



Standard Terminology Relating to Catalysts and Catalysis¹

This standard is issued under the fixed designation D3766; 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 terminology covers definitions of terms related to catalysts and catalysis.

NOTE 1—The Manual of Symbols and Terminology for Physicochemical Quantities and Units presents authoritative descriptions of many terms used in the field of catalysis.²

1.2 *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. Terminology

2.1 Definitions:

abrasion, *n*—the gradual removal of material from a surface due to friction typically generating fine particles. Note: **abrasion** and **attrition** are often used interchangeably.

activity, *n*—of a catalyst, the measure of the rate of a specific catalytic reaction conducted in the presence of a catalyst.

attrition, *n*—the wearing down of particles by grinding against each other producing chips and fine particles. Note: **abrasion** and **attrition** are often used interchangeably.

calcine, *v*—*in catalysis*, to heat a material to a high temperature causing a physical or chemical change, for example, loss of moisture and volatile matter, or a phase change, or both.

catalyst bed support, *n*—an essentially inert plate, grid, particulate bed, or other structural component designed to hold up or bear a quantity of catalyst in a catalytic reactor.

catalyst carrier, *n*—a solid, generally porous material upon the surface or into the voids of which catalytic materials are placed to create the desired catalyst.

¹ This terminology is under the jurisdiction of ASTM Committee D32 on Catalysts and is the direct responsibility of Subcommittee D32.92 on Nomenclature and Definitions.

Current edition approved Jan. 1, 2024. Published January 2024. Originally approved in 1979. Last previous edition approved in 2018 as D3766 – 08 (2018). DOI: 10.1520/D3766-24.

² “The Manual of Symbols and Terminology for Physicochemical Quantities and Units—Appendix II. Definitions, Terminology and Symbols in Colloid and Surface Chemistry. Part II: Heterogeneous Catalysis,” Pure and Applied Chemistry, Vol 46, No. 1, 73–90(1976).

DISCUSSION—A carrier may have or contribute to catalytic activity.

catalyst substrate, *n*—less preferred alternative term for **catalyst carrier**.

catalyst support, *n*—less preferred alternative term for **catalyst carrier**.

crush strength, *n*—*in catalysis*, a measure of the resistance of formed catalysts or catalyst carriers, either singly or in bulk, to loss of form when subjected to a compressive force.

DISCUSSION—Formed catalysts may include tablets, spheres, extrudates, rings, pellets, etc. and should be distinguished from powders and granules.

density, packing (bulk), *n*—the ratio of the mass of a collection of discrete pieces of solid material to the sum of the volumes of: the solids in each piece, the voids within the pieces, and the voids among the pieces of the particular collection.

density, particle (envelope), *n*—the ratio of the mass of a particle to the sum of the volumes of: the solid in each piece and the voids within each piece, that is, within close-fitting imaginary envelopes completely surrounding each piece.

density, skeletal, *n*—the ratio of the mass of discrete pieces of solid material to the sum of the volumes of: the solid material in the pieces and closed (or blind) pores within the pieces.

density, theoretical, *n*—the ratio of the mass of a collection of discrete pieces of solid material to the sum of the volumes of said pieces, the solid material having an ideal regular arrangement at the atomic level.

envelope, *n*—of a particle in catalysis, a theoretical surface that encloses the particle and that bridges openings to the interior of the particle.

fragmentation, *n*—the breaking of a solid catalytic material into two or more smaller particles.

pore, *n*—*in catalysis*, a small opening in a material permitting admission, adsorption, or passage of a fluid.

pore size distribution, *n*—*in catalysis*, the volume of pores of a material expressed or displayed as a function of pore diameters.