CHEMICAL PROPERTIES OF ELEMENTS 99 AND 100

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July 23, 1954

ABSTRACT

A description of some of the chemical properties and of the methods used in the separations of elements 99 and 100 is given. The new elements exhibit the properties expected for the tenth and eleventh actinide elements. Attempts to produce an oxidation state greater than III of element 99 have been unsuccessful. In normal aqueous media only the III state of element 100 appears to exist. The relative spacings of the elution peaks of the new elements in some separations with ion exchange resin columns are the same as the relative spacings of the homologous lanthanide elements. The results of experiments involving cation exchange resins with very concentrated hydrochloric acid eluant show that the new elements, like the earlier actinides, are more strongly complexed than the lanthanides. The new elements also exist partially as anions in concentrated hydrochloric acid, as do earlier actinide elements, and they may be partially separated from each other by means of ion exchange resins. With some eluants interesting reversals of elution positions are observed in the region Bk-Cf-99-100, indicating complex ion formation involving unusual factors.