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STUDY OF CAKES OF SOME MINING ENTERPRISES IN UZBEKISTAN

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Abstract
The results of X-ray fluorescence and atomic emission analyzes of technogenic raw materials of mining production at MPZ AGMK JSC and GMZ No. 2 at NGMK JSC of the Republic of Uzbekistan are considered, which showed the content of non-ferrous metals such as gold, silver, copper, zinc, chromium, manganese and others.

Keywords: X-ray fluorescence analysis, atomic emission analysis, non-ferrous metals, industrial waste.

Introduction

The main reason for the relatively low level of use of the deposit's raw materials is that while the extracted rock mass usually contains several useful components, mining and metallurgical enterprises are programmed to produce, in the overwhelming majority, only one type of marketable product. Therefore, significant reserves of mineral raw materials accumulate in dumps. Today, all over the world, there is increased interest in research that makes it possible to create energy-saving and environmentally sound technologies for the disposal and processing of industrial waste, since natural reserves are being depleted, and the level of man-made pollution has long exceeded all permissible standards. Technogenic waste, being complex compositional formations in composition, contains non-ferrous and rare metals in concentrations of industrial interest, and in some cases exceeding their content in ores. Of the various technogenic wastes, waste from non-ferrous and rare metal metallurgy enterprises is of particular interest.

During the mining and processing of gold ores, numerous man-made wastes were generated: dumps of gold-bearing poor and off-balance ores, tailings of processed ore (in the form of pulp), as well as spent heap leaching piles.

Relevance of the problem

According to experts, the practical implementation of already developed technical solutions for the development of technogenic deposits will reduce the volume of mineral extraction by

20-30%. In this regard, the problem of integrated use of mineral resources and technogenic raw materials is becoming increasingly urgent. During the study of samples of technogenic raw materials from non-ferrous metallurgy enterprises of the Republic of Uzbekistan, a significant content of important non-ferrous metals was revealed. The full use of all extracted natural components, as well as those created and accumulated by man, is becoming increasingly relevant and is the most important direction in their use based on waste-free technologies. Maximum involvement in industrial circulation of all mineral resources, including waste, increases the economic efficiency of the total cycle of work in the geological, mining and processing industries.

Instruments and reagents. High-performance energy-dispersive X-ray fluorescence spectrometer – Rigaku NEX CG EDXRF Analyzer with Polarization in set – 9022 19 000 Japan; Optical emission spectrometer with inductively coupled plasma ICPE-9000 "SHIMADZU", Kyoto Japan; concentrated solution of sulfuric acid H_2SO_4, beaker, flask, test tubes and pipette.

The discussion of the results. X-ray fluorescence analysis of samples of MPZ sludge showed that the most iron in its composition is 58,2%, followed by silicon 23% and aluminum 6,5%. There are also many other elements that are of great importance for the national economy, such as: magnesium (Mg), sulfur (S), calcium (Ca), potassium (K), copper (Cu), zinc (Zn), etc.

Experimental part. Average monthly samples of copper waste (sludge) from the Almalyk mining and metallurgical plant, as shown by X-ray fluorescence analysis, contain the following components - Fe_2O_3, SiO_2, CaO, MgO, ZnO and CuO. An atomic emission spectroscope with inductively coupled plasma made it clear that in samples of technogenic raw materials from Hydrometallurgical Plant No. 1 NMMC, per ton of technogenic raw materials there are: 1,02 g of Ag; 0,501 g Au; 48,9 g Cu; 66 g Zn; 328 g Mn. The cakes contain a significant amount of antimony 26%, barium 23%, tin 16%, uranium 11%, yttrium 5%, zirconium 7%, molybdenum 5% and others.

A comprehensive methodology for analyzing mining waste is scientifically substantiated and is based on the physical and chemical processes of structure formation and methods for their regulation. The reliability of the data obtained is proven by the convergence of theoretical and experimental results based on modern methods of physicochemical analysis. The following have been established: features of the behavior of noble and non-ferrous metals during their concentration from technogenic waste from gold mining production with solvents of various concentrations; To dissolve technogenic raw materials, a more aggressive solvent, concentrated sulfuric acid, was used, which dissolves most non-ferrous metals (iron, copper, zinc, tin, mercury, cadmium, nickel, chromium, manganese and others), with the exception of noble metals.

General conclusion

During the study of samples of technogenic raw materials from non-ferrous metallurgy enterprises of the Republic of Uzbekistan, a significant content of important non-ferrous metals was revealed. X-ray fluorescence analysis of slag samples showed that the most iron in its composition is 58,2%, followed by silicon 23% and aluminum 6,5%. There are also many other elements that are of great importance for the national economy, such as: magnesium (Mg), sulfur (S), calcium (Ca), potassium (K), copper (Cu), zinc (Zn) and many others. AMMC smelter as the main component of building materials. The reliability of the data obtained is proven by the convergence of theoretical and experimental results based on modern methods of physicochemical analysis. The characteristics of the behavior of noble and non-ferrous metals during their concentration from technogenic waste from gold mining production with solvents of various concentrations have been established. During the study of samples of technogenic raw materials from non-ferrous metallurgy enterprises of the Republic of Uzbekistan, a significant content of important non-ferrous metals was revealed. This allows us to predict the further use of technogenic raw materials.

References

1. Хасанов А.С., Вахидов Б. Р. «Разработка технологии получения пятиокиси ванадия из минерального и техногенного сырья». Universum: технические науки (научно-технический журнал), т. 10, с. 276-282, 2020

2. Мирзанова З.А. «Технология переработки техногенных отходов содержащие цветные металлы». Образование и наука, том-4, с. 59-65, 2021.

3. Рузметов У.У., Усмоналиев Ж.И. Исследование техногенных отходов горно-рудного производства месторождений кальмакир и мурунтау // Universum: химия и биология: электрон. научн. журн. 2022. 6(96). URL: https://7universum.com/ru/nature/archive/item/13851

4. Рузметов У.У., Усмоналиев Ж. Исследование некоторых техногенных отходов горно-металлургических комбинатов в Узбекистане. O‘zMU XABARLARI. 2023 3/1. Стр.407-411

5. Mirzakhmedov R M., Madusmanova N. K., Makhmudova G U., Sorbtsion-photometric determination of rhenium metal in Zr and Pb cake // Innovative, educational, natural and social sciences, T.2 №.4. 2022/4. P. 663-669.

6. Мирзахмедов Р. М., Мадусманова Н К., Сманова З. А., “Сорбционно-Фотометрическое Определение Иона Рения С Иммобилизованным Органическим Реагентом”, // Central asian journal of theoretical and applied sciences, Volume: 02 Issue: 03 | March 2021, ISSN: 2660-5317, 89-93 б.

7. Мирзахмедов Р.М., Мадусманова Н.К., Мирусманова Ф.Б., Иммобилланган янги 2, 4, 6-три (2-пиридил)-s-триазин ҳосилалари билан темир (III) ионини аниқлашнинг сорбцион-спектроскопик усулларини ишлаб чиқиш // nnovative, educational, natural and social sciences, T.2. №.6, 2022. С 753-761.

8. Мирзахмедов Р.М., «Олмалиқ кмк» аж корхонаси саноат кеки таркибидан никель ва коблть ионларини сорбцион-фотометрик аниқлаш // Образование наука и инновационные идеи в мире, Т.31. №.1, 2023/10/9. С 140-143.
9. Мирзахмедов Р.М., Саноат чиқинди кеклари таркибидан қўрғошин (II) ионни сорбцион-фотометрик аниқлаш усулини ишлаб чиқиш // Journal of new century innovations, Т.38. №.2, 2023/10/12. С 45-48.