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Содержание

МЕТОДЫ И ПРИБОРЫ АНАЛИТИЧЕСКОЙ ХИМИИ И АНАЛИТИЧЕСКОГО КОНТРОЛЯ

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ESTIMATION OF APPLICABILITY OF SCATTERED RADIATION FOR XRF

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The applicability of coherently and incoherently scattered radiation was investigated on the example of quantifying the Nb content in wolframite. The calculated and experimental intensities of NbK_{α}-line for binary and multicomponent mixtures of Nb_2O_5 with various matrices have been compared. The major oxides MgO, SiO_2, CaO, Fe_2O_3, and a typical component of tungsten ore (Fe, Mn)WO_3 were used as the main matrices. Measurements were carried out using the energy dispersive X-ray spectrometer with Si(Li)-detector and radioactive isotope source ^{109}Cd. The analysis of data shows that when using the ratio of the intensities of coherently and incoherently scattered X-radiation of the excitation source the dependence of the analytical line intensity of niobium on the content of W in the samples is taken into account. The experimental results confirm the conclusions of the theoretical consideration. This technique was successfully used to study wolframite samples from the deposits of the Eastern and Western Mongolia.

A procedure for the determination of Cu, Mo and Fe concentrations in ores, copper and molybdenum concentrates, and enrichment waste was developed to control the process of enrichment at the mining company "Erdenet", Mongolia. This procedure was based on using regression equations. The form of regression equations was chosen based on the theoretically calculated intensities. The comparison results of measurements using the newly developed technique and the standard-background method are presented.

Keywords: X-ray spectral fluorescence analysis of ores and enrichment products, method of standard-background, theoretical simulation of matrix effects.

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1. INTRODUCTION

The study of the distribution of impurity elements in the ore minerals allows to reveal a number of regularities of mineralization. For wolframite deposits tantalum, niobium, and scandium are of particular interest from this point of view. It was found that in some cases the wolframites can be an additional source of niobium, tantalum, and scandium [1, 2]. It was also found that the content of these impurity elements and their ratios can inform about the conditions of formation of wolframite deposits. On the other hand, the chemical methods for the separation and determination of Ta and Nb in wolframites are laborious.

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