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Standard Terminology for Radiochemical Analyses¹

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1. Scope

1.1 This standard describes terminology commonly used in radiochemistry and radioanalysis.

1.2 The values stated in SI units are to be regarded as standard. Other units of measurement, including some units that are not accepted for use with the SI, are also defined.

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:²

D7282 Practice for Setup, Calibration, and Quality Control of Instruments Used for Radioactivity Measurements

2.2 JCGM Documents:³

GUM Evaluation of measurement data—Guide to the expression of uncertainty in measurement (JCGM 100:2008)

2.3 Code of Federal Regulations:⁴

40 CFR 141.25 Analytical Methods for Radioactivity
40 CFR Appendix B to Part 136 Definition and Procedure for the Determination of the Method Detection Limit

¹ This terminology is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.04 on Methods of Radiochemical Analysis.

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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.

³ Available from Bureau International des Poids et Mesures (BIPM), Pavillon de Breteuil F-92312 Sèvres Cedex, France, <http://www.bipm.org>.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

2.4 ANSI Documents:⁵

ANSI N42.22 Traceability of Radioactive Sources to the National Institute of Standards and Technology (NIST) and Associated Instrument Quality Control

3. Significance and Use

3.1 This terminology standard describes terms and definitions used in standards for radiochemical analysis maintained by ASTM Committee D19 on Water. The terminology is also recommended for general use in the radiochemistry community.

4. Terminology: Terms and Definitions

4 π geometry, n —geometry in which the radiation detector has essentially the same probability of detecting radiation from the source emitted in any direction.

absorption (of radiation), n —transfer of some or all of the energy of a radiation to matter it traverses.

abundance,

(1) n —probability of emission of a given radiation during the decay of an atom of a given radionuclide; radiation emission probability—also called *intensity*;

(2) see **isotopic abundance**.

actinide, n —any element with atomic number between 89 and 103, including actinium, thorium, protactinium, uranium, neptunium, plutonium, americium, and curium.

activation, n —inducement of radioactivity by irradiation.

activation analysis, n —analysis based on the characteristic radiations emitted by nuclides formed by activation.

activity (for radionuclides), A [T^{-1}], n —mean rate of radioactive decay in a quantity of material.

DISCUSSION—The term *activity* may be qualified by specifying one or more radionuclides (for example, ^{238}U activity) or the type of decay (for example, gross alpha activity).

DISCUSSION—The SI unit of activity is the becquerel (Bq), which equals 1 s^{-1} (one nuclear disintegration per second).

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.