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Title:	Sr Chemistry for Uranium Ore Concentrates
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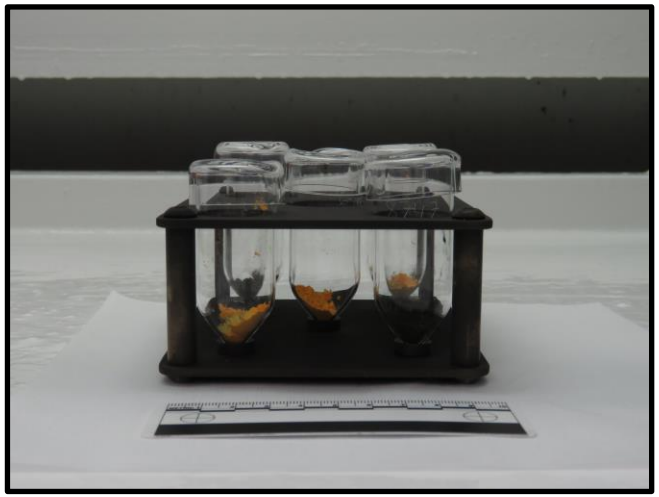
Sr Chemistry for Uranium Ore Concentrates

Jeremy D Inglis

JAEA - NSDD PA-13 U ORE/UOC JSA Technical Meeting – Dec 1st 2022

LA-UR-22-XXXXX

Aliquoting decisions & Ideal sample size?



U assay / isotope composition - < 1 mg

Trace Element (100mL @ 100 ppm U) – 20 mg

Th assay – (150 pg ^{230}Th) – 100 mg

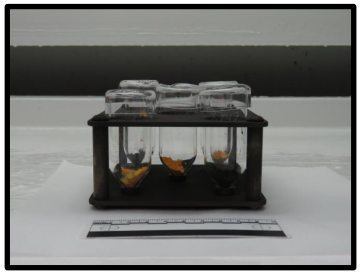
Sr, Nd, Sm, Pb - 100 mg

Oxygen Isotopes – 10-20 mg

Total: ~ 0.3g of powder minimum >1.0 g better

Sr Purification Overview

Weigh

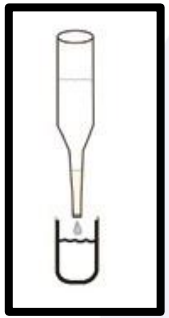


100 mg Aliquot

Dissolve

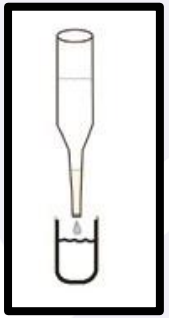
3 mL 10.5 M HCl
50 µL concHNO$_3$

Bulk Uranium Separation



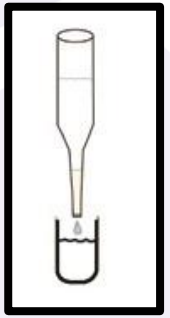
AG1-X8 Resin
100-200 mesh

Pb Separation



AG1-X8 Resin
100-200 mesh

Sr Separation



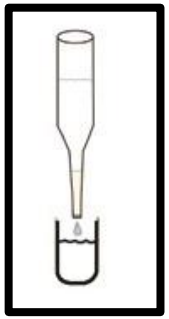
Sr Spec
100-150 size

**All acids are SeaStar grade - sub-boiling double distilled in quartz*

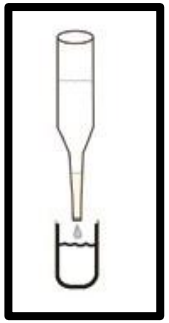
Bulk Uranium Separation

AG1-X8 Resin 100-200 mesh

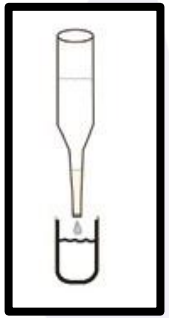
▪ *Aliquot ~100mg dissolved sample 3 mL 10.5 M HCl*



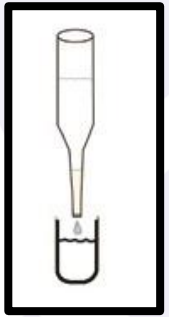
Prepare 2 mL BioRad Column



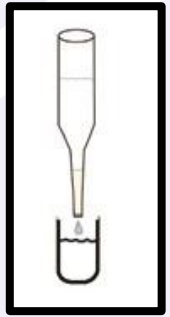
Condition 8 mL 10.5 M HCl



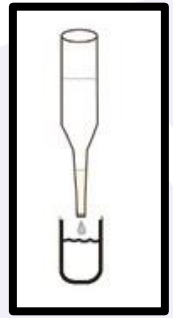
Load Sample 3 mL 10.5 M HCl



Rinse Vial & Load 1 mL 10.5 M HCl



Rinse Vial & Load 2 mL 10.5 M HCl

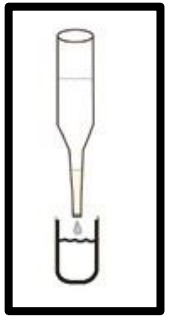


Wash 2 mL 10.5 M HCl

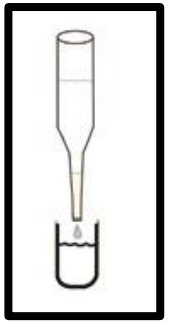
Pb Separation

AG1-X8 Resin 100-200 mesh

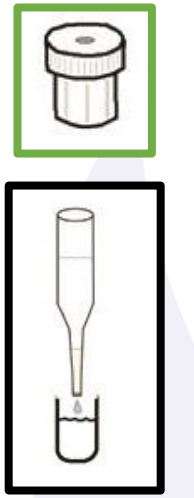
- *Dry down Pb Separation Wash Dissolve in 0.1 mL 4 M HNO_3*



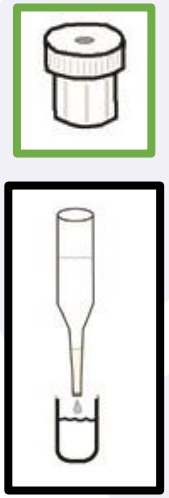
Prepare 0.3 mL Sr Spec Column



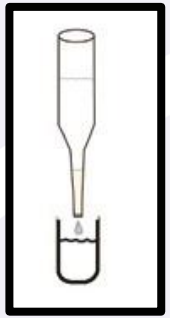
Clean 2 mL MilliQ Condition 2 mL 4 M HNO_3



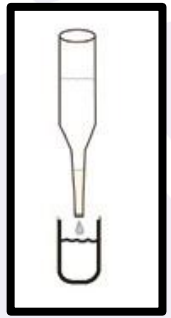
Load Sample 0.5 mL 4 M HNO_3



Rinse Vial & Load 0.5 mL 4 M HNO_3



Wash 1 mL 4 M HNO_3

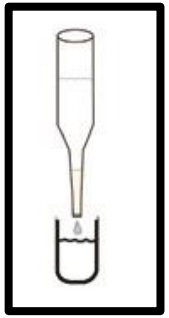


Collect 1.5 mL MilliQ

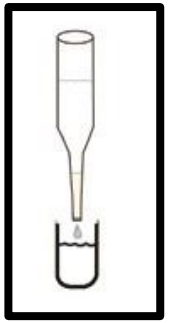
Sr Separation

Eichrom Sr-Spec 100-150 size

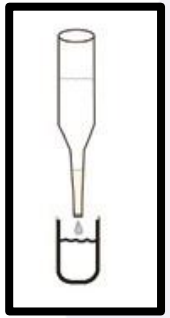
- *Dry down U Separation Wash Dissolve in 0.5 mL 1.8 M HCl*



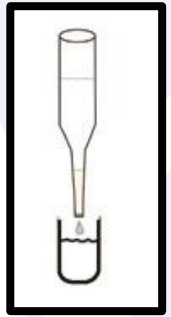
Prepare 1 mL BioRad Column



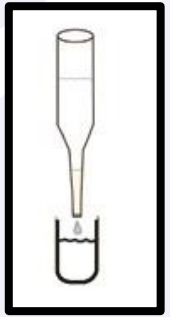
Condition 2 mL 6 M HCl



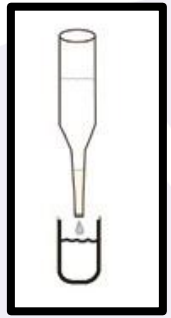
Condition 5 mL 1.8 M HCl



Load Sample 0.5 mL 1.8 M HCl



Rinse Vial & Load 1 mL 1.8 M HCl



Wash 2 mL 1.8 M HCl