0.2 ml RE-Spec (50-100 mesh) Columns for Whole Rock Bulk REE Separations

Column Procedure:

1. clean resin	3 ml 0.05 N HNO_3
2. precondition column	3 ml 2 N HNO_3
3. load sample	dissolved in 0.2 ml 2 N HNO_3
4. wash	0.1 ml 2 N HNO_3
5. wash	0.1 ml 2 N HNO_3
6. wash	0.1 ml 2 N HNO_3
7. wash	0.5 ml 2 N HNO_3
8. wash	0.5 ml 2 N HNO_3
9. wash	1.0 ml 2 N HNO_3
10. wash	1.5 ml 2 N HNO_3
11. elute REE	4 ml warm* 0.05 N HNO_3

* use of warm acid helps overcome a kinetic effect which results in severe tailing of the REE when room temperature acid is used.

Resin Cleaning:

RE-Spec resin is a rare earth element selective extraction chromatographic material produced by EIChroM Industries, Darien, IL. We preclean the resin by placing an aliquot in a small Teflon bottle which is then filled with quartz-distilled water, shaken well, and placed on a hotplate set at around 50ºC overnight. The next day the water is decanted and the procedure is repeated ten times. Once the resin is ready for use, it is transferred to a dropper bottle where it is dispensed as needed. The resin in the columns is disposed of after every use.

For details on this resin, see:
Horwitz, E.P., Chiarizia, R., Dietz, M.L., and Diamond, H., 1993. Separation and preconcentration of actinides from acidic media by extraction chromatography. Anal. Chim. Acta, 281: 361-372. (note: this paper discusses TRU-Spec, an analogous extraction chromatographic material to RE-Spec, but with a lower ratio of CMPO/TBP)

Column Construction and Cleaning:

Start with 5.5 cm KORVEX 4 × ½ shrink tubing. Fit the shrink tubing over the end of a standard test tube with approximately 2.5 cm of the tubing extending beyond the end of the test tube. Shrink this portion of the tubing with a hot air gun as far as it will go. This will result in a column with an interior diameter of around 3.6 mm. Place a polystyrene frit in the end of the column and adjust it so that the volume of the column is 0.2 ml. The reservoir (the unshrunk portion of the column) has a volume of 3 ml.

After use, the columns are placed in a Teflon bottle which is then filled with clean water and placed on a hotplate at a low setting for a couple of days. After this, the water is decanted, the columns are rinsed, and 7 N HNO_3 is added to the bottle and placed back on the hotplate at a low setting for a couple more days. After this, the HNO_3 is decanted and the columns are rinsed with clean water and are ready for use.

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