



Contribution ID: 333

Type: Poster

Combined, sequential procedure for radiochemical analyses of ^{63}Ni , ^{99}Tc , Pu, Th, Am, U and ^{90}Sr in environmental samples

Monday, 12 May 2014 17:15 (1h 30m)

Environmental samples are sometimes quite unique –the mass of sample collected frequently on remote locations is limited due to need of transportation by hands. The advantage of analyses of as much as possible radionuclides is obvious. The information obtained from ratios between different nuclides are enlarging our knowledge a lot. Moreover, the efforts devoted for dissolution of sample sometimes are large. All this supports concept of developing a single, sequential radiochemical procedure, which applied to a single environmental sample, after single mineralization can give information on many radionuclides. In our laboratory from many years a sequential procedure for radiochemical analyses was developed. Recently sub-procedures for ^{63}Ni and ^{99}Tc were included into existing large sequential procedure for Pu, Th, U, ^{90}Sr radiochemical analyses in environmental (soil, sediment, peat etc.) samples [1]. Soaked with ammonia sample (~10g) is ashed in 400 °C sample (about 10 g). Then tracers are added and wet complete digestion is applied using HF, HNO_3 , HCl and H_3BO_3 . Sample is converted to 1 M HNO_3 and then it is neutralized up to pH=6 using ammonia. Precipitation contains all actinides and ^{90}Sr whereas Tc and Ni stay in solution. Actinides are then separated using Dowex-1 and TEVA resins and ^{90}Sr using Sr-Resin. ^{63}Ni is separated using DMG and ^{99}Tc using TEVA. Procedure was positively tested using reference materials spiked with ^{95}mTc (obtained with AIC-144 cyclotron by us) and NiCl_2 as tracers only for radiochemical yield tracing due to lack of RM with certified values for ^{99}Tc and ^{63}Ni .

Works were carried out under the strategic research project “Technologies supporting the development of safe nuclear power” financed by the National Centre for Research and Development (NCBiR). Research Task “Development of methods to assure nuclear safety and radiation protection for current and future needs of nuclear power plants”, contract No. SP/J/6/143339/11.

References

1. E. Łokas, J.W. Mieltski, K.Kleszcz, E. Tomankiewicz (2010), *Nukleonika* 55 (2) 195-199.

Primary authors: Prof. MIETELSKI, Jerzy-Wojciech (The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN)); Dr KLESZCZ, Krzysztof (The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN))

Co-authors: Dr ŁOKAS, Edyta (The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN)); Ms TOMANKIEWICZ, Ewa (The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN))

Presenter: Prof. MIETELSKI, Jerzy-Wojciech (The Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN))

Session Classification: Poster Session - Separation Methods, Speciation

Track Classification: Separation Methods, Speciation