

# Development of a Rapid Method for Po, Th, and U Analysis in Hydraulic Fracturing Flowback Water

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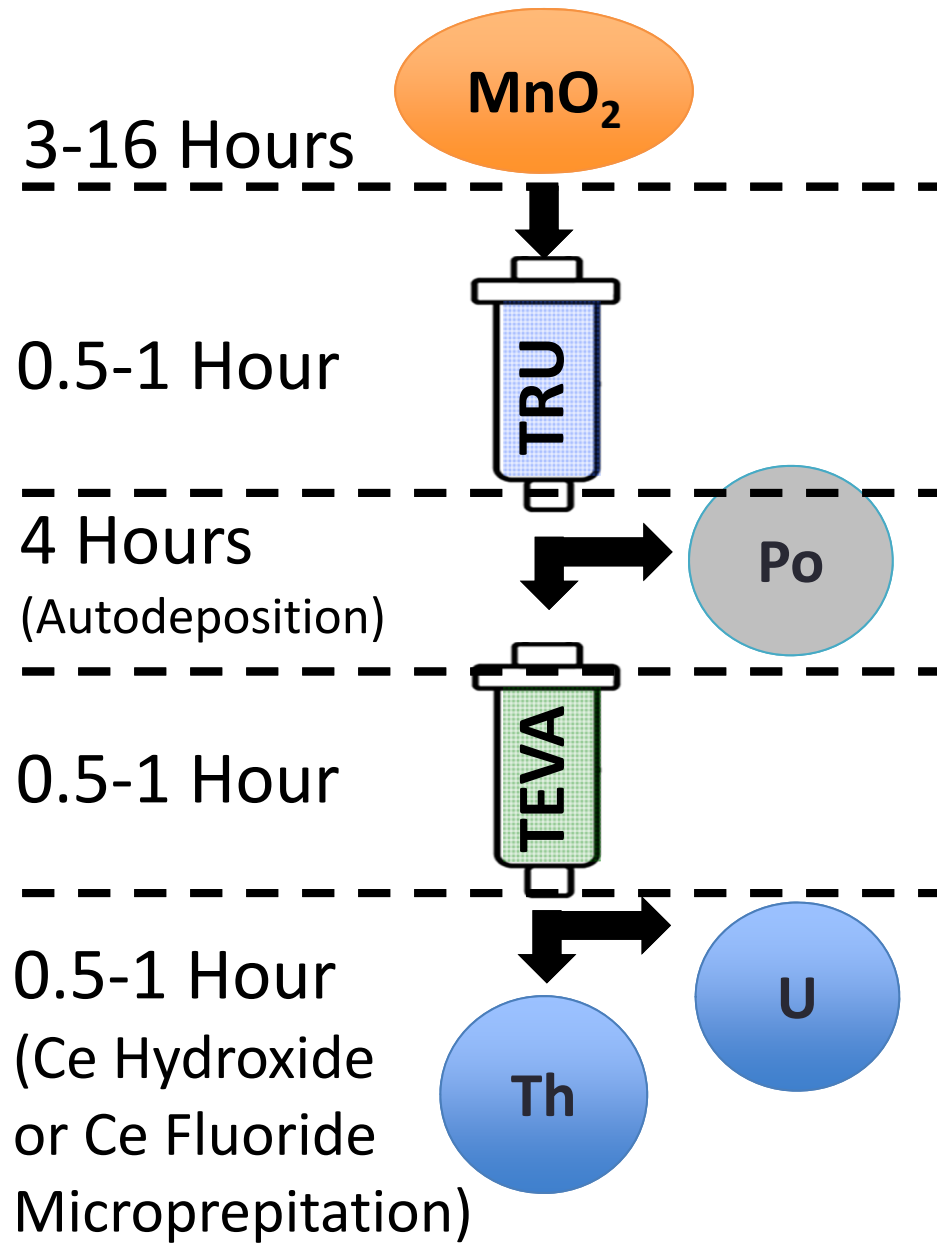
University of Iowa, Iowa City

# Chemical Matrix

Specie	Concentration (mg/L)
<b>Chloride (Cl)</b>	<b>146667</b>
<b>Strontium (Sr)</b>	<b>36333</b>
Sodium (Na)	29333
<b>Calcium (Ca)</b>	<b>13000</b>
<b>Barium (Ba)</b>	<b>9000</b>
<b>Magnesium (Mg)</b>	<b>853</b>
Potassium (K)	163
Manganese (Mn)	3
<b>Iron (Fe)</b>	<b>43</b>
Lead (Pb)	1
Total Solids (TS)	277666
Total Suspended Solids (TSS)	783
Gasoline	1
Mineral Spirits	LOD
Kerosene	<1
Diesel Fuel	1
Motor Oil	LOD
Total extractable hydrocarbons (TEH)	2

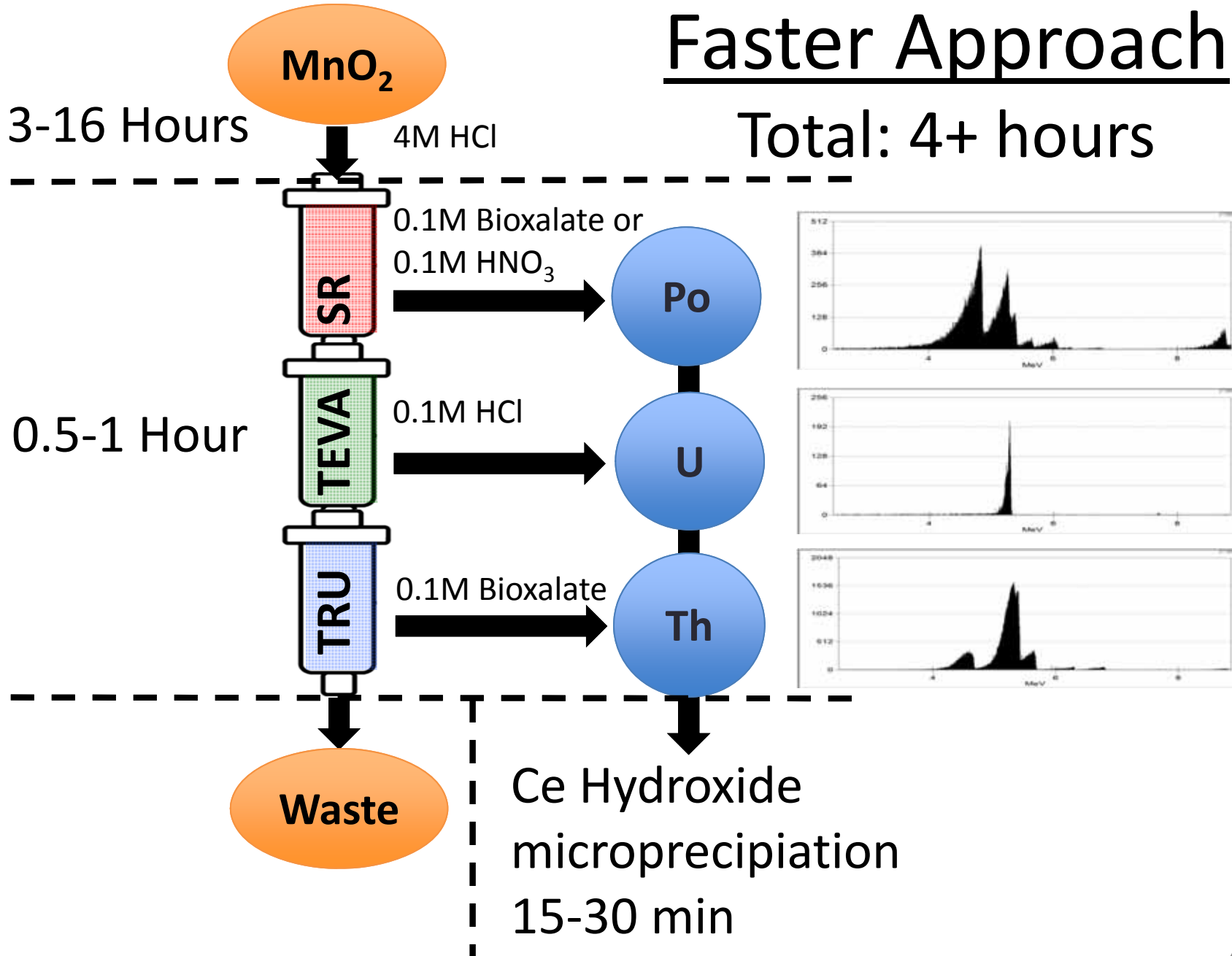


Current  
Approach  
Slow  
Total=1-2 days

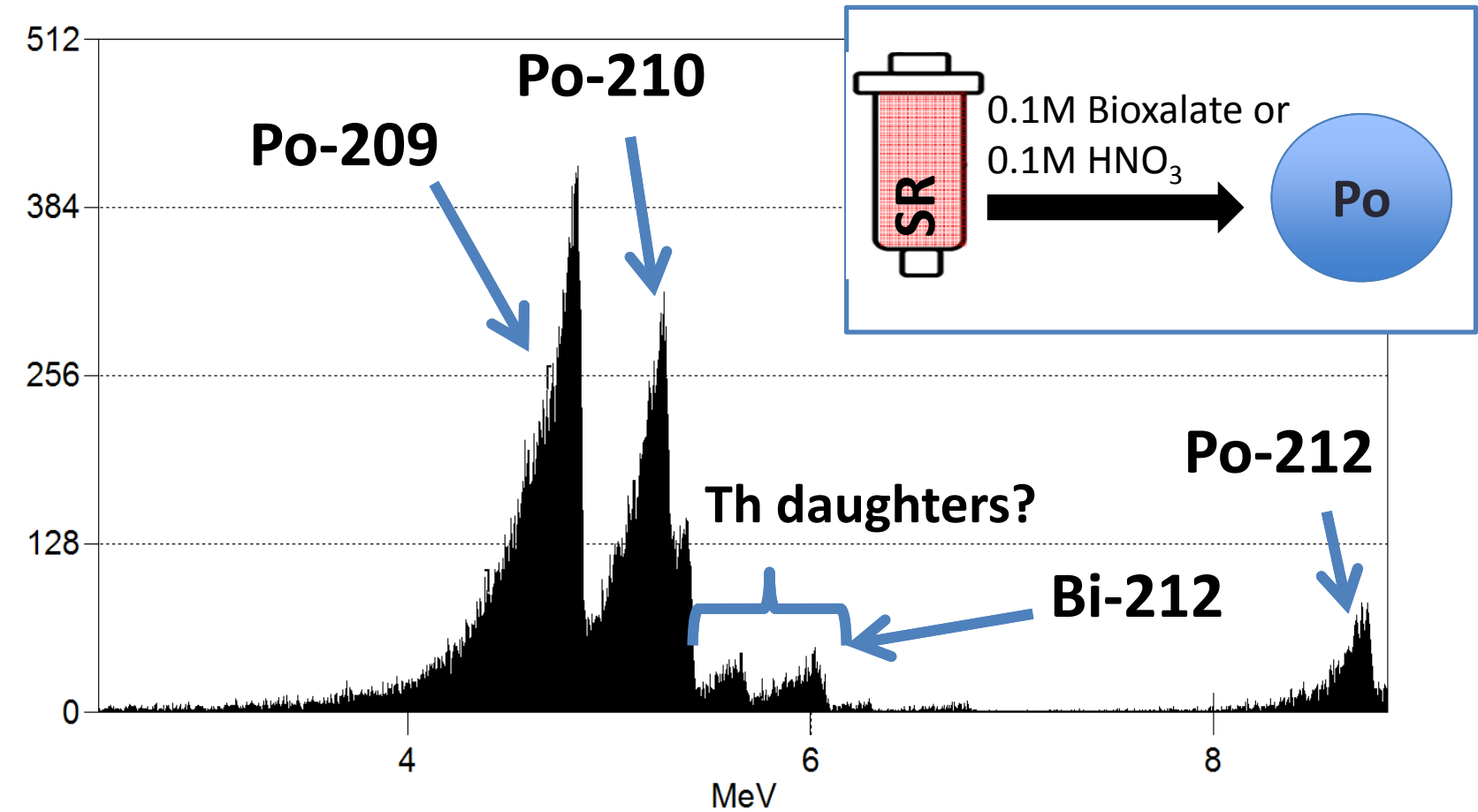


# Faster Approach

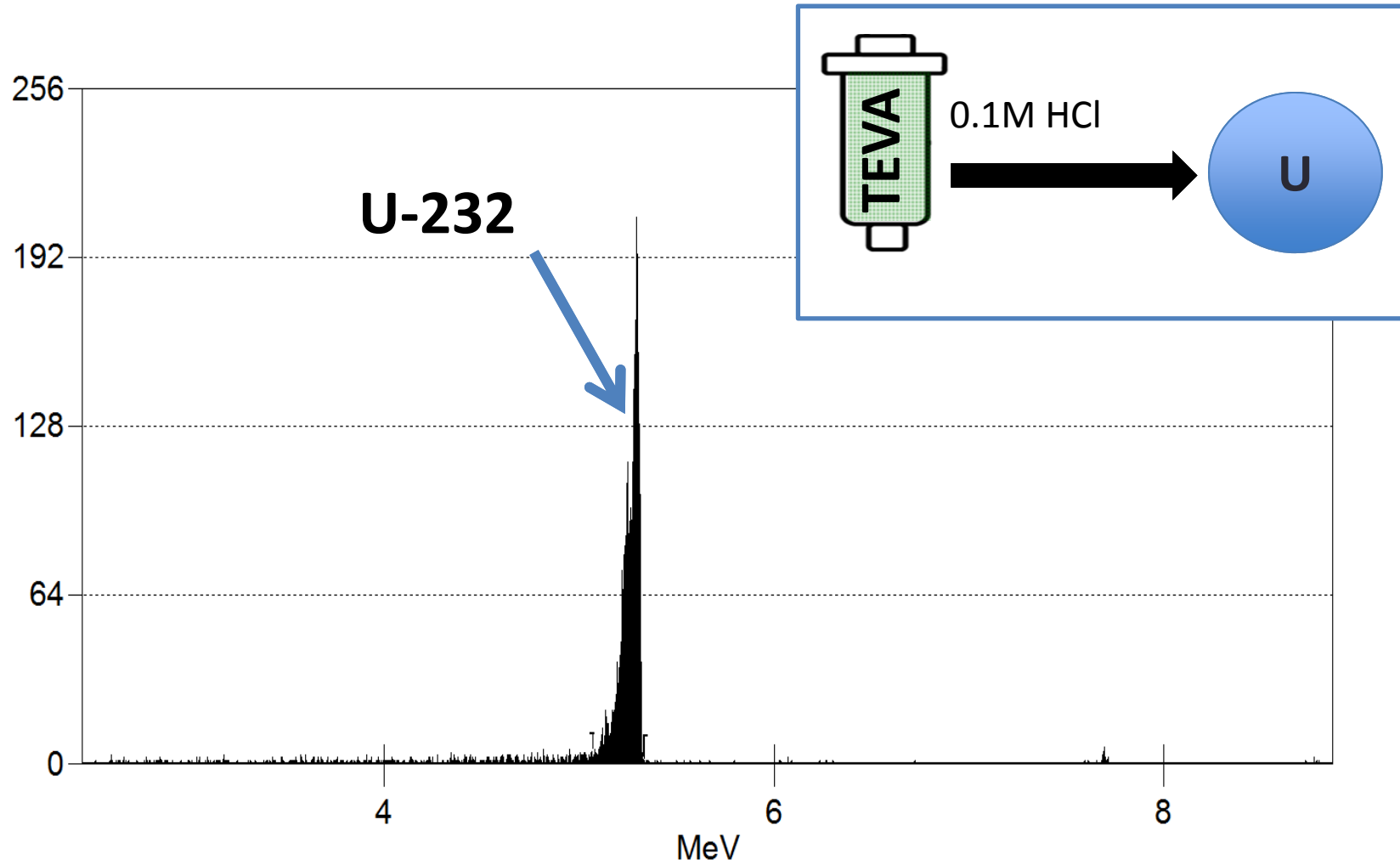
Total: 4+ hours



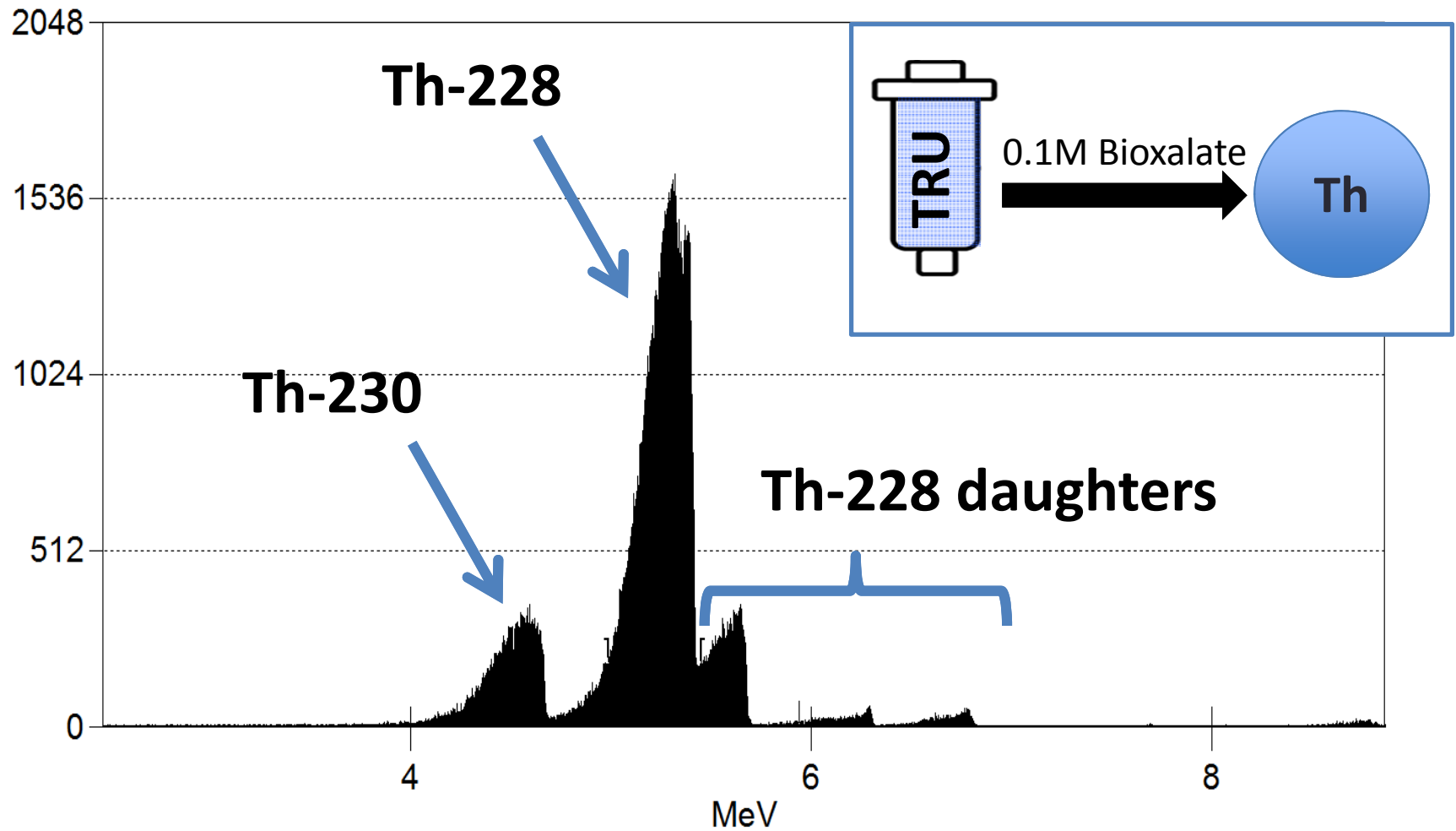
# Polonium Recovery $\geq 100\%$



# Uranium Recovery $\approx 13\%$



# Thorium Recovery $\approx 85\%$



# Discussion

- Reconsider preconcentration technique?
- Uranium recovery from matrix interference?
  - Carbonates?
- Is there a more robust resin for U, Th, Po?
  - Improve resolution of  $\text{Ce}(\text{OH})_3$  precip for Po?



# Thank You!

- **State Hygienic Laboratory at Ulowa**
  - Marinea Mehrhoff
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  - Dr. Michael K Schultz
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  - Andrew Knight
- **Environmental Management Solutions**
  - Robert Shannon
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