# The Chemistry of Americium. I : A Study of the Preparation of Am(V) and Its Behavior by Means of TTA Extraction

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# The Chemistry of Americium. I. A Study of the Preparation of Am(V) and Its Behavior by Means of TTA Extraction*

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## Abstract

The method for preparing Am(V) in various solutions was investigated by utilizing the difference in extractability between Am(V) and Am(III) in an TTA-isobutanol extraction system; Am(III) was quantitatively extracted with 0.1 M TTA in isobutanol from a 1 M acetate buffer solution at a pH greater than 3, while the percentage of Am(V) extracted into the organic phase was increased substantially with an increase in the pH from 3 to 5. When the organic phase containing Am(V) was shaken with an aqueous phase having a proper pH value and composition, Am(V) was selectively stripped into the aqueous phase. The stability of the valency state of Am(V) in the perchlorate, the acetate, and the sulfate solutions was then studied by examining the variation in the percentage of americium extracted as a function of the standing time. The rate of change in the valency state in the acetate and the perchlorate media is very slow, while it is rather rapid in the sulfate medium. This difference may be attributable to the faster rate of the disproportionation reaction of Am(V) in the last medium than in the former two. By applying the above results, the chemical behavior of Am(V) in the aqueous solution was investigated by TTA extraction; it was found that Am(V) would be in the form of $AmO_2^+$ in the absence of a complexing reagent. By the addition of acetate ions, the step-by-step formation of the acetate complex of Am(V) was observed. The stability constants of $[AmO_2Ac]$ and $[AmO_2Ac_2]^-$ were determined to be $(25.0\pm3.1)$ $(mol/l)^{-1}$ and $(12.8\pm1.2)$ $(mol/l)^{-2}$ respectively.

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