Designation: D 2332 – 84 (Reapproved 2003)

Standard Practice for Analysis of Water-Formed Deposits by Wavelength-Dispersive X-Ray Fluorescence[1]

This standard is issued under the fixed designation D 2332; 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 X-ray spectrochemical analysis of water-formed deposits.

1.2 The practice is applicable to the determination of elements of atomic number 11 or higher that are present in significant quantity in the sample (usually above 0.1 %).

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 887 Practices for Sampling Water-Formed Deposits

D 1129 Terminology Relating to Water

E 11 Specification for Wire Cloth Sieves for Testing Purposes

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology D 1129.

4. Summary of Practice

4.1 The sample or its fusion with a suitable flux is powdered and the powder is compacted (mounted). The mount is then irradiated by an X-ray beam of short wavelength (high energy). The characteristic X rays of the atom that are emitted or fluoresced upon absorption of the primary or incident X rays are dispersed, and intensities at selected wavelengths are measured by sensitive detectors. Detector output is related to concentration by calibration curves or charts.

4.2 The K spectral lines are used for elements of atomic numbers 11 to 50. Whether the K or L lines are used for the elements numbered 51 or higher depends on the available instrumentation.

5. Significance and Use

5.1 Certain elements present in water-formed deposits are identified. Concentration levels of the elements are estimated.

5.2 Deposit analysis assists in providing proper water conditioning.

5.3 Deposits formed from or by water in all its phases may be further classified as scale, sludge, corrosion products, or biological deposits. The overall composition of a deposit or some part of a deposit may be determined by chemical or spectrographic analysis; the constituents actually present as chemical substances may be identified by microscope or X-ray diffraction studies. Organisms may be identified by microscopical or biological methods.

6. Apparatus

6.1 *Sample Preparation Equipment*:

6.1.1 *Fusion Crucibles*, prepared from 25-mm (1-in.) commercial-grade graphite rods. The dimensions shall be 29 mm (1⅛ in.) high, an inside diameter of 19 mm (¾ in.), and a cavity 22 mm (⅞ in.) deep.

6.1.2 *Pulverizers*, including an agate or mullite mortar and pestle, minimum capacity 25 ml.

6.1.3 *Sieves*—No. 100 (150-μm) and No. 270 (53-μm) as specified in Specification E 11.

6.1.4 *Compactors*—A press, equipped with a gage enabling reproducible pressure, is recommended.

6.2 *Excitation Source* (*X-ray Tube:*)

6.2.1 *Stable Electrical Power Supply* (±1 %).

6.2.2 Source of high-intensity, short-wave-length X rays.

6.3 *Sample Housing* (*Turret*).

6.4 *Spectrometer*—Best resolution of the spectrometer and best sensitivity are not simultaneously attainable; a compromise is effected to give adequate values for each.

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[1] This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.03 on Sampling of Water and Water-Formed Deposits, Analysis of Water for Power Generation and Process Use, On-Line Water Analysis, and Surveillance of Water.

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[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.