Designation: E 7 – 03

Standard Terminology Relating to Metallography[1]

This standard is issued under the fixed designation E 7; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This standard covers the definition of terms, acronyms, and symbols used in ASTM documents related to the field of metallography and metallographic testing. Terms that are only relevant to a particular standard or that are adequately defined in a general dictionary are not defined in this terminology standard.

1.2 This standard includes terminology used in metallographic areas, such as, but not limited to: light microscopy, microindentation hardness testing, specimen preparation, x-ray and electron metallography, quantitative metallography, photomicrography, and determination of grain size and inclusion content.

1.3 This standard may be of use to individuals utilizing standards of Committee E-4 as well as by those in need of a general reference source for terminology in the field of metallography.

2. Referenced Documents

2.1 *ASTM Standards:*

E 14 Practice for Thermal Analysis of Metals and Alloys[2]

E 45 Test Methods for Determining the Inclusion Content of Steel[3]

E 80 Practice for Dilatometric Analysis of Metallic Materials[4]

E 92 Test Method for Vickers Hardness of Metallic Materials[3]

E 112 Test Methods for Determining Average Grain Size[3]

E 1122 Practice for Obtaining JK Inclusion Ratings Using Automatic Image Analysis[3]

3. Significance and Use

3.1 Standards of Committee E-4 consist of test methods, practices, and guides developed to ensure proper and uniform testing in the field of metallography. In order for one to properly use and interpret these standards, the terminology used in these standards must be understood.

3.2 The terms used in the field of metallography have precise definitions. The terminology and its proper usage must be completely understood in order to adequately communicate in this field. In this respect, this standard is also a general source of terminology relating to the field of metallography facilitating the transfer of information within the field.

4. Terminology

absorption—the decrease in intensity which radiation undergoes during its passage through matter when the ratio of transmitted or reflected luminous flux to incident is less than 1.

absorption coefficient—specific factor characteristic of a substance on which its absorption radiation depends. The rate of decrease of the natural logarithm of the intensity of a parallel beam per unit distance traversed in a substance. For X-rays, the linear absorption coefficient is the natural logarithm of the ratio of the incident intensity of an X-ray beam incident on unit thickness of an absorbing material to the intensity of the beam transmitted. If I_e is the incident intensity of a beam of X-rays, I_t the transmitted intensity, and X the thickness of the absorbing material, then:

$$I_t = I_e exp(-\mu X) \quad (1)$$

Here μ is the linear absorption coefficient. The mass absorption coefficient is given by μ/ρ where ρ is the density.

absorption edge—an abrupt change in absorption coefficient at a particular wavelength. The absorption coefficient is always larger on the short wavelength side of the absorption edge.

absorption limit—See **absorption edge.**

accelerating potential—a relatively high voltage applied between the cathode and anode of an electron gun to accelerate electrons.

achromatic—literally, color-free. A lens or prism is said to be achromatic when corrected for two colors. The remaining color seen in an image formed by such a lens is said to be secondary chromatic aberration. See **apochromatic objective**

[1] This terminology is under the jurisdiction of ASTM Committee E04 on Metallography and are the direct responsibility of Subcommittee E04.02 on Metallographic Terminology and Nomenclature of Phase Diagrams.

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[2] *Annual Book of ASTM Standards,* Vol 04.01.

[3] *Annual Book of ASTM Standards,* Vol 03.01.

[4] Discontinued; see *1984 Annual Book of ASTM Standards,* Vol 14.02. Replaced by E228.

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