

actinides is delayed as much as a factor of two as compared with the aqueous hydrochloric acid elution. Separations with Dowex 1 resin were also much more critically dependent on conditions of operation than were those with Dowex 50 cation resin. The separations were improved by using resin fines of the smallest particle size which would still permit a suitable flow of eluant. Even with such precautions elution peak half-widths were about 30%. The separations were highly dependent on the hydrochloric acid concentration. With 10 M hydrochloric acid, no delay in the elution of curium or californium could be observed. In the range 11-12 M hydrochloric acid some delay in elution became evident and a change from 12 to 13 M hydrochloric acid approximately doubled the drop number of the californium elution peak. The absence of delay in the elution of californium at hydrochloric acid concentrations less than 10 M enabled excellent separations of uranium and plutonium to be made when the latter were in oxidation states of VI and greater than III, respectively. In such cases a suitable range of hydrochloric acid concentrations was from 6 to 10 M whereupon complete adsorption of the uranium or plutonium was accomplished with no adsorption of elements 95 through 100 inclusive. In some cases it was convenient to ensure the presence of plutonium in the tetrapositive state by making the solution 0.1 M in ammonium nitrite. The plutonium was removed from the resin either by elution with 6 to 10 M hydrochloric acid containing HI at a concentration of about 0.1 M (the HI reduces the plutonium to the tripositive state), or by elution with 1 M