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Recycling of molybdenum waste by hydrometallurgical method

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ABSTRACT

Currently, waste from the molybdenum industry and the production of Almalyk MMC is processed hydrometallurgically to produce ammonium tetramolybdate. Obtaining competitive molybdenum wire is provided under conditions of minimal content of harmful substances, which requires us to pay special attention to the purity of raw materials.

Keywords:

Hydrometallurgy, sorption, extraction, cake, slag, spectrum.

Introduction.

According to the state committee for geology and Mineral Resources, the value of Uzbekistan's mineral Resources is estimated at 5.7 trillion dollars, of which more than 1 trillion dollars are considered explored reserves. 20% of deposits on the territory of Uzbekistan have been studied and have tremendous potential for the identification of new deposits.

A decree of the president of the Republic of Uzbekistan was adopted on measures to further provide the economy with mineral resources, increase the investment attractiveness of the geological industry, take into account the tasks set in the strategy of actions in five priority areas of development of the Republic of Uzbekistan in 2017-2021.

In addition to the search for new deposits, the decision set the task of preparing specific proposals for the deep processing and disposal of man-made waste and organizing the production of the necessary products on their basis.

Currently, molybdenum industrial products and Apple KMK waste are processed hydrometallurgically to obtain ammonium tetramolybdate. From them are obtained

compact molybdenum wire products designed for Alloy Steels. Obtaining competitive molybdenum wires is ensured under the conditions of a minimum amount of harmful impurities in them, which makes us pay special attention to the purity of raw materials. Molibden tuzlari (ammoniy molibden kislota) olish amaliyotiga azot – sulfat kislota ochilishi va molibdenni eritmalardan sorbsion qazib olishdan iborat ruda va konsentrlarni qayta ishlashning gidrometallurgik usuli keng joriy etilmoqda.

As a result of preliminary research, the ways of carrying out the tasks of cleaning molybdenum industrial products from inorganic and organic mixtures by the hydrometallurgical method were determined. Hydrometallurgical methods make it possible to involve ammonium molybdate solutions in the processing of various molybdenum emissions and alloys based on it, which requires solving cleaning problems from impurities (nickel, carbon, margimush, phosphorus, tungsten, cobalt and other).

The low-grade molybdenum concentrate obtained during the enrichment of copper-molybdenum ores of the almalyk mining

product combine is an important composition of molybdenum, iron, calcium, silicon, copper, zinc and other impurities in the molybdenum industrial product.

To achieve this goal, it is necessary to develop an effective technology for obtaining chemically pure ammonium molybdenum acid from molybdenum industrial products and production waste.

The chemical composition of Tetramolibdenammonium intended for the production of molybdenum does not exceed 76%, the mass fraction of molybdenum anhydride does not exceed 1.5%, silicon dioxide is 1.3%, tungsten is 0.3%, carbon is 0.2%, p, s, does not exceed 0.01%, Sn, Sb, PB, Bi-0.003% and Zn-0.006%. Preliminary research and studies of literary sources show that one of the best methods for processing molybdenum concentrates is the sod method, which provides a high level of mining of molybdenum.

When processing molybdenum concentrate and slag in various known methods, a large amount of molybdenum cake is formed. Thus, when using the existing ammonia washing technology of molybdenum mixtures, that is, up to 7-8% molybdenum remains during processing. Their restoration is an urgent task.

The cake has a complex chemical composition, the main elements of which are Si, Fe, Mg, Al, Cu. The results of spectral analysis of the processed molybdenum solid waste (cake) are shown in Table 1.

Table 1.

Results of spectral analysis of molybdenum solid waste (cake) composition

Elements, %													
S	A	C	N	F	M	M	T	C	C	P	Z	N	M
i	l	a	a	e	g	n	i	r	u	b	n	i	o
8	3	0	0	1	1	0	0	0	0	0	0	0,	8
		,	,	5	5	,	,	,	,	,	,	0	
		2	2			0	0	0	3	1	0	0	
						1	1	2			7	1	

The duration of sintering was 1 hour, the amount of molybdenum in the initial waste cake was 7.18%, the mass was 50 g.soda of different proportions was added to the suspension, mixed and sintered. Liquefaction was carried out in a heated mechanical mixer, and the Q:S ratio of the calculations, the solution temperature of which was maintained at 60-700S, was 1:3 and 1:4.

Washing was carried out in two stages.

The optimal mode of processing the cake by washing it with water has been determined. For the largest transfer from molybdenum landfills to the solution by sintering with Soda, the ratio of the cake with soda is 1:0.3.

An extended laboratory study of washing the cake with soda was carried out according to the proposed technological scheme (Fig. 1). At the same time, it turned out that after washing soda, the cake contains 0.65% molybdenum.

Table 2.

Soda-the results of the transfer cake to the selective solution

Sampl e mass, kg	Mo composit ion, %	Mo quantity in sample, kg	The volume of Water spent on washing molybdenum, l			The volume of a solution containing molybdenum, l		
			1 st	2 st	Enterpris e water	1 st	2 st	Enterpris e water
30	6,9	2,06	95	85	80	75	70	70
Molybdenum content in solution g/l		The emaining soda content, g/l	Mo conten t in the cake, %	Mo content in the sample, kg			Sample after transfer to selectiv e	The total amount of Mo in solution, kg
1 st	2 st			Enter prise water	1 st	2 st		

								<i>solution</i> <i>, kg</i>	
36,6	7,1	1,3	48	0,65	2,7 5	5,95	0,091	37	8,79

Based on the experiments carried out, a technological scheme for processing a molybdenum-containing cake is proposed, which is shown in Figure 1.

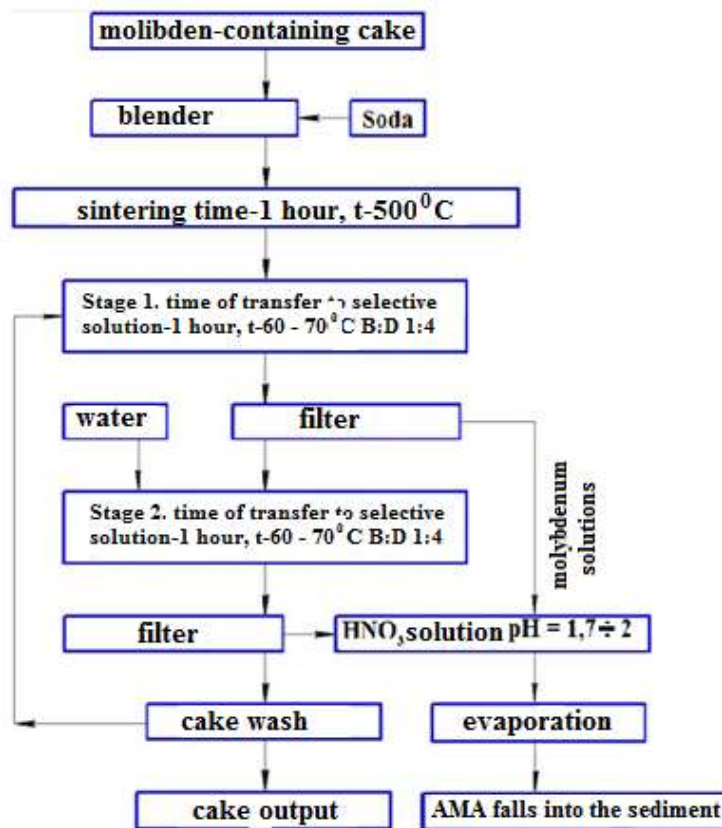


Figure 1. Technological scheme of processing molybdenum cake

To effectively obtain molybdenum from an industrial product, it was carried out to obtain molybdenum slag at a temperature of 750-800. A scheme for processing waste is proposed by sintering the cake with soda and subsequent washing with water.

It has been shown that the process proceeds with the formation of sodium molybdate, calcium carbonate and the main carbonates of copper and iron, and together with molybdenum, Silicon, phosphorus, arsenic compounds, as well as partially copper, pass into the solution.

Cleaning from harmful impurities is carried out by a method based on the deposition of silicate acid in a certain pH range. For cleaning from impurities, the influence of

various factors (temperature, pH and concentration of reagents) was determined.

As a result, a methodological recommendation was drawn up for the purification of molybdenum salt (ammonium molybdenate acid) from harmful impurities, and an analysis of the chemical composition of ammonium molybdenate acid obtained from the molybdenum industrial product was carried out.

When laboratory work was carried out, technological methods of obtaining ammonium molybdenum acid were developed by the hydrometallurgical method of cake processing. Analysis of the chemical composition showed that the main elements of ammonium

molybdenic acid obtained meet the requirements of their technical condition.

Used literature

1. А.А.Шегай, Х.Т.Шарипов, М.А.Шегай
Технология молибдена и материалов на его основе. 2010г. г.Ташкент – с. 215-218.
2. К.С. Санакулов. Основные тенденции комплексной переработки отходов горно-металлургических производств. Навои. МНТК «Перспективы науки и производства химической технологии в Узбекистане» 2014г.-С. 23-26
3. Р.Д.Аллабергенов, Шарипов Х.Т., Р.М.Михридинов, Бозоров А.Н. //Молибденсодержащее техногенное сырье и его переработки. Республиканская научно-техническая конференция «Перспективы развития композиционных и нанокоспозиционных материалов», г. Ташкент.11-12 Ноября 2016 г. -С. 132-134.
4. Abdullaev A. A. et al. Molibden sanoati chiqindilarining inson va atrof-muhitga ta'siri //Журнал естественных наук. – 2021. – Т. 1. – №. 4.
5. А.Н. Бозоров, С.С. Негматов, Х.Т. Шарипов, Исследование и выявление оптимальных технологических параметров выщелачивания отходов-огарков промпродукта молибдена. «Композиционные материалы»,Ташкент, 2020, №3, - С.298-299.
6. Абдуллаев А. А. Олтин қазиб олиш корхоналари чиқиндиларини флотация усулида тозалаш //Журнал естественных наук. – 2022. – Т. 1. – №. 1 (6). – С. 179-183.
7. Абдуллаев А. А. Олмалиқ кон-металлургия комбинатидаги молибден сақлаган кекларини қайта ишлаш жараёни //Science and Education. – 2022. – Т. 3. – №. 1. – С. 225-228.