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A sample preparation method for extracting plutonium from soil samples for AMS measurement

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Plutonium (Pu) is recognized as an essential environmental indicator isotope. The purpose of this investigation is to devise a protocol for extracting plutonium from soil samples, aimed at Accelerator Mass Spectrometry (AMS) analysis. The procedure initiates with the purification and ashing of samples, followed by the integration of the standard reference material ^{242}Pu before proceeding to acid dissolution. Subsequent to the matrix element reduction via $\text{Fe}(\text{OH})_3$ co-precipitation, NaNO_2 is administered to stabilize the oxidation state of plutonium at Pu(IV). Further purification and separation of plutonium are achieved through TEVA resin application. The resultant eluate is then dried, re-acidified, and subjected to another round of $\text{Fe}(\text{OH})_3$ co-precipitation. The final precipitate is calcined to yield an iron oxide matrix embedding PuO , which is then mixed with niobium powder and pressed into the cathodes for AMS measurement.

Student Submission

Yes

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