domain melting of vanadium-containing iron ores or agglomerates after the magnetic enriching get vanadium cast-iron to which 80-85 % vanadium passes. For the receipt of slags with high content of vanadium oxides aim to smelt cast-irons with subzero content of silicon and manganese, and also enhanceable content of vanadium. Vanadium in slags is contained, mainly, in composition connections of type spinel $FeO \cdot V_2O_3$ and $MnO \cdot V_2O_3$. Vanadium slags are vanadium concentrates which it is possible relatively easily to process on the vanadium oxide or calcium vanadate.

In work [3] steel-smelting slags are exposed to the oxidizing burning with addition of Na_2CO_3 and subsequent aquatic lixiviating of sodium vanadate. Extraction V_2O_5 in solution is 89.5 %, its cleanness – 99.0 %.

Executed sintering of slags, containing 8.07 % V_2O_3 with CaO [4], and studied influence of it regime on the acid lixiviating of vanadium from cake. It is shown that at a temperature 600-900 °C in cake vanadates of different composition appear depending from composition of charge and temperature.

For the receipt of vanadium slags with high content of calcium in work [5] burning of the got vanadium slags was conducted in a furnace with a pseudo liquefied layer at a temperature 850-950 °C the subsequent lixiviating of the burnt clinker in solution of sulphuric acid and receipt of vanadium slags.

In work [6] there are studied the process of lixiviating of vanadium from the slags of production steel, which preliminary had processed by alkali (KOH) at a tem-

perature below than point of it melting. At sintering insoluble in water slag phases decompose and the soluble in water appear. Extractions of vanadium in solution more than 90 % it is possible to attain at a temperature sintering 220-240 °C during 1 hour.

New technology of receipt of clean pentaoxide vanadium from mandamus vanadium containing of metallurgical slags is worked out in work [7]. There are used the oxidizing burning without some additions with the receipt of vanadates manganese and soda method of lixiviating of slag for mixing of it with an ethyl spirit. From solutions vanadium is deposited by the ammonium carbonate.

In work [8] the method of processing of vanadium containing converter slags and slimes of ferro-alloy production is offered by preparation from raw material of aquatic pulp, introductions of sulphuric acid and anionite for lixiviating and extraction of vanadium a persorption from pulp. After a sorbtion there are carry out the conclusion of the saturated anionite, it washing, desorption of vanadium from an anionite and input of regenerated anionite on the stage of lixiviating and persorption.

The method of lixiviating mainly of vanadium from a slag is worked out inprocess [9] which consist disintegration, temperature treatment, lixiviating and depositiom of connections of vanadium. Vanadium and other metals transfer from a slag in solution with the use of warmth of reaction «vanadium slag-sulphur aquatic solution» and deposited as hydroxides by treatment of sulfate solution a mangos.

Lately conduct to research on the study of possibility of effective extraction of vanadium from coal, coal slates and ore with high content of carbon. So, in work [10] technology is improved «burning-lixiviating of vanadium from anthracite coal», using here lixiviating dilute acid and Fe^{2+} for deposition of vanadium, and industry product, containing vanadium, return on burning and expose to cyclic oxidization in presence small additions of sodium.

Technological scheme of vanadium extraction from anthracite coal, based on his acid lixiviating, with joint with iron deposition, lixiviating from sediment of vanadium by alkali and receipt of V_2O_5 worked out in work [12]. Extraction of vanadium is 97 %. In work [13] the study of lixiviating of vanadium showed from carbonate slates of dilute H_2SO_4, that extractions 92 % it is possible to attain at the relation of L:S = 4, at the initial concentration of acid 18 %, at the temperature 95 °C during 8 h.

At processing of carbon slates of deposit of «*Jiangxi*» (*PRCh*) with extraction from its V_2O_5 in work [14] there are at first exposed to the oxidizing burning. Then a candle-end is lixiviated by H_2SO_4, and from solution vanadium is extracted by the reagents of Р204+ТБФ. Further execute treatment of solution ammonia, depositing a product, containing 98 % V_2O_5.

Results of lixiviating of vanadium from coaly slates with the use of H_2SiF_6 [15], showed that efficiency of this process can attain 80 %. The lixiviating action of H_2SiF_6 is explained by formation of etching acid which easily breaks the steady structure of iolite.

Conclusions. Perspective technologies of receipt of vanadium from the slags of metallurgical plants, coal and slates are considered. It is shown that application of the indicated technologies can allow effectively and cost-effective to use untraditional for Ukraine vanadium containing raw material.

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