Contribution ID: **58**   Type: **Poster**

Sequential separation of ⁹⁰Sr from α emitters with mixed solvent anion exchange and their determination by LSC and α spectrometry

Thursday, 22 April 2010 12:00 (20 minutes)

Strontium, plutonium and americium are isotopes which determination is most often in practice (from all among alpha and pure beta emitters) because of their radiotoxicity, long period of half life and potential hazardous for human life. It is well known that their determination, because of radiochemical properties, require isolation from sample and separation from other elements (active or inactive) before detection. In past many methods were developed for their separation from different kind of samples. Main characteristic of almost all this methods is that separation and determination of strontium isotopes are separated from alpha emitters.

Therefore the main aim of this paper is development of method for strontium and alpha emitters separation in one step by mixed solvent anion exchange. It will be shown that Sr, Y and mentioned alpha emitters can be isolated from complex samples and separated from great amounts of Ca and many other elements and after that, separated mutually on the chromatographic column filled with strong base anion exchangers (Amberlite CG-400 or Dowex 1x8) in nitrate form combined with alcoholic solutions of nitric acid as eluent. It will be also shown how combination of used alcohols can improve separation efficiency between mentioned isotopes. Separation of Sr and Y from Am and Pu can be achieved on the column filled with mentioned exchanger and alcohol (ethanol, methanol)-water mixture as eluent. Pu and Am can be easily stripped from column by water. In addition it will be shown how this type of isolation can accelerate 89,90Sr determination on LSC or proportional counter and determination of Pu and Am by alpha spectrometry.

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Session Classification: Poster Session - Separation Methods, Speciation

Track Classification: Separation Methods, Speciation