Extraction and Determination of Thorium and its Application on Geologic Samples using Trioctyl Phosphine Oxide

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Abstract

The extraction of thorium from aqueous solution was studied using the organic extractant trioctyl phosphine oxide (TOPO) dissolved in cyclohexane. The parameters affecting the extraction, determination and stripping of Th (IV) included type of extractant, shaking time, extractant concentration, pH, aqueous to organic phase ratio (A/O), temperature, certain interfering ions and stripping agents. Best results were at 0.08M TOPO, pH 1, 2:1 A/O, shaking time 4 min. at 22±1°C. The best factors for stripping process were 2M H_2SO_4, 4:1 A/O, shaking time 4 min. at 22±1°C. The factors studied were followed by application of the extraction system to extract and determine thorium content from certified reference samples and geologic samples collected from South Eastern Desert, Egypt. Also thorium was separated in a laboratory scale from a representative sample of the geologic comprised six samples in a pure state as thorium oxide. Statistics were performed to evaluate the importance of the data collected and therefore set limitations on each step of the analysis. The final results indicate that the method has high precision and accuracy in addition to be fast and of selective manner.

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