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Determination of U,Pu, Am /Cm Isotopes in Ash Resulted from the Incineration of NPP Cernavoda Low Level Waste

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For the waste management characterization of radionuclides inventory is required. This work presents the method and the results for determination of U, Pu and Am/Cm isotopes in the ash resulted from the incineration of NPP Cernavoda, (Romania) low level activity waste, in order to have accurate information regarding the alpha emitting radionuclide content and a proper classification (LLW, ILW)of the waste.
The sample is traced with U-232, Pu-242 and Am-243, then is decomposed in an open microwave digestion system by a mixture of a strong acids and peroxide. Hydrofluoric acid is used for destruction of silicates. Hydrofluoric acid is eliminated by addition of nitric acid several times. The residue is dissolved in nitric acid and aluminum nitrate solution. Uranium, Plutonium and Americium/Cm isotopes are separated from each other and from other radionuclides and matrix constituents by extraction chromatography . Two columns with UTEVA and TRUE Eichrome resine were used for separation .The sample solution is passed first through UTEVA resin that retains U isotopes, then loading and rinsing effluents are passed through TRU resin that retains Pu and Am/Cm isotopes. A redox adjustment of Pu was done before passing through UTEVA column using Fe(II) and NH2OH . HCl , and also into the TRU column using NaNO2. Ascorbic acid was used to reduce Fe(III) to Fe (II) in order to prevent the uptake of Fe (III). Uranium was eluted from UTEVA with diluted hydrocloric acid, americium is eluted from TRU with hydrocloric acid and plutonium is eluted from TRU with amonium bioxalat. The sample preparation for alpha spectrometry was done by cerium carrier coprecipitation. Alpha spectrometry of measurements were performed by Ortec Alpha Spectrometer System. average tracer recovery was about 50,6% for Uranium, 43,7% for Plutonium and 54,1% for Americium

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