SEPARATION OF ACTINIDES BY ION CHROMATOGRAPHY

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ABSTRACT

A thirty-five minute elution program was developed for separating uranium, thorium, neptunium, plutonium, americium, and curium by automated ion chromatography. In the program, solutions of oxalic acid, diglycolic acid, and nitric acid are used to sequentially elute actinides from a chromatography column packed with hydrophilic mixed bed ion exchange media. Np(V), Am(III), and Cm(III) are eluted as weak anionic oxalate complexes at times of 1.8 ± 0.1, 9.8 ± 0.4, and 11.4 ± 0.4 minutes, respectively; Pu(IV) and Th(IV) are eluted as nonionic diglycolate complexes at times of 19.9 ± 0.6 and 22.6 ± 0.6 minutes, respectively; and U(VI) is eluted as a cation in dilute nitric acid at a time of 30.4 ± 0.5 minutes. The volume of each actinide eluate is less than 2 mL, and the total volume of liquid waste is less than 50 mL.