

with the heavier elements. However, in the case of solid compounds such as the oxides, the increased stability produced by certain crystal structures may enable a IV oxidation state to be formed.

It is often difficult to interpret the results of a tracer experiment unless a comparison is made with another tracer element whose behavior is known. In the following experiment americium and curium tracer were present and the oxidation of the former to the VI state with simultaneous non-oxidation of the latter and the element 99 tracer permits the conclusion that element 99 is more difficult to oxidize to the VI state than americium under the same conditions. This method has been applied previously in the attempted oxidation of element 99¹⁸ with results the same as reported here.

Experimental

A mixture of the tracers Am²⁴¹, 99²⁵³ and Cm²⁴² was precipitated with 200 micrograms of lanthanum as the hydroxide by adding ammonium hydroxide. The precipitate was separated from the solution by centrifugation and was washed twice with water. The lanthanum hydroxide was dissolved in perchloric acid, the volume of the solution adjusted to 200 microliters and the pH adjusted to 1.5. The solution was heated for one hour at 90° C. and a few crystals of (NH₄)₂S₂O₈ were added approximately every 15 minutes. A small addition of ammonium hydroxide was made after about one-half hour to adjust the pH to ~3. The lanthanum was then precipitated as the fluoride by the addition of potassium fluoride solution which had been pretreated with (NH₄)₂S₂O₈. The solutions were chilled in an