



Contribution ID: 1325

Type: **Oral (Non-Student) / orale (non-étudiant)**

Separation and analysis of Sr-90 and Zr-90 for nuclear forensic applications

Wednesday 15 June 2016 09:30 (15 minutes)

In this work, a technological development to determine the age of radioactive strontium sources through the $[Zr-90]/[Sr-90]$ ratio using mass spectrometry and liquid scintillation to quantify both isotopes is presented. Because Sr-90 and Zr-90 are isobaric interferences in mass spectrometry, a radiochemical separation to isolate Zr-90 has been shown to be mandatory prior to analysis. Four commercial resins (AG50W-X9, Dowex1-X8, Sr and DGA resins) were tested to isolate Zr-90 from Sr-90. Best performance was observed for the DGA resin, including recoveries higher than 99% for Zr-90. DGA has also demonstrated to be the faster approach and the most efficient not only to eliminate isobaric interferences from Sr-90, but also from Y-90, potentially present in samples containing high levels of radioactivity.

The use of ICP-MS/MS using oxygen as a reaction gas in the Octopole Reaction system (ORS) was also evaluated as a potential approach to reduce isobaric interferences at m/z 90. While some level of decontamination was achieved, the coupling of this instrumental configuration with a pre-plasma separation was deemed necessary.

Author: Prof. LARIVIERE, Dominic (Chemistry Department, Laval University)

Co-author: Ms ZATTONI, Ana Paula (Chemistry Department, Laval University)

Presenter: Prof. LARIVIERE, Dominic (Chemistry Department, Laval University)

Session Classification: W1-6 Instrumentation for the Detection of Low-Level Radioactivity (DIMP) / Appareillage de détection de radioactivité de faible intensité (DPIM)

Track Classification: Instrumentation and Measurement Physics / Physique des instruments et mesures (DIMP-DPIM)