



Contribution ID: 222

Type: **Invited Lecture**

INVITED LECTURE - Rapid Radiochemical Analysis of Radionuclides Difficult to Measure in Environmental and Waste Samples

Tuesday, 18 September 2012 12:30 (20 minutes)

With the increasing requirement on rapid reaction system for nuclear emergency preparedness, increasing numbers of nuclear facilities being decommissioned, as well as radioecological investigation, a large number of environmental, biological and waste samples need to be rapidly analyzed for various radionuclides. Except gamma emitting radionuclides, other radionuclides have to be first separated from the sample matrix and purified from the interferences before measurement, therefore defined as radionuclides difficult to measure. The traditional analytical methods for these radionuclides normally take a few days to weeks for one analysis; this makes the emergency reaction impossible in one day, and impossible to analyze a large number of samples from decommissioning work and radioecological investigation. In recent years, considerable efforts have been focused on the development of automated and rapid analytical methods. In our laboratory, automated analytical systems have been established by exploiting flow/sequential injection approach, using chromatographic separation concept, combined with rapid measurement of radionuclides using ICP-MS. A number of analytical methods have been developed to determine ^{99}Tc , ^{237}Np , and isotopes of Pu and U in biological, environmental and nuclear waste samples. This work aims to summarize these automated and rapid analytical methods for the determination of various radionuclides.

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Session Classification: Session 4 - Reaction mechanisms and nuclear recoils, nuclear based spectroscopies, radiation geochronology, isotope effects

Track Classification: Reaction mechanisms and nuclear recoils, nuclear based spectroscopies (MOSSPEC and PAS), radiation geochronology, isotope effects