DETERMINATION OF HAFNIUM AND ZIRCONIUM IN GEOLOGICAL MATERIALS BY NEUTRON ACTIVATION ANALYSIS

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The determination of Hf and Zr is of great interest for geochemical investigations as well as in evaluating their economic potential in ore prospecting. Besides, Hf and Zr analysis presents a great analytical problem due to the close chemical behaviour of these elements.

In this work, neutron activation analysis was applied to analyze the geological standard rocks: GSP-1 and W-1 from USGS, GB-1 and BB-1 from the University of Bahia and a sample of uraniferous rock. Hf was determined by instrumental method by measuring ^{181}Hf radioisotope and the results obtained presented relative standard deviations varying from 1.2 to 14 %. In the case of Zr analysis, both instrumental and radiochemical neutron activation analysis were used. A radiochemical separation was required depending on the sample due to the interference of ^{154}Eu radioisotope that emit gamma rays too close to those emitted by ^{95}Zr. The uranium fission product contribution was considered in the determination of Zr by using interference factor. The results found for Zr presented relative standard deviations varying from 2.0 to 26 % and the more precise results with relative standard deviations lower than 3.3 % were obtained by using the radiochemical separation. The concentration values obtained for Hf and Zr in the reference standards agreed well with the respective certified or information values.