

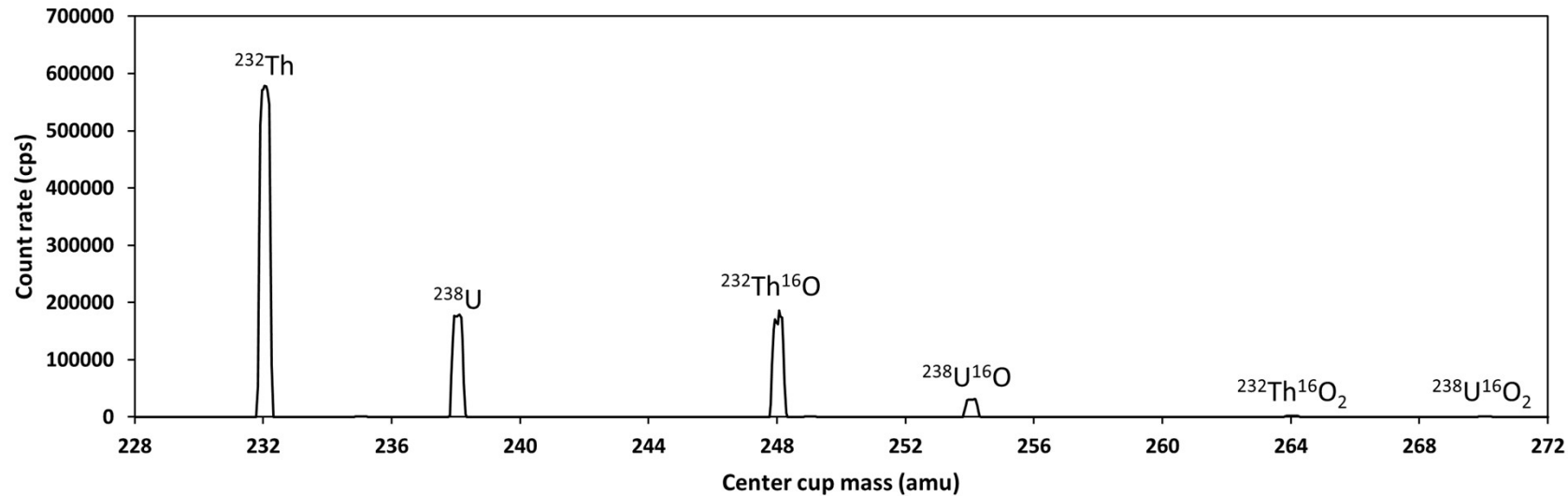
PNNL-SA-196058

Supplementary File: Uranium isotopic analysis in unpurified solutions by ICP-MS

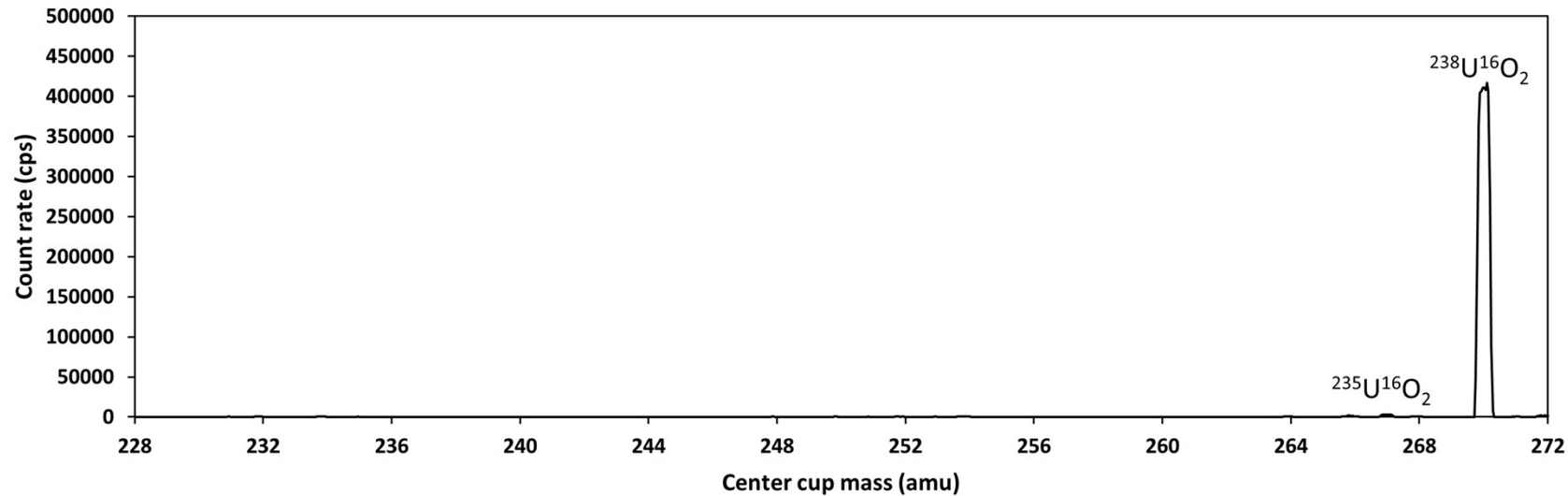
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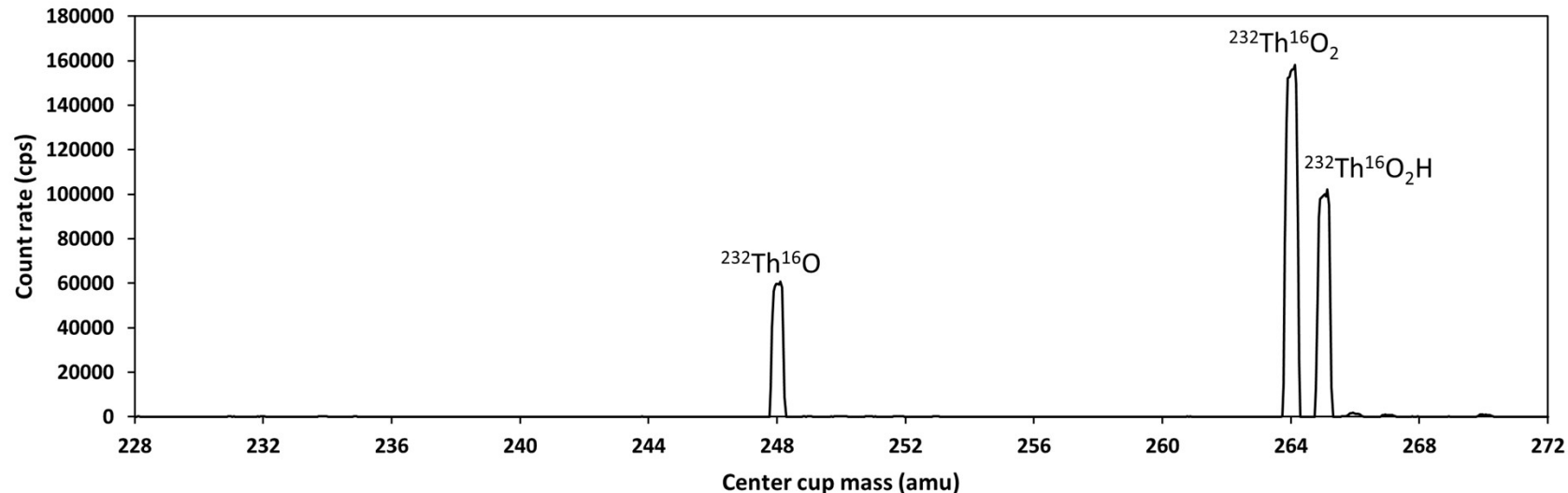
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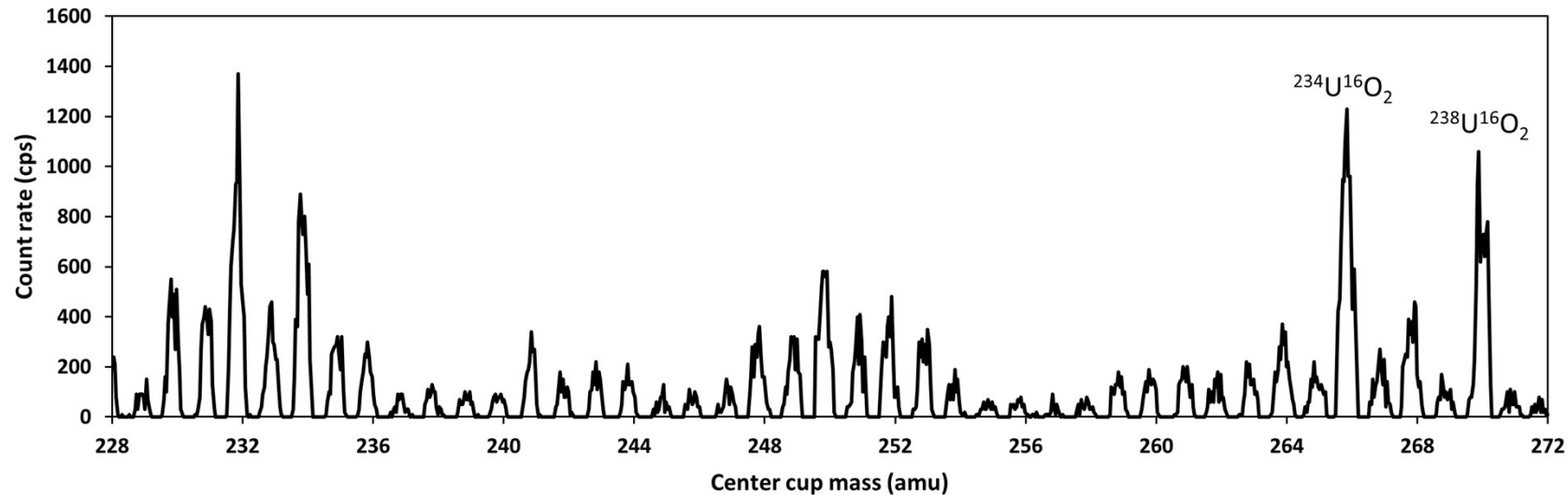
Supplementary Figure 1. Mass scan in the NIST SRM2780a digest (diluted to provide ~ 100 ppt U) from 228 amu to 272 amu without any gas in the collision/reaction cell. The relevant peaks are labeled.



Supplementary Figure 2. Mass scan of a High Purity Standards Uranium standard solution at a concentration of 100 ppt U from 228 amu to 272 amu with O_2 in the collision/reaction cell at a flow rate of 0.05 ml/min. The pre-filter magnetic field was set to 60 % with the pre-filter slit 50 % open. Uranium is efficiently converted to a double oxide species.



Supplementary Figure 3. Mass scan of a High Purity Standards Thorium standard solution at a concentration of 100 ppt Th from 228 amu to 272 amu with O_2 in the collision/reaction cell at a flow rate of 0.05 ml/min. The pre-filter magnetic field was set to 60 % with the pre-filter slit 50 % open. Thorium is primarily converted to a double oxide species, although some single oxide Th is present. The Th double oxide hydride (265 amu) is also a dominant peak, in addition to potentially double (266 amu) or triple hydrides (267 amu). Thus, the presence of thorium in an unpurified sample precludes the analysis of uranium isotopes as double oxides.



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Supplementary Figure 4. Mass scan of a clean blank 2 % HNO_3 solution from 228 amu to 272 amu with O_2 in the collision/reaction cell at a flow rate of 0.05 ml/min. Note the high background counts across the entire mass spectrum. The labeled uranium peaks show the positions of those masses and the overlapping background, especially problematic for ^{234}U analysis.