

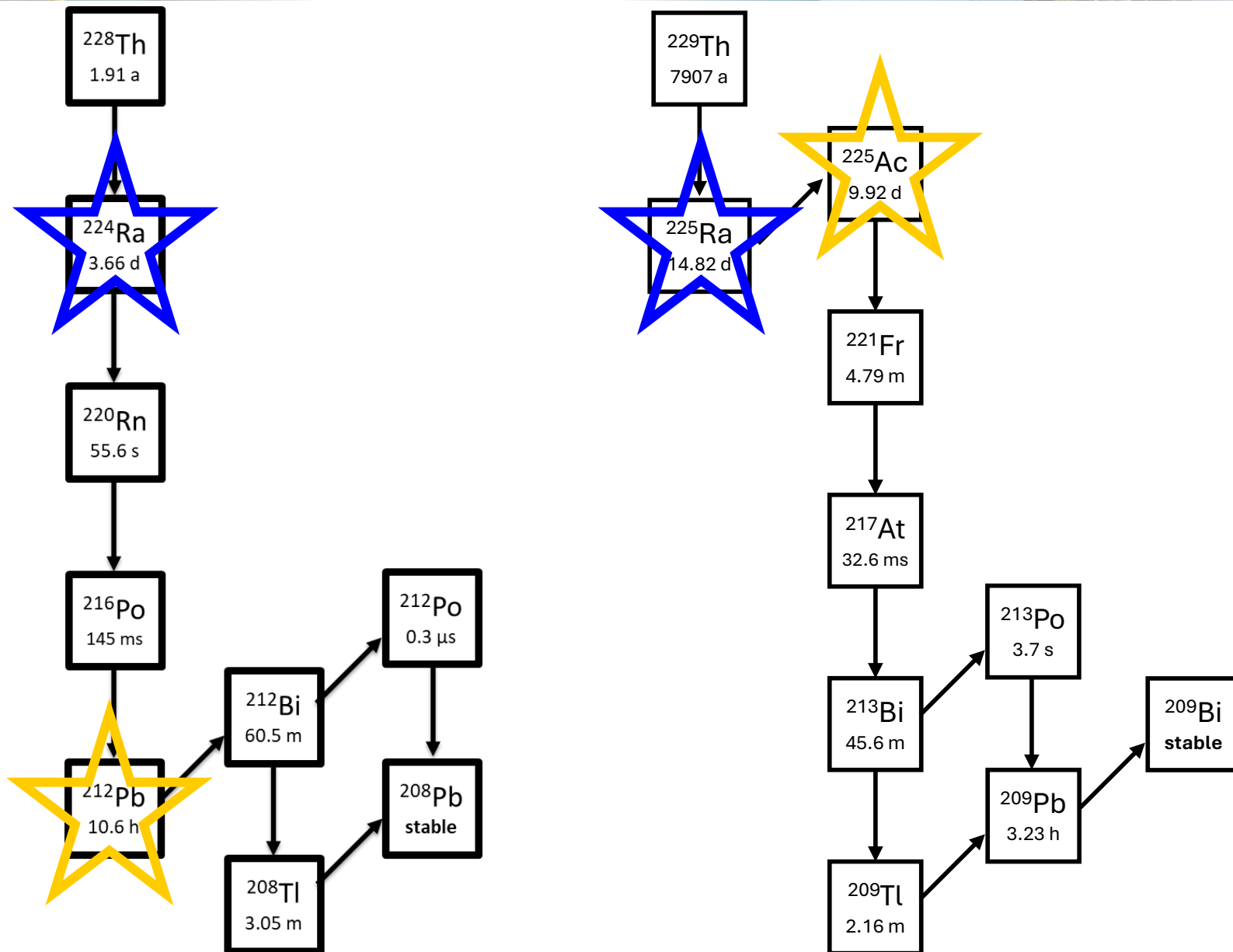
Preservation of Thorium Source Material in the Production of Radiol isotopes for Nuclear Medicine

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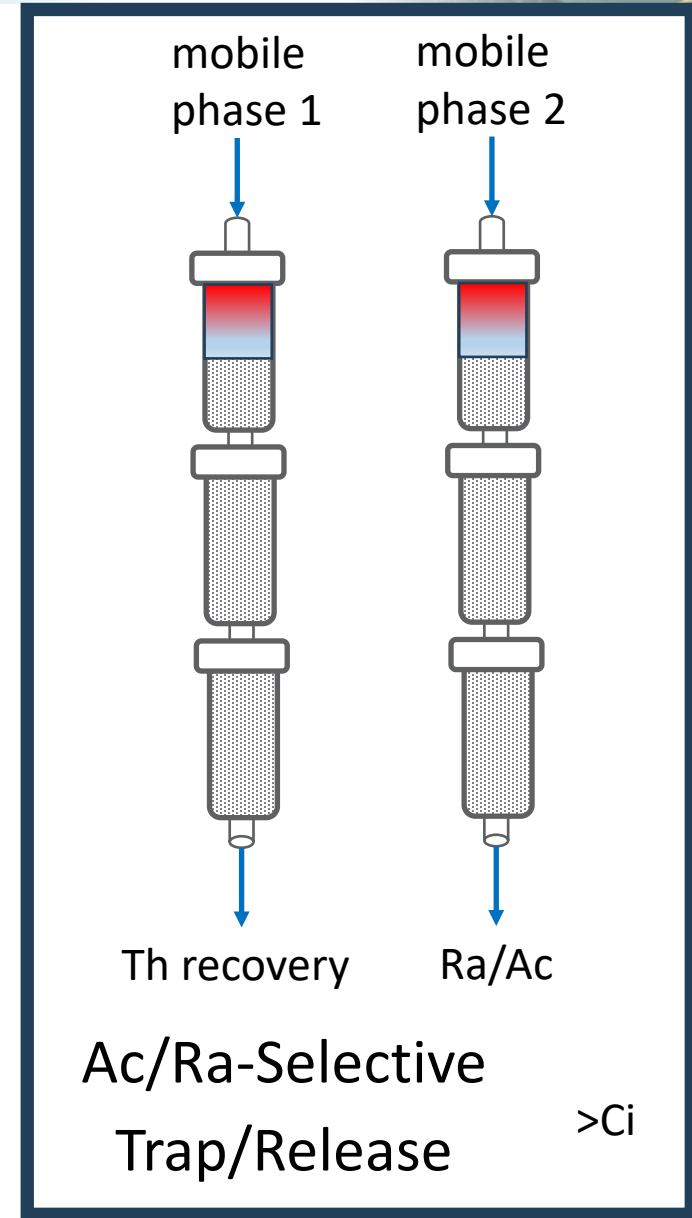
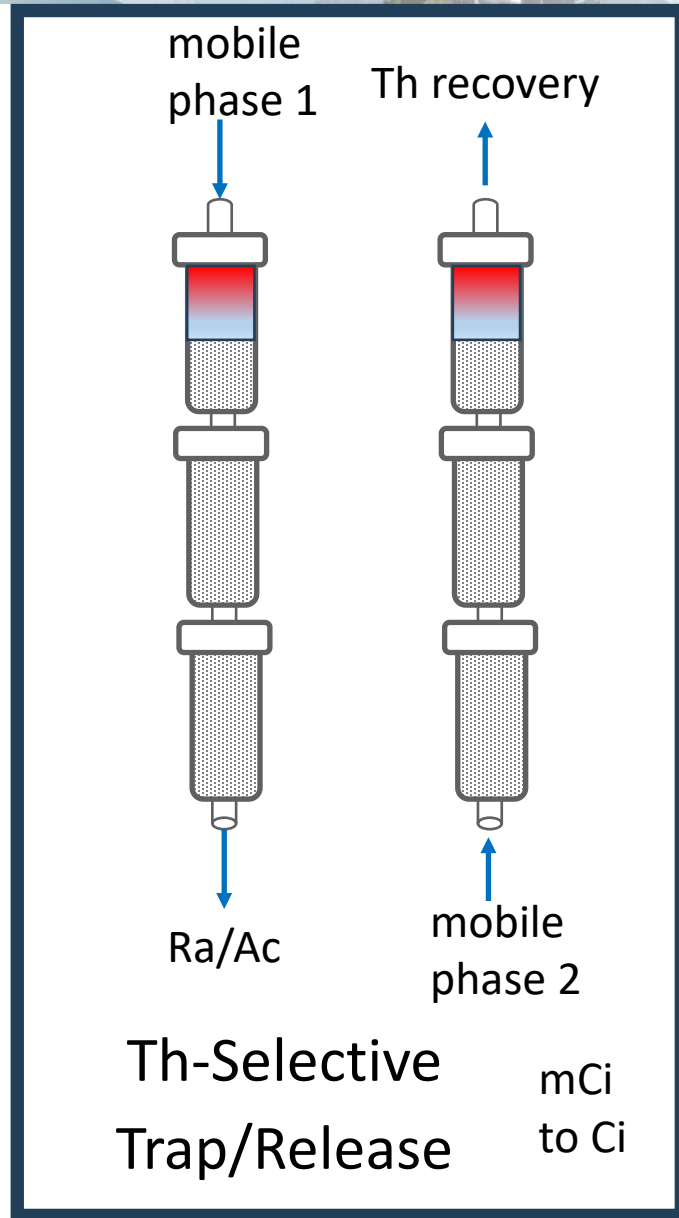
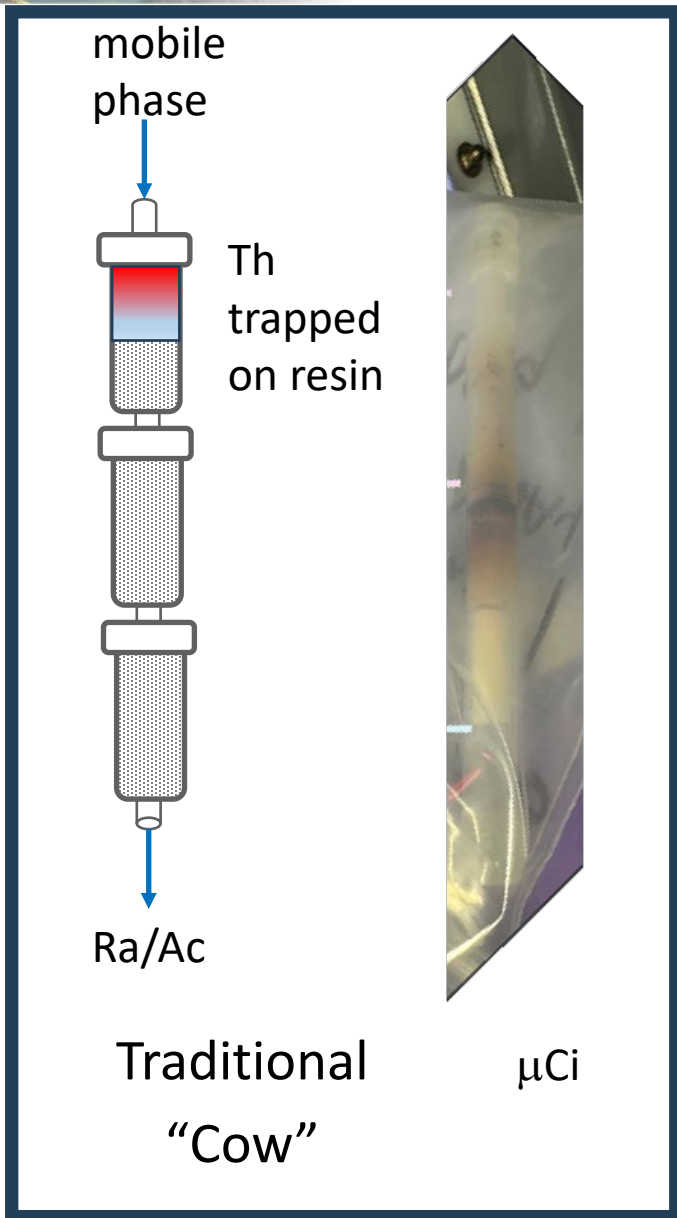
- 1) High purity Ra/Ac
- 2) Recover Th for future production. (>99.5%)

Choose materials and methods that will work at current scale

when process is performed correctly

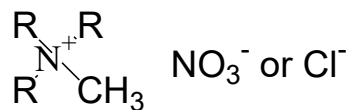
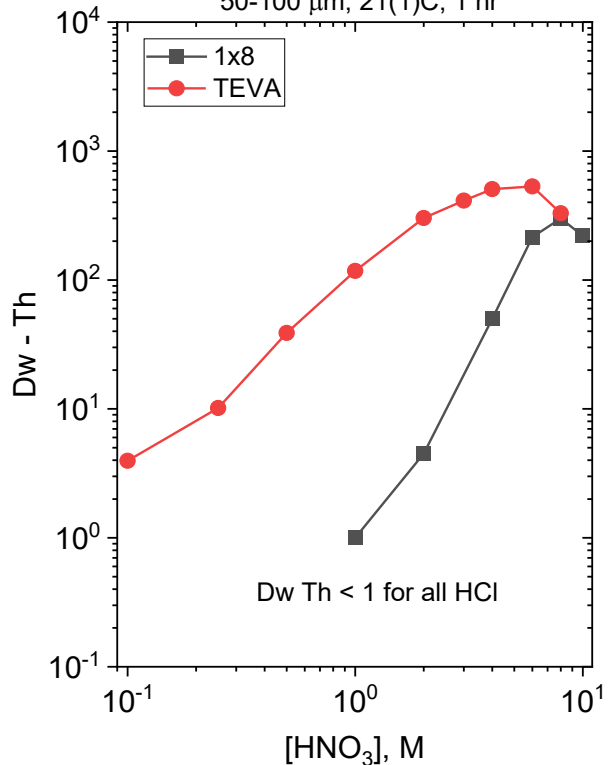
allow scaling to higher levels of radioactivity

Permit recovery of Th source material for all conceivable failure routes



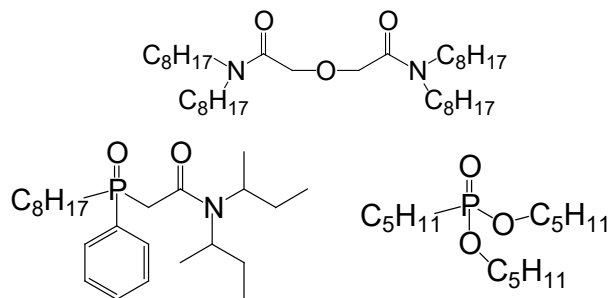
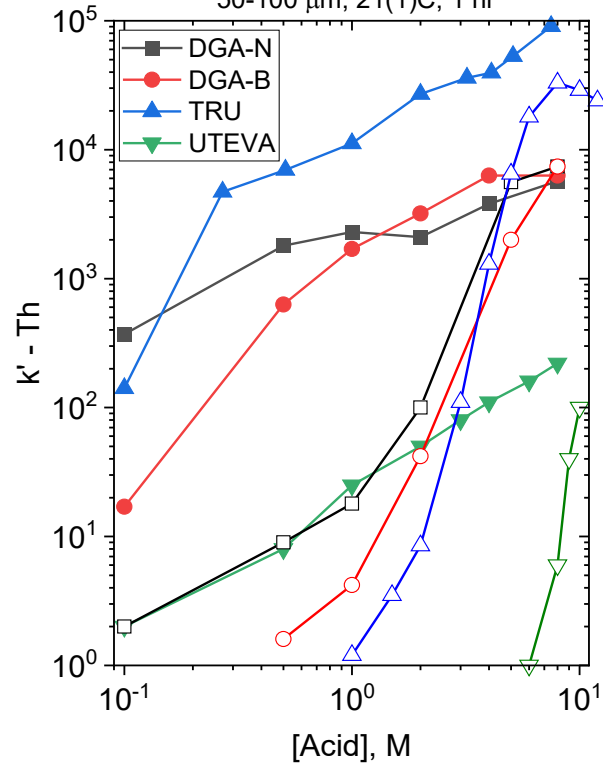
Dw Th on Anion Exchangers vs HNO₃

50-100 μm, 21(1)C, 1 hr



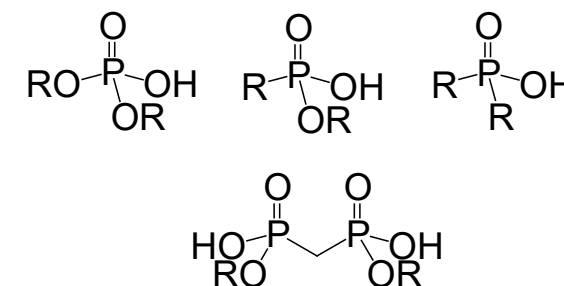
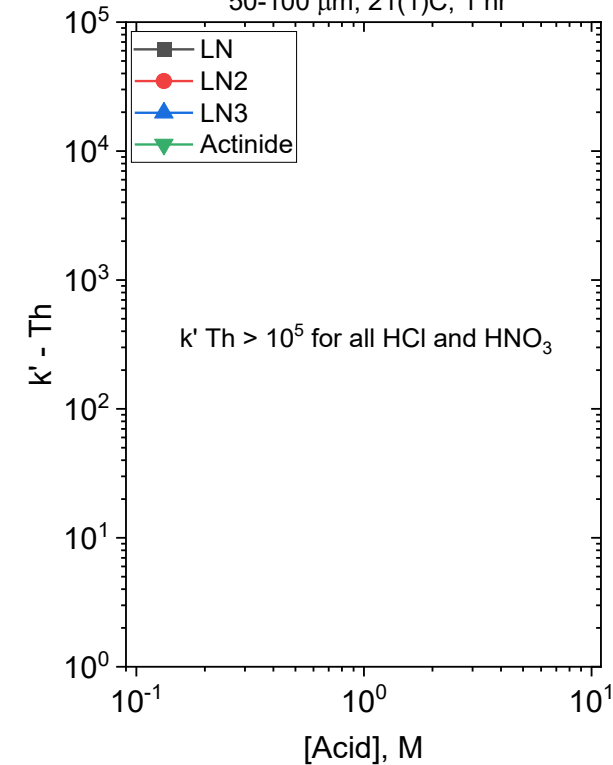
k' Th on Neutral/Solvating Resins

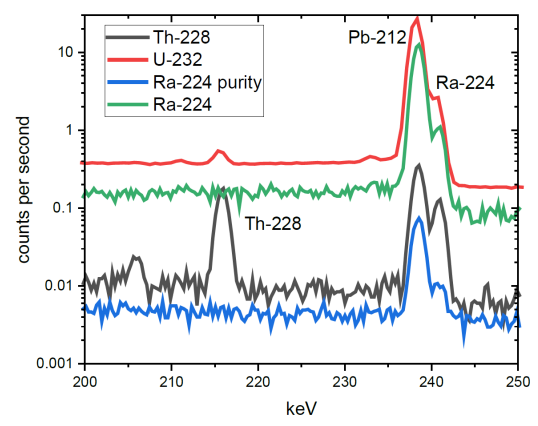
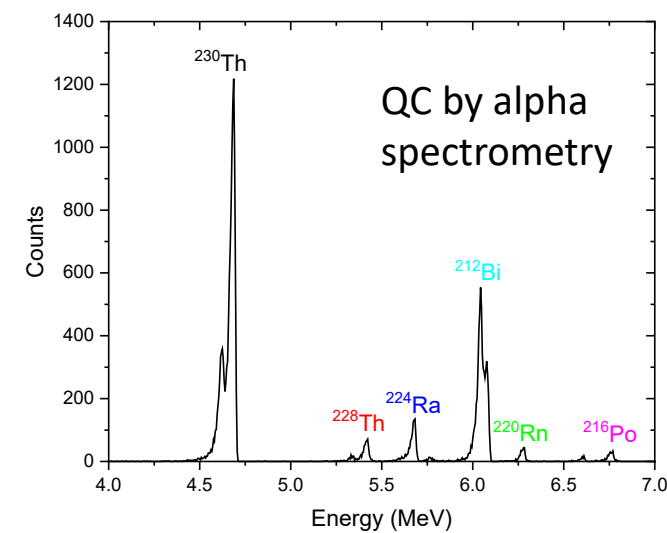
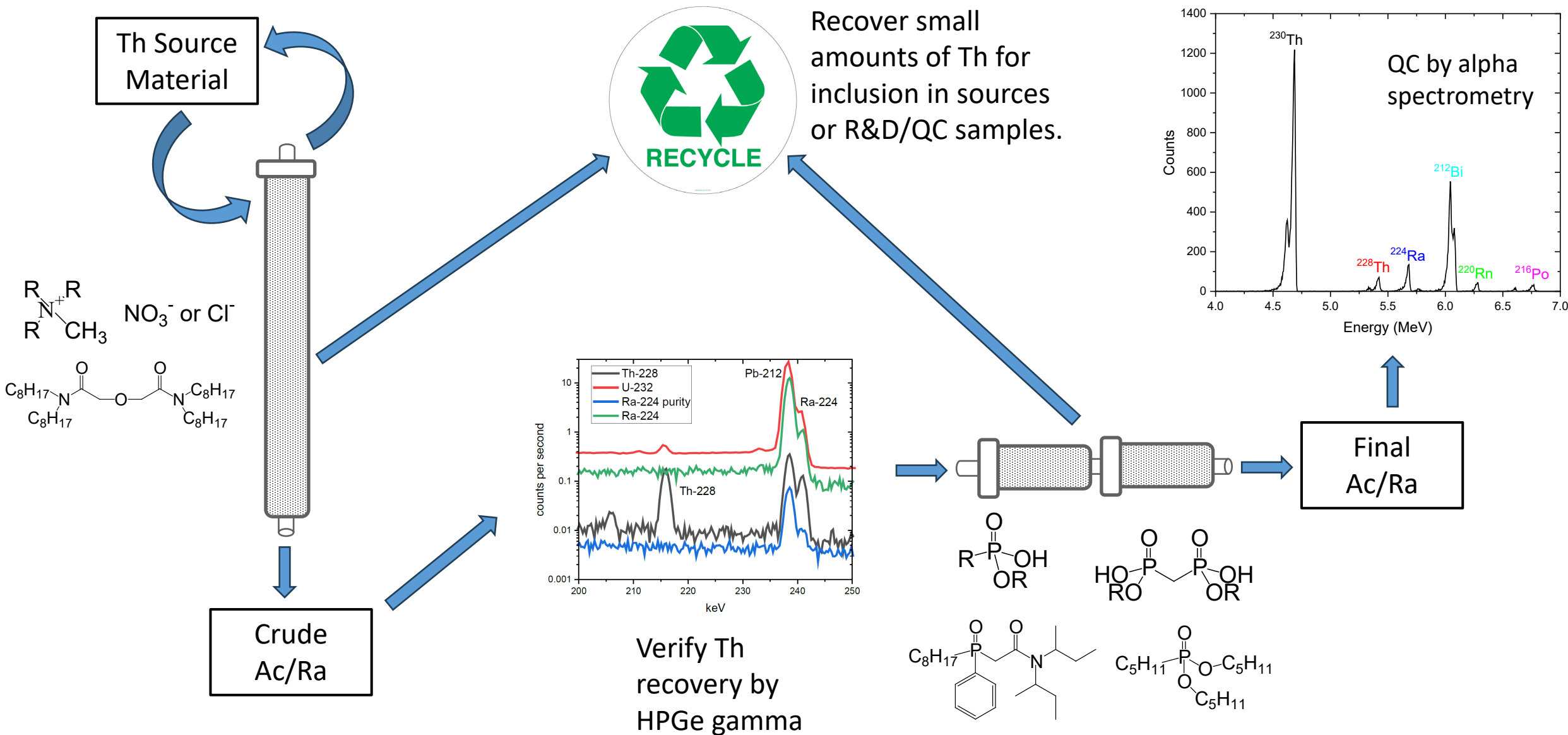
50-100 μm, 21(1)C, 1 hr

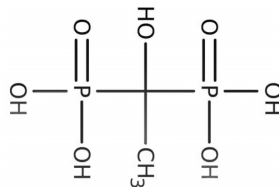
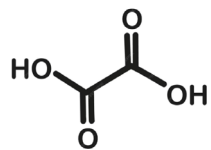


k' Th on Acidic organophosphorus Resins

50-100 μm, 21(1)C, 1 hr







Oxalic acid, phosphate-acids, and F- form strong complexes with Th(IV) improving recovery from resins.

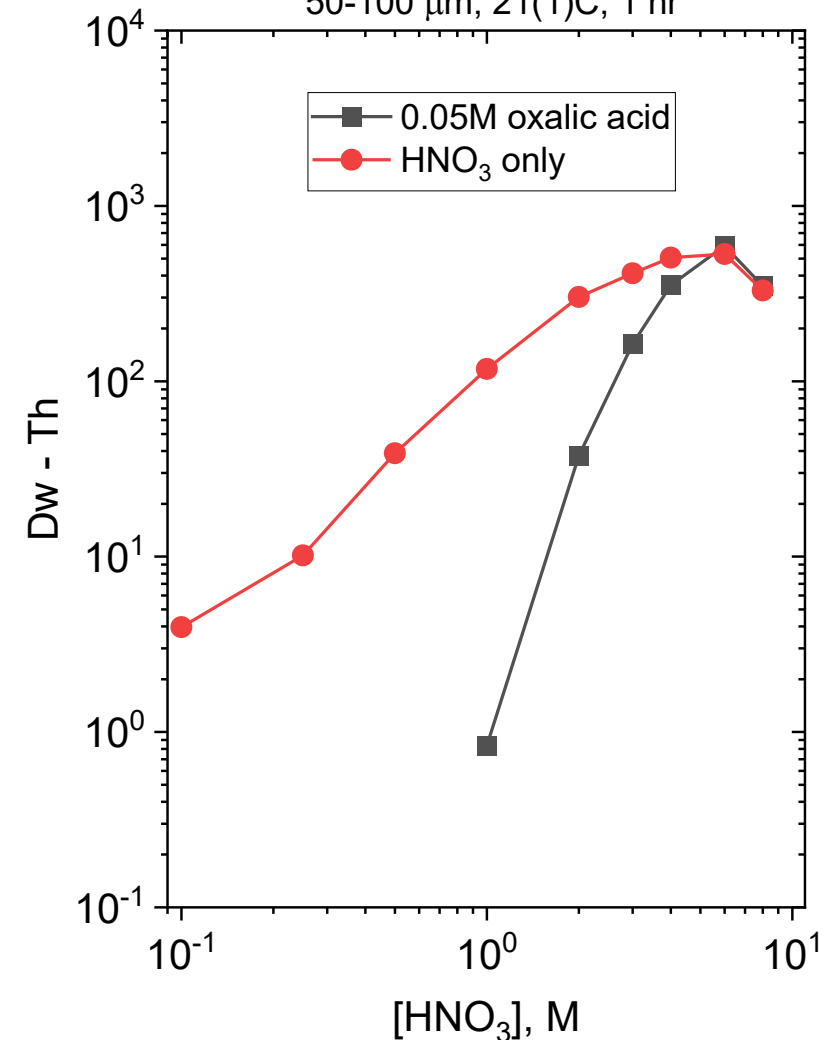
% Recovery of ^{228}Th from 0.25 mL cartridge with 20 mL mobile phase

Resin	0.1M bioxalate	0.05M HCl – 0.05M oxalic acid*	1M HEDPA
TEVA	> 99%	> 99%	> 99%
DGA	> 99%	> 99%	> 99%
TRU	> 99%	> 99%	> 99%
LN	83%	19%	> 99%
LN2	> 99%	81%	> 99%
LN3	98%	98%	> 99%
Actinide	< 1%	< 1%	70%

*HCl added to lower pH to improve solubility of Th/oxalate (^{229}Th)

Dw Th on TEVA Resin vs HNO_3

50-100 μm , 21(1)C, 1 hr



CHON based resins are lower risk for catastrophic Th loss.

Recovery with oxalic acid or oxalic acid-HCl can preserve Th source material or recover from CHON resins after errors.

Source management, resin selection, and rapid QC analysis can minimize risk to Th source material.

10:30 - 10:40

Rapid Quantification of ^{228}Th and ^{224}Ra in ^{224}Ra and ^{212}Pb Isotope Products

Madeleine Eddy

Phosphorus containing resins could be considered for additional Th removal during polishing steps of Ac or Ra, once it is confirmed that the bulk of Th has already been removed/recovered.

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14-15-16
APRIL
2026

RIO DE JANEIRO
BRAZIL

WINDSOR BARRA
CONVENTION CENTER

Obrigado

Danke

ありがとう

Thank you

Grazie

Merci

Gracias

谢谢