

## ABSTRACT 41

### PRECISION AND ACCURACY OF THE METHODOLOGY FOR THE DETERMINATION OF Pb-210 BY LSC AND Po-210 BY ALPHA SPECTROMETRY USING A SR-SPEC RESIN

*C.H.R. Saueia<sup>1,2</sup>, M.B. Nisti<sup>1</sup> and B.P. Mazzilli<sup>1</sup>*

<sup>1</sup>*Instituto de Pesquisas Energéticas e Nucleares (IPEN / CNEN - SP), São Paulo, Brazil*

<sup>2</sup>*Universidade Nove de Julho, São Paulo, Brazil*

*chsaueia@ipen.br*

Pb-210 and Po-210 were important from the radiation protection and environmental protection point of view, due to its high toxicity. It is part of the U-238 natural series, formed by decay of the Rn-222 gas; Pb-210 has a half-life of 22.3 years and emission beta particles with 16.5 keV (80.2%) and 63.0 keV (19.8%); and Po-210 has a half-life of 138.4 days and emission alpha particle with 5.3 MeV.

The methodology for the Pb-210 and Po-210 determination is based on the purification and concentration of the radionuclides using a Sr-Spec resin from EICHRON and performed by Liquid Scintillation Counting (LSC) and Alpha Spectrometry, respectively. The sample solution was loaded onto the Sr resin column preconditioned in advance with 100 mL of 2M HCl. Lead and polonium were retained, Po-210 was stripped with 60 mL of 6M HNO<sub>3</sub> and Pb was eluted with 60 mL of 6M HCl. Po was spontaneously deposited on a silver disc and counted on an alpha spectrometer for 80,000 seconds. The Pb solution was evaporated three times with 5 mL portions of 65% HNO<sub>3</sub> and the final residue was dissolved in 10 mL of 1M HNO<sub>3</sub>. Pb was precipitated as Pb-oxalate, which was dried and weighed to calculate the chemical recovery using the gravimetric method. The precipitate was quantitatively transferred into a liquid scintillation vial and 1 mL of 1M HNO<sub>3</sub> was added to dissolve the precipitate. The solution was mixed with 15 mL of Hisafe III scintillation solution. The final solution was counted on a 1220 Quantulus™ Ultra Low Level Liquid Scintillation Spectrometer for 24,000 seconds.

In this paper, evaluates the accuracy and precision of the methodology of Pb-210 by LSC and Po-210 by alpha spectrometry using a separation technique with resin Sr-Spec was performed.