

The discovery^{1,10} of element 97 was of primary importance in making possible better predictions of the chemical properties of element 98. In such predictions it was first necessary to consider its normal oxidation state in aqueous solution. Since the oxidation potential of the change $\text{Bk(III)} \longrightarrow \text{Bk(IV)}$ was found to be quite negative^{6,11} (-1.6 volts), it seemed likely that the tripositive state of element 98 would be the state normally existing in aqueous solutions. Since the tripositive oxidation state appeared to be the one on which the chemical separations would have to depend, it was necessary to use the ion exchange methods as they were used in the search for element 97 and to estimate precisely the position of element 98 relative to berkelium and curium in the separations.

Since berkelium had taken its place as the eighth member of the actinide series, there was every reason to believe that element 98 should be an "eka-dysprosium." The properties of berkelium made clear the existence of the same sort of discontinuity in ionic radius at the point of half-filling of the 5f electron shell, as occurs in rare earth elements at the point of half-filling of the 4f shell. Knowing, then, the relation between gadolinium, terbium, and dysprosium on the one hand, and the homologues curium and berkelium on the other, one could estimate with confidence the fractions from the adsorption columns in which tripositive eka-dysprosium (element 98) would be present. Using this information it was predicted that element 98 should be eluted at about 1.4 times the rate of elution of berkelium. Needless to say, element 98 could also be expected to exhibit normal chemical behavior similar to the rare earths--namely, it should carry well with rare earth or actinide fluoride and hydroxide precipitates.

¹⁰Thompson, Ghiorso, and Seaborg, Phys. Rev. (to be published).

¹¹W. M. Latimer, Oxidation Potentials (Prentice Hall, Inc., New York, 1938).