

A SIMPLE PROCEDURE FOR THE DETERMINATION OF ACTINIDES IN SOIL AND SEDIMENT SAMPLES

Patrícia Szeredy*, Nóra Vajda, Judit Groska, Márton Zagyvai, Zsuzsa Molnár, Edit Bokori

RADANAL Ltd., 1121 Budapest, Konkoly-Thege M. út 29-33.

*szeredyp@gmail.com

A new procedure has been recently developed for the separation of uranium, thorium, plutonium, neptunium and americium based on extraction chromatography using a single DGA resin® column¹. DGA is the trade name of the extractant containing N,N,N',N'-tetraoctyldiglycolamide sorbed onto Amberchrom CG-71 produced by Triskem International. The procedure was successfully tested for the analysis of radioactive waste samples. Dissolved samples were loaded from a reductive media on the column and the actinides were sequentially eluted changing the nature and the acidity of the eluents, the oxidation states of the given actinides, the concentration of the complexing agent, and the temperature. Alpha sources were prepared by micro-coprecipitation from the strip solutions without further processing. High recoveries and decontamination factors were obtained in each alpha source.

To extend the procedure for the determination of the actinides from soil and sediment samples, model experiments were performed in order to study the influence of the various sample constituents on the retention of actinides. Distribution coefficients of actinides as a function of the Fe, Ca and sulfite concentration were determined in batch experiments. The procedure was tested by column separations using standard reference materials. Good results i.e. high recoveries and decontamination factors were obtained for the determination of plutonium and americium from various soil and sediment samples. The procedure does not need any pre-concentration and a small chromatographic column (containing 0.5 g DGA resin) is adequate for the treatment of 5-10 g of samples.

¹ J. Groska, N. Vajda, Zs. Molnár, E. Bokori, P. Szeredy, M. Zagyvai: Determination of actinides in radioactive waste after separation on a single DGA resin column, J. Radioanal. Nucl. Chemistry, DOI 10.1007/s10967-016-4729-1 (2016.)