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## Study of The Composition of Layout Tails of The Chadak Gold Extracting Factory of JSC "ALMALYK MMC"

**Samadov Alisher Usmanovich,**

Director of the Almalyk branch of the Tashkent State Technical University named after I. Karimov,  
Doctor of Technical Sciences, Uzbekistan

**Shonazarova Shakhnaza Isakulovna,**

Assistant of the Almalyk branch of the Tashkent State Technical University named after I. Karimov,  
Uzbekistan

**Jalolov Bakhtiyorjon Adhamjonugli,**

Master's student of the Almalyk branch of the Tashkent State Technical University named after I.  
Karimov, Uzbekistan

**Abdugaparova Sevara Raimqizi,**

Master's student of the Almalyk branch of the Tashkent State Technical University named after I.  
Karimov, Uzbekistan

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### **Abstract**

*The article presents the results of a study of the composition of stale tailings of the Chadak Gold Extraction Factory of JSC "Almalyk MMC" with the aim of extracting non-ferrous and rare metals from their composition.*

**Keywords:** *Industrial waste, gold recovery plant, tail, valuable components, environmental pollution, sample, chemical composition, spectral analysis.*

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### **INTRODUCTION**

At present, the waste generated as a result of production at metallurgical enterprises is considered as a future raw material.

In any metallurgical enterprise, precious metals contained in waste resulting from processing are present in the form of a certain amount of chemical compounds or chemical elements. Isolation of a given chemical compound or chemical elements from the composition of waste and using in the manufacture of various products on an industrial scale is one of the urgent problems of modern metallurgy.

It is known that the continuous increase in the volume of mining production of precious metals for decades has led to formation of a huge mass of mining waste in the form of dumps and tailings. As a result, man-made deposits were formed with industrial reserves and consisting of useful components at the level of poor and poor ores, which are now involved in processing.

Technogenic waste is environmentally hazardous, especially its sulfide and arsenic components. One of such wastes is the stale tailings of concentration plants, which are formed during the processing of gold-bearing ores.

A number of gold mining enterprises operate in Uzbekistan, such as: Navoi Mining and Metallurgical Combine, which processes ore from the unique gold-bearing Muruntau deposit, Uchkuduk ZIK, Zarmitan ore field; Mardzhanbulak mine. Associated extraction of gold is carried out from copper-porphyry ores at the Almalyk Mining and Metallurgical Combine. The Angren and Chadak gold Extraction Factories are in operation.

Currently, there are two tailing dumps at the Chadak Gold Extraction Factory of JSC "Almalyk MMC". The total amount of stale tailings of the Chadak Gold Extraction Factory of JSC "Almalyk MMC" is more than 14 thousand tons.

Waste from gold recovery factories contaminates soil, groundwater and surface water. The environmental situation in the area of operating mining enterprises is often in a difficult state, since the elimination of harmful environmental consequences is expensive and significantly reduces the profit from the exploitation of deposits.

The products of processing enterprises' activity accumulate at the tailing dump and represent the so-called "man-made deposits". In fact, they are additional sources for obtaining useful components, since significant reserves are stored in them every year.

For this purpose, we have studied the composition of the Chadak Gold Extraction Factory of JSC "Almalyk MMC". For the study, a sample of the tailings of the Chadak Gold Extraction Factory was taken with a mass of 100 g. The selected sample was studied in the Central Analytical Laboratory of JSC "Almalyk MMC" by spectral analysis.

The results of the spectral analysis of the tails of the Chadak Gold Extraction Factory are shown in Table 1.

**TABLE 1 RESULTS OF SPECTRAL ANALYSIS OF THE TAILS OF THE CHADAK GOLD EXTRACTION FACTORY**

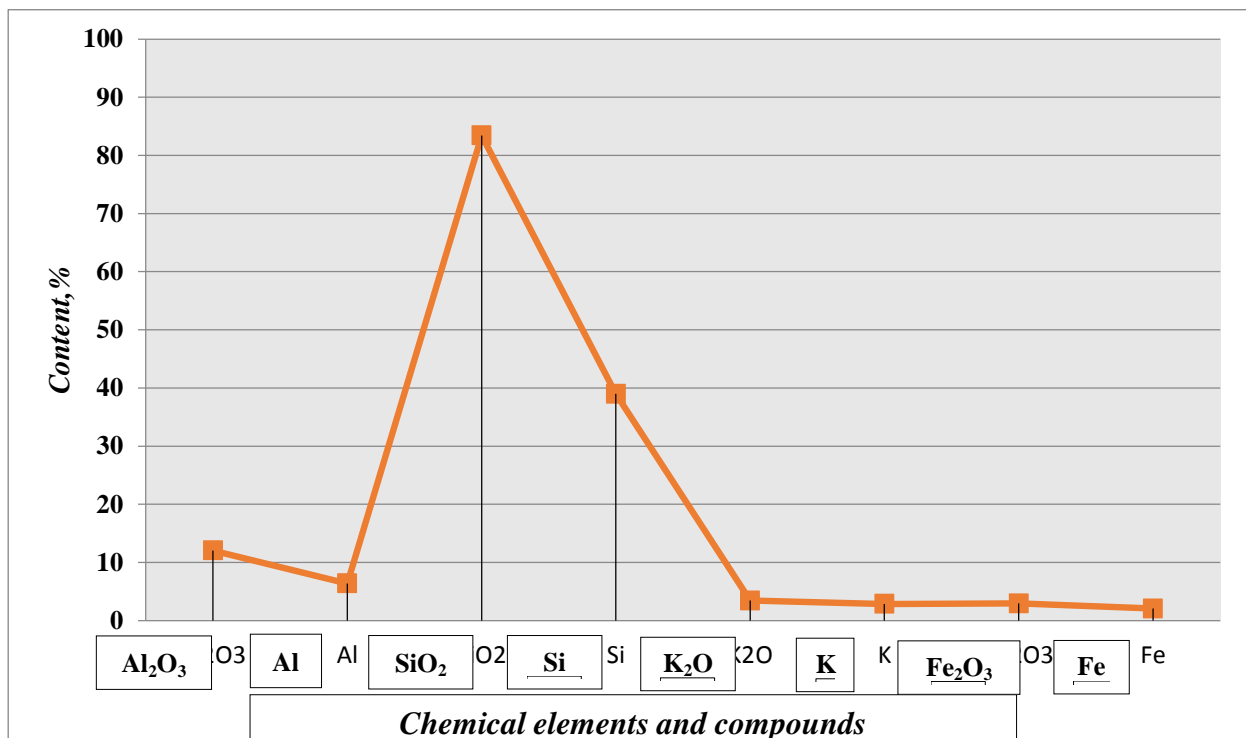
Name of chemical elements	The elements	Concentration	
		%	mg/g
Aluminum oxide	Al <sub>2</sub> O <sub>3</sub>	12.06	120600
Aluminium	Al	6.382	63820
Silicon oxide	SiO <sub>2</sub>	83.42	834200
Silicon	Si	38.99	389900
Sulfide oxide	SO <sub>3</sub>	0.7043	7043
Sulfur	S	0.2821	2821
Potassium oxide	K <sub>2</sub> O	3.441	34410
Potassium	K	2.857	28570
Calcium oxide	CaO	0.8486	8486
Calcium	Ca	0.6065	6065
Titanium	Ti	0.1920	1920
Manganese oxide	MnO	0.03972	397.2
Manganese	Mn	0.03076	307.6
Iron oxide	Fe <sub>2</sub> O <sub>3</sub>	2.937	29370
Iron	Fe	2.054	20540

Cobalt	Co	< 0.00010	< 1.0
Nickel	Ni	0.00039	3.9
Copper	Cu	0.00199	19.9
Zinc	Zn	0.00493	49.3
Germanium	Ge	0.00015	1.5
Strontium	Sr	0.01399	139.9
Zirconium	Zr	0.01111	111.1
Barium	Ba	0.1152	1152
Silver	Ag	0.00045	4.5
Gold	Au	< 0.00001	< 0.1
Uranium	U	0.00108	10.8

According to the results of spectral analysis of the tails, the main components are 83.42%  $\text{SiO}_2$ , 12.06%  $\text{Al}_2\text{O}_3$ , 3.441%  $\text{K}_2\text{O}$  and 2.937%  $\text{Fe}_2\text{O}_3$ . Their content in tailings is much higher than the content of non-ferrous and precious metals. Removal of these chemical compounds with a high content from the tailings, in turn, increases the possibility of extracting non-ferrous and noble metals several times.

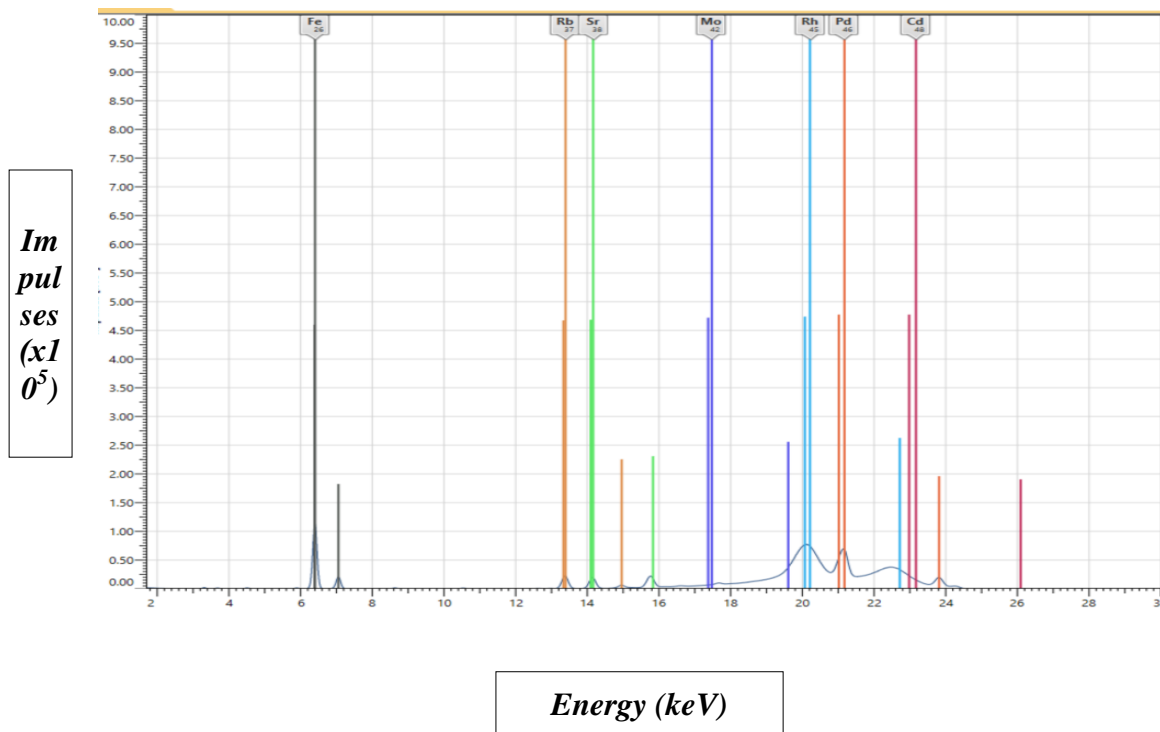
The amount of a chemical compound and chemical elements identified as a result of the study is necessary to determine the possibility of further processing of a chemical compound and chemical elements that have a higher content in these wastes.

According to the results of spectral analysis, the diagram of the state of a chemical compound and chemical elements with a percentage of more than 1% in the waste composition is shown in Figure 1.



**Figure 1. Diagram of chemical elements and compounds of stale tailings of the Chadak Gold Extraction Factory of JSC "Almalyk MMC"**

The diagram of the state of chemical elements, obtained on the basis of spectral analysis of the waste of the Chodak gold recovery plant, taken as a sample in order to study its composition, is shown in Figure 2.



**Figure 2. Diagram of spectral analysis of chemical elements of stale tailings of the Chadak Gold Extraction Factory of JSC "Almalyk MMC"**

## Output

As a result of spectral analysis of the chemical composition of the tailings of the Chodak gold recovery plant of JSC Almalyk MMC, it was found that the tail contains silicon dioxide, aluminum oxide, potassium oxide, iron oxide and other non-ferrous metals. By extracting large amounts of chemical compounds from the tailings, including silicon dioxide and iron oxide, it is possible to recover non-ferrous and precious metals from the tailings.

## REFERENCES

1. K.S.Sanakulov, Nauchno-texnicheskiye osnovy pererabotki otvalov gornoy metallurgicheskoy promyshlennosti. – Tashkent.: Izdatelstvo Fan ANRUz. 2009. – 404 str.
2. A.Samadov, M.Ernazarov, «Issledovaniye vozmozhnostey doizvlecheniya zolotykh otvalov izvlekatel'nykh fabrik», Gornyye vestnik Uzbekistana. – Navoi, 2017. – №1. – Str. 160-163.
3. A.U.Samadov, M.Ernazarov, B.R.Raimzhanov, U.K.Sanakulov, Razrabotka tekhnologii kompleksnoy pererabotki otvalov zolotoizvlekatel'nykh fabrik, Sbornik nauchnykh statey Mejdunarodnoy nauchno-texnicheskoy konferentsii na temu: «Problemy i puti innovatsionnogo razvitiya gorno-metallurgicheskoy otrasli». – Tashkent, 2014. – Str. 156-159.

4. A.U.Samadov, M.Ernazarov, *Issledovaniye i razrabotka texnologii doizvlecheniya serebra iz produktov xvostoxranilisha Chodakskoy zolotoizvlekatelnoy fabрики*, «Innovatsion-texnologik rivojlanish va kichik ishlab chiqarish korxonalari tizimini yaratish muammo va istiqbollari (Innovatsiya-97) Respublika ilmiy-amaliy konferensiyasi». – Navoi, 1997. – 78-81b.
5. A.Samadov, N.Nosirov, *Sposobizvlecheniyasennixkomponentov (zoloto, srebro) izxvostov ZIF*. Scientific Collection «InterConf», (43)\_ with the Proceedings of the 2nd International Scientific and Practical Conference «Global and Regional Aspects of Sustainable Development» (February 26-28, 2021) at Copenhagen, Denmark, Pp 605-612.
6. Samadov A.U., Nosirov N.I., Jalolov B.A., *Izucheniye mineralogicheskoy sostav xvostov Chadakskoy ZIF. THE ISSUE CONTAINS: Proceedings of the 8 th International Scientific and Practical Conference SCIENTIFIC RESEARCH IN XXI CENTURY., OTTAWA, CANADA, 6-8.03.2021 y. 665-672 Pp.*
7. A.K.Koyzhanova, G.V.Sedelnikova, E.M.Kamalov, E.M.Erdenova, N.N.Abdylidaev «k voprosu izvlecheniya zolota iz lejalix xvostov *zolotoizvlekatelnoy fabрики*», *Otechestvennaya geologiya*, - Moscow, 2017. - №6. - Str. 98-103.