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ABSTRACTS

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isotope analysis and have observed varying run quality between samples of differing matrix. This presentation will provide some insight into the investigations carried out into the differences observed and how they can be improved for consistent quality routine analysis. [1] S. Richter et al, J. Anal. At. Spectrom., 2011, 26, 550-564

Log: 343. **AN IMPROVED MEASUREMENT METHOD FOR ^{89}SR AND ^{90}SR AFTER A REACTOR ACCIDENT OR NUCLEAR DETONATION, BASED ON STRONTIUM SEPARATION CHEMISTRY**. S. Holmgren, A. Tovedal, S. Jonsson, U. Nygren, H. Ramebäck.

Measurement of ^{89}Sr and ^{90}Sr after nuclear power plant accident and nuclear explosions will be limited by short lived radionuclide interferences. In this paper an improved separation method, which takes these interferences into consideration is presented. The method is based only on strontium separation chemistry and the radioactivity for both ^{89}Sr and ^{90}Sr, via ^{90}Y, is determined by Cherenkov counting. By using radioactive ^{85}Sr as the only yield tracer this offers the advantage of determining the total chemical yield of the analysis by gamma spectrometry alone. The method development is based on theoretical calculations of potential interfering fission products present after a nuclear weapon detonation or a nuclear power plant accident. The method was applied and validated on relevant reference material, spiked strontium standard solutions and samples containing radionuclides, who are known interferences, at a composition representing that from e.g. a reactor accident. By evaluating the relative combined uncertainties of the yield determination a measurement of the reliability of the method was given.

Log: 344. **DETERMINATION OF URANIUM FISSION INTERFERENCE FACTORS FOR INAA**. Ribeiro Junior, IS (1); SAIKI, M (1); Genezini, FA (1); ZAHN, GS (1). (1) Instituto de Pesquisas Energéticas e Nucleares - IPEN.

Instrumental neutron activation analysis (INAA) is a very suitable technique for the determination of several elements in different kinds of matrices. However when a sample contains high uranium concentrations this method presents interference problems from uranium fission products. The same radioisotopes used in INAA in the determination of the elements such as lanthanides, Mo, Zr among others are formed in the uranium fission. These radioisotopes are La-140, Ce-141, Ce143, Mo-99, Nd-147, Sm-153 and Zr-95. This study aimed to the determination of uranium fission interference factors to be used in the correction of the contribution of fission products. The experimental procedure consisted of irradiating synthetic standards of the elements to be determined and of U in IEA-R1 nuclear research reactor followed gamma ray spectrometry using HPGe detector. The thermal and epithermal neutron flux were determined using gold monitor. Experimental and theoretical interference factors obtained were statistically evaluated and comparison made with literature data demonstrates good agreement. The findings of this preliminary study suggest the application of factors in the INAA of geological materials containing high levels of uranium.

Log: 345. **FISSION YIELD MEASUREMENTS FROM HIGHLY ENRICHED URANIUM IRRADIATED INSIDE A BORON CARBIDE CAPSULE**. LA Metz1, JI Friese1, E Finn1, LR Greenwood1, RF Payne1, CC Hines2, MD King2, KM Henry2, and DE Wall2 1. Pacific Northwest National Laboratory, 902 Battelle Blvd, P.O. Box 999, Richland WA 99352 2. Nuclear Radiation Center Dodgen Research Facility, Washington State University, Pullman WA 99164.

A boron carbide capsule was previously designed and tested by Pacific Northwest National Laboratory and Washington State University for spectral-tailoring in mixed spectrum reactors. The presented work used this B_4C capsule to create a fission product sample from the irradiation of highly enriched uranium with a fast fission neutron spectrum. An HEU foil was irradiated inside of the capsule in WSU's 1 MW TRIGA reactor at full power for 200 min to produce 5.8×10^{13} fissions. After three days of cooling, the sample was shipped to PNNL for radiochemical separations and analysis by gamma, beta, and alpha spectroscopy. Fission yields for products were calculated from the radiometric measurements and compared to published evaluated fast-