

THE DETERMINATION OF MERCURY CONTENT IN MERCURY ORES

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The radioactive Co-57 and a scintillation counter were employed in the construction of a surface probe for the determination of mercury content in ores. The concentration ranges from 0,005% to about 2 %.

The spectra of backscattered radiation analysed by a germanium detector exhibit a Compton peak at the energy of 80 keV to which the characteristic K-series of mercury is superimposed at the energy of 70 keV. In the analysed ores mercury represents the only highly absorptive element so it was expected that the relations $I_{sc} = I_0 \alpha_1 (1 - \beta_1 C)$ and $I_{fl} = I_0 \alpha_2 C$ were valid for the intensities of Compton scattered and fluorescent radiation, respectively. In the equations I_0 represents the intensity emitted by the source, α_1 , α_2 and β_1 are constants while C denotes the concentration.

In order to extract the fluorescent radiation from the data obtained with the scintillation counter the method of Ross differential filters was applied. The energy channel containing the $K\alpha_1$ and $K\alpha_2$ lines of mercury was determined by filters of 0,18 g/cm² rhenium and 0,19 g/cm² tantalum. The parameter $(I_{Re} - I_{Ta})/I_{Ta}$ was used to indicate mercury concentration. The notations I_{Re} and I_{Ta} denote the counting rates obtained during the use of rhenium and tantalum filters, respectively.

The detection limit was determined as 0,01% of mercury.