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.

Designation: D8075 – 16

An American National Standard

Standard Guide for Categorization of Microstructural and Microtextural Features Observed in Optical Micrographs of Graphite[1]

This standard is issued under the fixed designation D8075; 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 guide covers the identification and the assignment of microstructural and microtextural features observed in optical micrographs of graphite. The objective of this guide is to establish a consistent approach to the categorization of such features to aid unambiguous discussion of optical micrographs in the scientific literature. It also provides guidance on specimen preparation and the compilation of micrographs.

1.2 The values stated in SI units are to be regarded as the standard.

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]

D7219 Specification for Isotropic and Near-isotropic Nuclear Graphites

3. Terminology

3.1 The definitions listed below cover terms used in this guide and apply specifically to the optical microscopy of graphite. Properties and features not apparent under the optical microscope are avoided where possible. Definitions may not exactly match those adopted in general scientific usage but should not be at variance. General terms have not been redefined with graphite-specific meanings or optical microscopy-specific meanings. As with the identification of features in micrographs, some definitions have become unclear to differences in usage and this guide provides the basis for a more consistent approach.

3.2 *Definitions:*

3.2.1 *accommodation cracks, n*—(also referred to as Mrozowski-like cracks) cracks and voids formed between basal planes and at domain interfaces throughout the graphite microstructure from thermal contraction of the graphite during carbonization/graphitization (sometimes referred to as calcination cracks), from chemical decomposition of the liquid crystal hydrocarbon precursor in graphite manufacture (also referred to as calcination cracks) and following cooling after graphitization (manufacture). In irradiated graphite, they also comprise cracks arising from anisotropic responses to irradiation.

3.2.2 *agglomerate, n—in manufactured carbon and graphite product technology*, composite particle containing a number of grains.

3.2.3 *binder, n*—substance such as coal tar pitch or petroleum pitch, used to bond the coke or other filler material prior to baking.

3.2.4 *crystallite, n—in manufactured carbon and graphite product technology*, a region of regular crystalline structure having parallel basal planes.

3.2.5 *filler, n—in manufactured carbon and graphite product technology*, particles that comprise the base aggregate in an unbaked green-mix formulation (also referred to as coke particles, grist particles, or filler grains).

3.2.6 *filler-binder phase, n—in manufactured carbon and graphite product technology*, mix of finely ground filler (flour) and binder comprising the matrix in which the filler is bound.

3.2.7 *grain, n—in manufactured carbon and graphite*, particle of filler material (usually coke or graphite) in the starting mix formulation. Also referred to as granular material, filler particle, or aggregate material. The term is also used to describe the general texture of a carbon or graphite body, as in the descriptions listed below:

3.2.7.1 *coarse grained, adj*—containing grains in the starting mix that are substantially greater than 4 mm in size.

3.2.7.2 *medium coarse grained, adj*—containing grains in the starting mix that are generally less than 4 mm in size.

3.2.7.3 *medium grained, adj*—containing grains in the starting mix that are generally less than 2 mm in size.

[1] This guide is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.F0 on Manufactured Carbon and Graphite Products.

Current edition approved Dec. 15, 2016. Published February 2017. DOI: 10.1520/D8075-16.

[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.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States