

Fe Separation from Rare Earth Chlorides

Summary of Method Fe(III) is removed from rare earth chloride solutions by extraction of $[\text{FeCl}_4]^-$ on TEVA resin. The anionic ferric chloride complex is strongly retained by the TEVA Resin, while the rare earth chlorides are rejected. Hydrogen peroxide is added to the sample to ensure Fe(III), as Fe(II) is not extracted. The TEVA column can be regenerated by eluting Fe with five bed volumes of 0.1M HNO_3 . 99.7% removal of Fe from 500 mL 0.75M YCl_3 -1M HCl was achieved on a 10 mL column of TEVA resin (3 mL/min flowrate) [1].

Reagents

TEVA Bulk Resin (TE-B25-S)

Nitric Acid (70%) Hydrogen Peroxide (30% H_2O_2)

Hydrochloric Acid (37%) Deionized Water

Tc Separation on WBEC Resin

- (1) Add 1-2 mL 30% H_2O_3 per 100 mL of sample to ensure Tc(VII). Adjust to 0.01M HNO_3 . Mix well.
- (2) Precondition WBEC column with 3 bed volumes of 0.01M HNO_3 .
- (3) Load Sample.
- (4) Rinse column with 10 bed volumes of 0.01M HNO_3 .
- (5) Strip Tc with 5 bed volumes of 1M NH_4OH .



Equipment

Empty Columns

2 mL snap tip (AC-141-AL)

2 mL cap tip (AC-100-MT-PP)

5 mL (AC-50E-5M)

20 mL (AC-20E-20M)

Column Reservoir

For 2 mL columns (AC-120-TK)

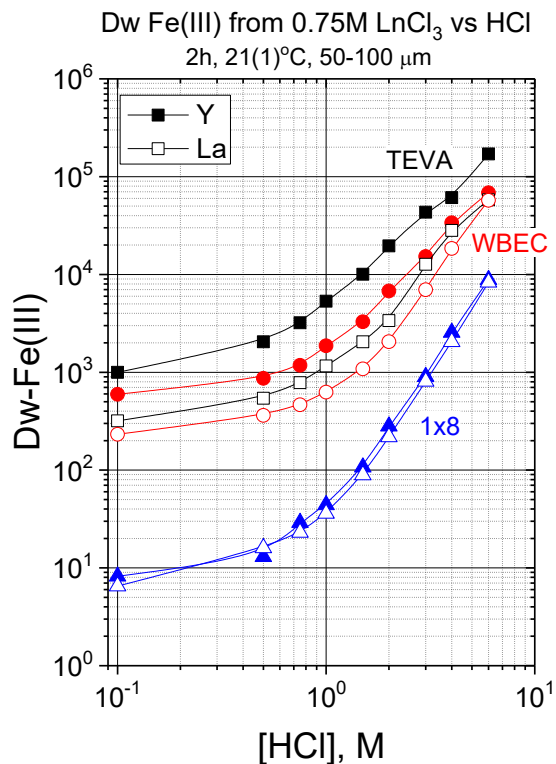
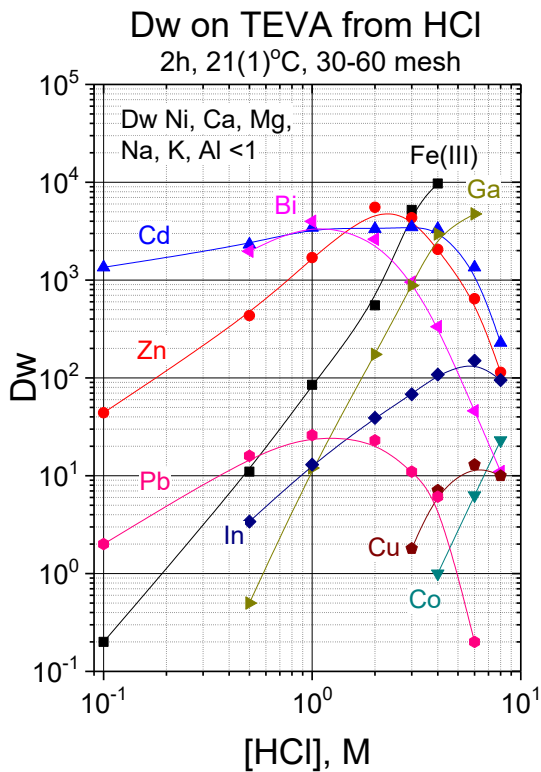
250 mL For 5 and 20 mL columns (AC-20X-20M)

Column Rack

15 hole for 2 mL columns (AC-103)

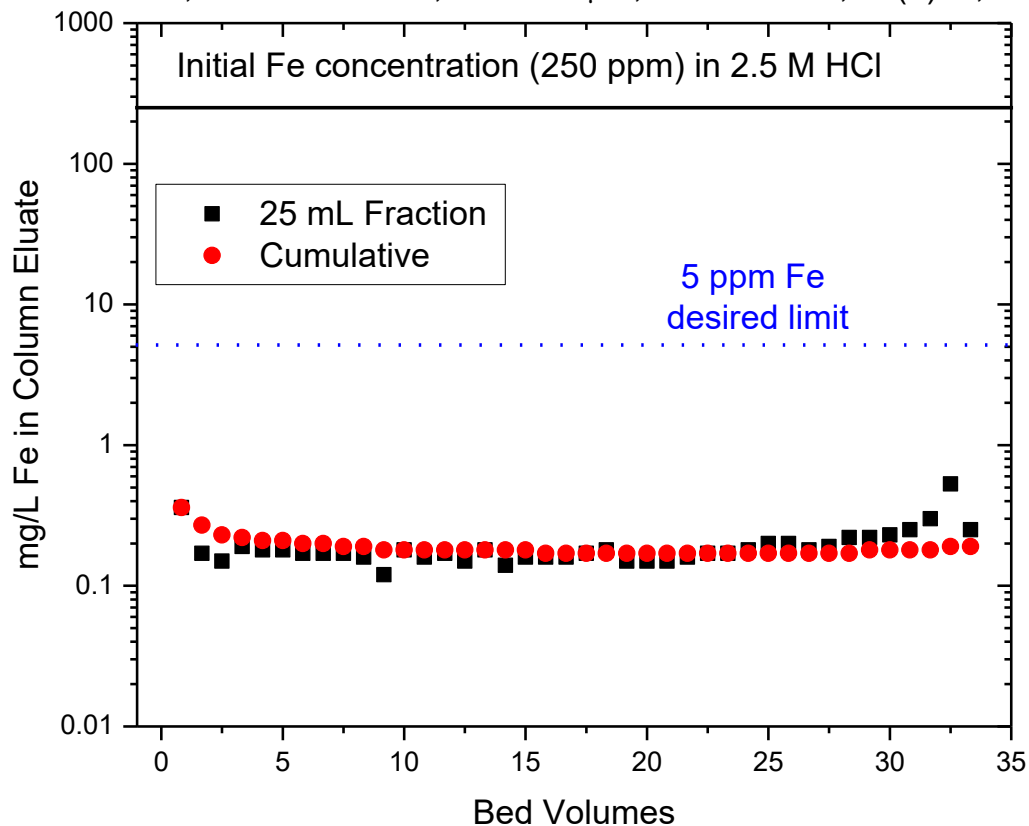
12 hole for 5 and 20 mL columns (AC-20M-RACK)

50 mL Centrifuge Tubes



Test of Fe Removal on Large Bead Resin

30mL column, 1.1 cm x 30 cm, 300-850 μm , TEVA XAD7, 18(1) $^{\circ}\text{C}$, 8mL/min



References

1) D.R. McAlister and E.P. Horwitz, unpublished data (2013).