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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

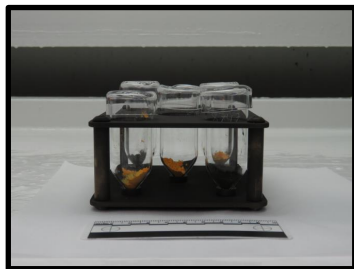
Sr, Nd, Sm, Pb - 100 mg

Oxygen Isotopes – 10-20 mg

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

Sr Purification Overview

Weigh



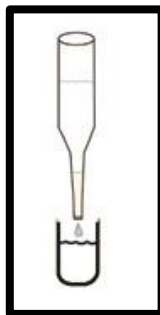
100 mg
Aliquot

Dissolve



3 mL 10.5 M HCl
50 μ L concHNO₃

Bulk Uranium
Separation



AG1-X8 Resin
100-200 mesh

Pb
Separation



AG1-X8 Resin
100-200 mesh

Sr
Separation



Sr Spec
100-150 size

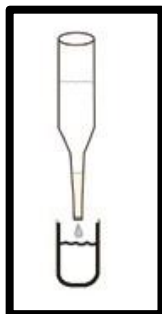
**All acids are SeaStar grade - sub-boiling
double distilled in quartz*

Bulk Uranium Separation

AG1-X8 Resin 100-200 mesh



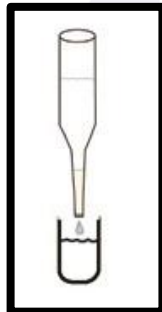
▪ Aliquot
~100mg
dissolved
sample 3 mL
10.5 M HCl



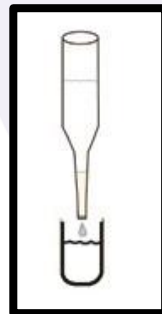
Prepare 2
mL BioRad
Column



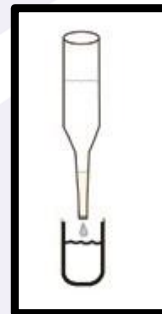
Condition
8 mL
10.5 M HCl



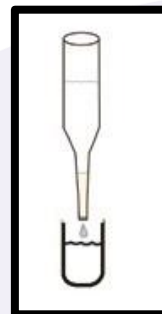
Load
Sample
3 mL
10.5 M HCl



Rinse Vial
& Load
1 mL
10.5 M HCl



Rinse Vial
& Load
2 mL
10.5 M HCl



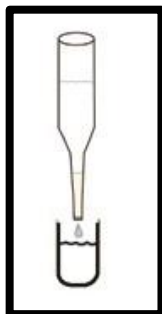
Wash
2 mL
10.5 M HCl

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



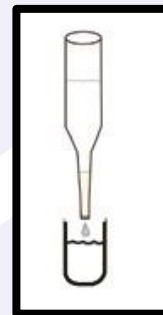
Clean
2 mL
MilliQ
Condition
2 mL
4 M HNO_3



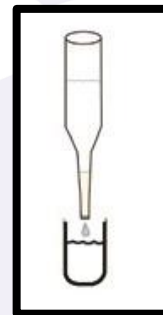
Load
Sample
0.5 mL
4 M HNO_3



Rinse Vial
& Load
0.5 mL
4 M HNO_3



Wash
1 mL
4 M HNO_3



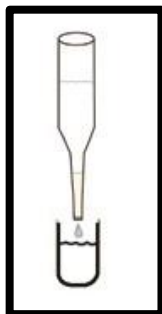
Collect
1.5 mL
MilliQ

Sr Separation

Eichrom Sr-Spec 100-150 size



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



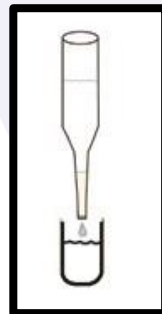
Prepare 1
mL BioRad
Column



Condition
2 mL
6 M HCl



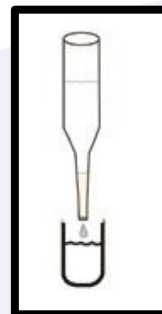
Condition
5 mL
1.8 M HCl



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