



Standard Practice for Sample Preparation for X-Ray Emission Spectrometric Analysis of Uranium in Ores Using the Glass Fusion or Pressed Powder Method¹

This standard is issued under the fixed designation C 1110; 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 uranium ore samples to be analyzed by X-ray emission. Two separate techniques, the glass fusion method or the pressed powder method, may be used.

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 problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E 50 Practices for Apparatus, Reagents, and Safety Considerations for Chemical Analysis of Metals, Ores, and Related Materials

E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

3. Terminology

3.1 *Definitions:* Refer to Terminology **E 135** for terms used in this practice.

4. Summary of Practice

4.1 Two types of specimen preparation methods are offered. These are the glass fusion technique and the pressed powder technique. The glass fusion specimens are fused and cast into disks in a platinum-gold alloy crucible in the presence of an oxidizing agent at a preset temperature and time. The pressed powder specimens are ground in a mill to a specified particle

size and briquetted into a solid specimen possessing a flat homogeneous surface to be analyzed.

5. Significance and Use

5.1 This practice is useful for the preparation of specimens of ore bodies for the analysis of uranium by X-ray emission. Two separate preparation techniques are described.

6. Apparatus

6.1 *Platinum-Gold Crucible*, 95 % platinum 5 % gold, with flat 32-mm diameter bottom.

6.2 *Muffle Furnace*, 1200°C capacity with controller of $\pm 10^\circ\text{C}$ resolution, or fusion apparatus with similar capabilities.

NOTE 1—A fusion apparatus may be substituted for the muffle furnace throughout this practice. If such is used, follow the manufacturer's operating instructions.

6.3 *Rotary Swing Mill*, with tungsten or boron carbide vials.

6.4 *Pellet Die*, 32-mm diameter.

6.5 *Hydraulic Press*, 25-ton capacity.

6.6 *Crucible*, porcelain, Coors, 30-mL capacity.

6.7 *Refractory Brick*, 60 to 70 % alumina firebrick.

6.8 *Analytical Balance*, accurate to ± 0.001 g.

7. Reagents and Materials

7.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination (see Practices **E 50**).

7.2 *Lithium Tetraborate*—($\text{Li}_2\text{B}_4\text{O}_7$), anhydrous, spectrographic grade.

³ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For Suggestions on the testing of reagents not listed by the American Chemical Society, see *Annual Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.

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 Dec. 1, 2008. Published January 2009. Originally approved in 1988. Last previous edition approved in 2003 as C 1110 – 03.

² 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.