

Fe Separation from Rare Earth Chlorides

Summary of Method Fe(III) is removed from rare earth chloride solutions by extraction of $[FeCl_4]^-$ 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

Fe(III) Separation on WBEC Resin

(1) Precondition WBEC column with 3 bed volumes of 2.5M HCl.

(2) Load Sample of rare earth chloride in $>0.1M$ HCl ($>2.25M$ total chloride).

(4) Rinse column with 5 bed volumes of 6M HCl.

(5) Strip Fe in reverse direction with 5 bed volumes of 0.10M HNO_3 to regenerate.



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)

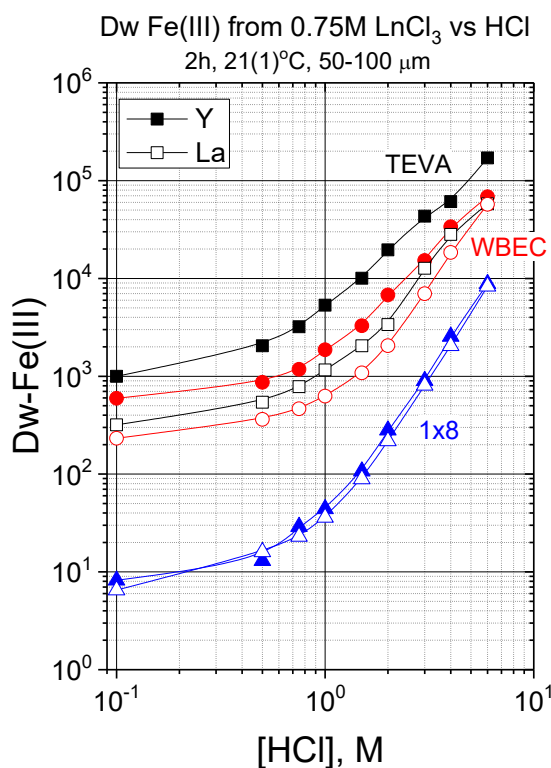
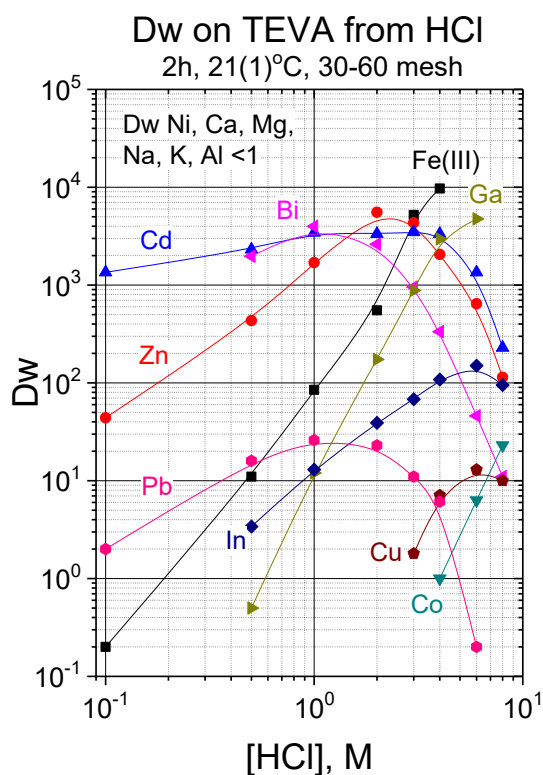
250 mL For 5 and 20 mL columns (AC-20X-20M)

Column Rack

15 hole for 2 mL columns (AC-103)

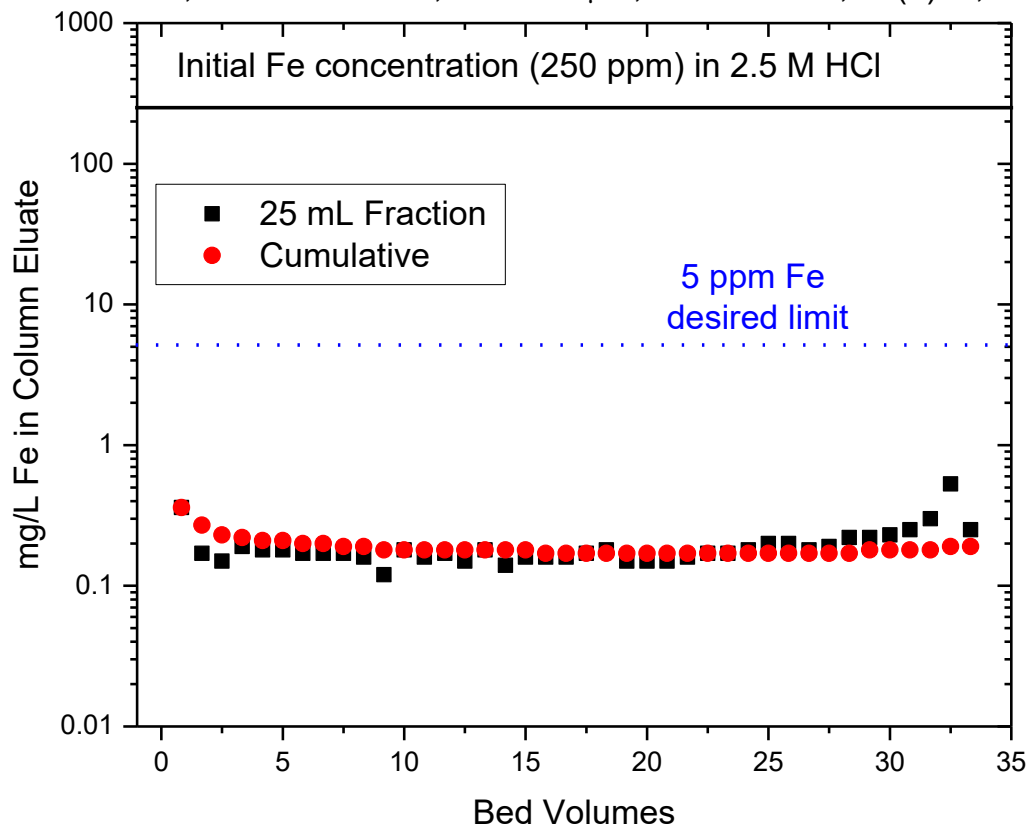
12 hole for 5 and 20 mL columns (AC-20M-RACK)

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1) D.R. McAlister and E.P. Horwitz, unpublished data (2013).