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Standard Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials¹

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Note— Changes were made throughout and the year date changed on July 25, 2005.

1. Scope

1.1 This is a compilation of terms commonly used in analytical chemistry for metals, ores, and related materials. Terms that are generally understood or defined adequately in other readily available sources are either not included or their sources are identified.

1.2 A definition is a single sentence with additional information included in a Discussion.

1.3 Definitions identical to those published by another standards organization or ASTM committee are identified with the name of the organization or the identifying document and ASTM committee.

1.4 Definitions specific to a particular field (such as *emission spectrometry*) are identified with an italicized introductory phrase.

2. Referenced Documents

2.1 ASTM Standards:²

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals

E 876 Practice for Use of Statistics in the Evaluation of Spectrometric Data

E 1914 Practice for Use of Terms Relating to the Development and Evaluation of Methods for Chemical Analysis

2.2 ISO Standard:

ISO Guide 30—Terms and Definitions Used in Connection with Reference Materials³

¹ This terminology is under the jurisdiction of ASTM Committee E01 on Analytical Chemistry for Metals, Ores, and Related Materials and is the direct responsibility of Subcommittee E01.23 on Terminology.

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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 American Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

3. Significance and Use

3.1 Definitions given in Section 4 are intended for use in all standards on analytical chemistry for metals, ores, and related materials. The definitions should be used uniformly and consistently. The purpose of this terminology is to promote clear understanding and interpretation of the standards in which definitions are used.

4. Terminology Definitions

absorption (of electromagnetic radiation), *n*—a decrease in radiant energy when passing through matter, resulting in a corresponding increase in the energy of the absorbing system.

accuracy, *n*—of methods of chemical analysis, a characteristic manifested by agreement. **E 1914 – 98 (2003)**

analytical curve—see **calibration curve**.

analyte, *n*—in methods of chemical analysis, the component determined by a method. **E 1914 – 98 (2003)**

analytical gap, *n*—in atomic emission spectrometry, the region between two electrodes in which the specimen is excited and from which radiant energy is used for analysis.

analytical line, *n*—the particular wavelength of an element used in determining the presence or concentration of that element.

arc, condensed—see **discharge, triggered capacitor**.

continuous dc, *n*—a self-maintaining dc discharge.

noncapacitive ac, *n*—in atomic emission spectrometry, a series of separate electrical discharges, individually self-initiating or initiated separately by another means, in which each current pulse has a polarity that is reversed from the previous one.

arc line—not recommended, see **atom line**.

atom line, *n*—a spectral line resulting from radiation emitted during electron transition as an excited atom returns to a lower energy level.

atomic emission spectrometry (AES), *n*—pertaining to emission spectrometry in the ultraviolet, visible, or infrared wavelength regions of the electromagnetic spectrum.

b-value, *n*—*in statistics*, the difference between the mean of a set of results on a material and its accepted reference value. (Compare **error**.) **E 1914 – 98 (2003)**

between-laboratory standard deviation, S_R , *n*—the standard deviation of results obtained on the same material in different laboratories (synonym: **reproducibility**). **E 1914 – 98 (2003)**

buffer, *n*—*in spectrometric analysis*, a substance that tends to minimize the effects of one or more elements on the emission of other elements.

burn, *n*—*in emission spectrometry*, (1) that portion of a solid specimen from which atoms were volatilized; (2) the act of burning.

burn, *vt*—*in emission spectrometry*, to vaporize and excite a specimen with sufficient energy to generate spectral radiation.

calibrant, *n*—a reference material used for a calibration.

calibrate, *vt*—(1) to establish the relationship between the response of an instrument and the concentration or mass of the analyte; (2) to establish a table of corrections to improve the accuracy of equipment used to measure physical properties such as mass, volume, temperature, and so forth.

calibration, *n*—the act, process, or result of establishing: (1) the relationship between the response of an instrument and the concentration or mass of the substance determined; (2) a table of corrections to improve the accuracy of equipment used to measure physical properties such as mass, volume, temperature, and so forth.

calibration curve, *n*—the graphical or mathematical representation of the relationship between the response of an instrument and the concentration or mass of the analyte.

certified reference material (CRM), *n*—a reference material, accompanied by a certificate, one or more of whose property values are certified by a procedure which establishes traceability to an accurate realization of the unit in which the property values are expressed, and for which each certified value is accompanied by an uncertainty at a stated level of confidence.

DISCUSSION—See also **SRM**.

characteristic emulsion curve—see **emulsion calibration curve**.

characteristic radiation, *n*—*of X rays*, a unique set of X rays emitted by an element.

comminution, *n*—*in sample preparation*, a process that reduces the particle size of a sample.

counter electrode, *n*—*in atomic emission spectrometry*, the electrode in an analytical pair that does not contain the specimen being analyzed.

densitometer—not recommended, see **microphotometer**.

detection limit, *n*—*for an analytical instrument*, the minimum quantity of analyte expected to yield a response greater than zero. **E 1914 – 98 (2003)**

discharge, triggered capacitor, *n*—a series of electrical discharges from capacitors initiated by a separate means and extinguished when the voltage across the analytical gap falls

to a value that no longer is sufficient to maintain it.

division, *n*—*in sample preparation*, a process which divides a sample into two or more subsamples without changing the composition.

doré bead, *n*—a gold and silver alloy bead which results from cupellation.

electrode, *n*—*in atomic emission spectrometry*, either of two terminals between which an electrical discharge occurs.

electrode gap—not recommended, see **analytical gap**.

error, *n*—*of a result*, the difference between a result obtained on a material and its accepted reference value. (compare *b-value*.) **E 1914 – 98 (2003)**

excitation potential (X-ray), *n*—the potential required to produce characteristic radiation from an element.

fatigue, *n*—*in atomic spectrometry*, the decrease in response of a photoelectric radiant energy receiver caused by the accumulated exposure of the receiver to radiant energy.

filter, *n*—*in atomic spectrometry*, a substance that attenuates the radiant power in a definite manner with respect to spectral distribution.

neutral, *n*—a filter that attenuates the radiant power reaching the detector by the same factor at all wavelengths within a prescribed wavelength region.

nonselective—not recommended, see **filter, neutral**.

goniometer, *n*—*in X-ray spectrometry*, a device used to adjust the angular relationships among a sample, crystal, and detector in an X-ray spectrometer.

grating, concave, *n*—a diffraction grating on a concave mirror surface.

diffraction, *n*—a series of a large number of narrow, close, equally spaced, diffracting slits or grooves capable of dispersing light into its spectrum.

plane, *n*—a transmission or reflecting diffraction grating whose surface is flat.

reflection, *n*—a diffraction grating from which the incident light is reflected to form a spectrum.

transmission, *n*—a transparent diffraction grating through which light is transmitted.

homologous lines, *n*—*in atomic emission spectrometry*, spectral lines that exhibit minimal change in their intensity ratios with variations in excitation conditions.

increment, *n*—*in sampling*, a portion of material removed from a lot by a single operation.

inquantation, *vt*—the addition of silver to an assay sample to facilitate parting.

interlaboratory study, ILS, *n*—a study undertaken to demonstrate the precision and accuracy of a test method. **E 1914 – 98 (2003)**

internal standard, *n*—*in spectrometry*, a material present in or added to test samples that serves as an intensity reference for spectral measurements.

internal standard line, *n*—a spectral line of an internal standard, with which the radiant energy of an analytical line is compared.