



Designation: **C1284 – 10 C1284 – 18**

Standard Practice for Electrodeposition of the Actinides for Alpha Spectrometry¹

This standard is issued under the fixed designation C1284; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the preparation of separated actinide fractions for alpha spectrometry measurement.² It is applicable to any of the actinides that can be dissolved in dilute ammonium sulfate solution. Examples of applicable actinide fractions would be the final an elution from an ion exchange / extraction chromatography separation or the final strip from a solvent extraction separation.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*³

[C859 Terminology Relating to Nuclear Materials](#)

[C1163 Practice for Mounting Actinides for Alpha Spectrometry Using Neodymium Fluoride](#)

[D1193 Specification for Reagent Water](#)

3. Terminology

3.1 Except as otherwise defined herein, definitions of terms are as given in Terminology [C859](#).

4. Summary of Practice

4.1 Guidance is provided for the electrodeposition of separated actinide fractions onto metal discs. This practice is based on cathodic deposition of the hydrated oxides of the actinides from an acidic medium containing an ammonium salt. The resultant electrodeposited samples are suitable for alpha spectrometry measurements.

5. Significance and Use

5.1 The determination of actinide elements by alpha spectrometry measurement is an essential part of many environmental research, bioassay, and monitoring programs. Alpha spectrometry measurements identify and quantify the alpha-emitting actinide elements. A variety of separation methods will typically precede the electrodeposition of a sample for alpha spectrometry measurements. In addition to the electrodeposition procedure presented in this practice, the scientific literature contains other procedures for actinide electrodeposition.

NOTE 1—An alternate method for mounting actinides for alpha spectrometry measurements by coprecipitation with neodymium fluoride is described in Practice [C1163](#).

¹ This practice is under the jurisdiction of ASTM Committee [C26](#) on Nuclear Fuel Cycle and is the direct responsibility of Subcommittee [C26.05](#) on Methods of Test. Current edition approved June 1, 2010/June 1, 2018. Published July 2010/July 2018. Originally approved in 1994. Last previous edition approved in 2005/2010 as [C1284 – 00 \(2005\)](#)/C1284 – 10. DOI: [10.1520/C1284-10](#)/10.1520/C1284-18.

² Based on Talvitie, N. A., "Electrodeposition of Actinides for Alpha Spectrometric Determination," *Analytical Chemistry*, Vol 44, 1972, pp. 280–283.

³ For referenced ASTM standards, visit the ASTM website, [www.astm.org](#), or contact ASTM Customer Service at [service@astm.org](#). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.