



Contribution ID: 197

Type: Poster

Peculiarities of plutonium isotopic ratio determination by elemental mass spectrometry

Tuesday, May 13, 2014 5:15 PM (1h 30m)

Inductively coupled plasma high resolution mass spectrometry (ICP-MS) is widely used technique for $^{240}\text{Pu}/^{239}\text{Pu}$ isotopic analysis tool which leads to use plutonium isotopic composition to assess the artificial radionuclide source in the environment fast and accurately. ICP-MS measurements usually are performed in low resolution mode ($m/dm=300$) to enhance and maximize plutonium signal sensitivity. In this measurement mode various interferences emerge from sample solutions and are likely to overlap plutonium isotopic signal. To study occurring interferences soil samples were used. They were prepared by using ion exchange and extraction chromatography separation techniques. It was determined that $^{238}\text{U}1\text{H}^+$ interfering ion must be taken into the account if $^{238}\text{U}^+$ signal in the sample exceeds $1\text{E}5$ cps. However, to take into the account $^{238}\text{U}1\text{H}^+1\text{H}^+$ interference is not necessary. Besides, it is strongly not recommended to use hydrochloric acid as a final stabilizing matrix as serious $^{204}\text{Pb}^{35}\text{Cl}^+$ interferences occur on 239 a.m.u mass. For final stabilizing matrix five solutions were tested and it was found that the best one to use is ultrapure nitric acid as it creates the lowest background signal on 239 and 240 a.m.u masses.

Primary author: Mr PUZAS, Andrius (Center for Physical Sciences and Technology, LITHUANIA)

Co-authors: Mr GENYS, Paulius (Vilnius university, LITHUANIA); Dr DRUTEIKIENĖ, Rūta (Center for Physical Sciences and Technology, LITHUANIA); Prof. REMEIKIS, Vidmantas (Center for Physical Sciences and Technology, LITHUANIA)

Presenter: Mr PUZAS, Andrius (Center for Physical Sciences and Technology, LITHUANIA)

Session Classification: Poster Session - Radionuclides in the Environment, Radioecology

Track Classification: Radionuclides in the Environment, Radioecology