Designation: E 375 – 75 (Reapproved 1986)

AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 Race St., Philadelphia, Pa. 19103
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If not listed in the current combined index, will appear in the next edition.

Standard Definitions of Terms Relating to RESINOGRAPHY[1]

This standard is issued under the fixed designation E 375; 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.

aberration—any error that results in image degradation. Such errors may be chromatic, spherical, or astigmatic, and can result from design or execution, or both.

aberration, chromatic—a defect in a lens or lens system resulting in different focal lengths for radiation of different wavelengths. The dispersive power of a single positive lens focuses light from the blue end of the spectrum at a shorter distance than light from the red end. An image produced by such a lens will show color fringes around the border of the image.

aberration, spherical—the zonal aberration of a lens referred to an axial point.

adduct—a chemical addition product.

alloy—a metallic mixture of two or more elements to produce *(1)* a single phase (solid solution), *(2)* two or more solid solutions (phases) of varied composition and distribution, or *(3)* eutectic or eutectoid mixture (constant composition of two phases, uniformly distributed). The term alloy is also applied to resins, polymers, and plastics.

adsorption—a physical process in which molecules of gas, of dissolved substances or of liquids, adhere in an extremely thin layer to surfaces of solid bodies with which they are in contact.

amorphous—noncrystalline, devoid of regular, cohesive structure.

anisotropic, optically—having visible properties which vary with changing direction through the specimen.

antiglare device—an accessory or method for reducing the intensity of reflection or the amount of nonimage-forming light. Nonimage-forming light may be reduced by coating air surfaces of lenses with a low-refractive film. In photography especially, glare from reflecting surfaces is removed by covering the lens with a polarizing film and turning it to the optimum position. See **glare**.

artifact—a spurious image that does not correspond to the true microstructure of the original specimen.

artificial—produced or effected by man to imitate nature; man-made.

asbestos—a group of fibrous minerals which occur as veins in the massive body of natural hydrous silicates of serpentine or amphibole and have specific heat, fire, and solvent-resistant properties according to species and variety.

atactic—having an unordered succession of monomer units of the two steric configurations. Such a polymer is not crystallizable.

attitude—an acquired predisposition to respond in a consistent way toward a given class of objects; a persistent state of readiness to react to a certain object or class of objects, not as they are, but as they are conceived to be.

attribute—any quality or characteristic descriptive of a stimulus.

behavior—changes in properties of a substance with time, temperature, irradiation or illumination, humidity, or other environmental factors.

brand name— see **trademark.**

centrifugation, equilibrium—a method for determining the distribution of molecular

[1] These definitions are under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittees D20.71 on Resinography and D20.92 on Definitions.

Current edition approved Dec. 26, 1975. Published March 1976. Originally published as E 375 — 68. Last previous edition E 375 — 74.

weights by spinning a solution of the specimen at a speed such that the molecules of the specimen are not removed from the solvent but are held at a point where the (centrifugal) force tending to remove them is balanced by the dispersive forces caused by thermal agitation.

ceramography—the correlation of composition and treatment with properties and behavior, structure, and morphology of ceramics of all kinds.

chromatography—the separation, especially of closely related compounds, by allowing a solution or mixture to seep through an adsorbent (such as clay, gel, or paper), so that each compound becomes adsorbed in a separate, often colored, layer.

chromophore—a group of elements that gives rise to color in a molecule.

chrysotile—the hydrous magnesium silicate mineral $Mg_3Si_2O_5$ (OH). Of all asbestos minerals, chrysotile is most commonly used in textiles, paper, board, and kindred materials. Since chrysotile contains water of crystallization which is lost at elevated temperatures, along with strength and some other properties, it is not as desirable as naturally anhydrous species of asbestos for use at such elevated temperatures.

cis—see **stereoisomer, cis.**

cleanliness—the quality or state of being free of dirt, contamination, admixture encumbrance, incompletion, lack of skill (with respect to the specimen, substratum, superstratum, or optical system); orderliness.

collimator—a device for controlling a beam of radiation so that its rays are as nearly parallel as possible.

colloid—a system of at least two phases, including a continuous liquid plus solid, liquid, or gaseous particles so small that they remain in dispersion for a practicable time.

composite—a material made up of distinct parts which contribute, either proportionately or synergistically, to the properties of the combination.

composition—the qualitative and quantitative statement of constituents. The source of information is analysis and the derived facts need analytical interpretation.

condition—generally the result of treatment, processing, or use. It can be more important than composition at times, especially in the case of high polymers.

configuration—the structural makeup of a chemical compound, especially with reference to the spatial relationship of the constituent atoms.

conformation—the morphological disposition of a molecule in its environment, for example, the coiling of a macromolecular chain in a poor solvent and the uncoiling in a good solvent.

contrast perception—the ability to differentiate various components of the structure of an object by different intensity levels in the image.

crystal—a solid composed of atoms, ions, or molecules arranged and cohered in a pattern that is periodic in three dimensions, except for occasional dislocations.

crystallinity, degree of—ratio or percentage of crystallized phase(s) based on total material (or, perhaps, on crystallizable material only).

crystallizability—the inherent potential of a substance to arrange its units in a periodic, cohesive structure (crystal).

cues to depth (of object)—the hints of depth between near and distant points given by shadows, apparent size of similar objects, and perspective. Stereoscopy (effective use of both eyes) is very important in experiencing the third dimension. For relatively near objects, the use of both eyes is effective; for distant objects, use field glasses; and, for close or microscopic objects, use binocular-binobjective microscope.

depth of field—the thickness of the object space that is simultaneously in acceptable focus.

depth of focus—the thickness of the image space that is simultaneously in acceptable focus.

description—an image or impression in terms of morphology and structure. The description may be in words and numbers; photographs, patterns, and drawings; or diagrams and spectra. Descriptive tools include macroscopy and microscopies; light, electron and X-ray scattering, diffraction or absorption; and nuclear magnetic resonance, etc.

differential thermal analysis (DTA)—a method for plotting (usually automatically,

with two thermocouples bucking each other) the difference in temperature between a specimen and a neutral body against the temperature of the neutral body.

elastomer—a natural, synthetic, or artificial polymer which, at room temperature, can be stretched repeatedly to at least twice its original length and, upon removal of the tensile load, will immediately and forcibly return to its approximate original length.

electron spin resonance (ESR)—an apparatus and method similar to NMR, but which is adapted to the much greater magnetic moment of an unpaired electron (trapped radical) as compared to any nuclear moment.

emulsion—a stable dispersion of one liquid in another, generally by means of an emulsifying agent which has affinity for both the continuous and discontinuous phases. There is strong evidence that the emulsifying agent, discontinuous phase, and continuous phase together can produce another phase which serves as an enveloping (encapsulating) protective phase around the discontinuous phase.

epitaxy—the oriented growth of a crystalline substance on a substratum of the same or different crystalline substance.

equilibrium—a state of dynamic balance between the opposing actions, reactions, or velocities of a reversible process.

experience—the conscious perception or apprehension of reality or of an external, bodily, or psychic event.

experimentation—the testing of a hypothesis based on interpretations of observations or other experience with the sample.

field (of view)—the visible portion of the object.

filler—a relatively inert material added to another (for example, a plastic) to modify its strength, permanence, working properties, other qualities, or cost (as an extender).

floc—a loose, open-structured mass produced in a suspension by the aggregation of minute particles.

focus—a point at which rays originating from a point in the object converge or from which they diverge, or appear to diverge, under the influence of a lens or diffracting system.

gauss—the unit of magnetic induction in the cgs electromagnetic system. The gauss is equal to 1 maxwell per square centimetre or 10^{-4} tesla.

gel—a liquid containing a colloidal structural network that forms a continuous matrix and completely pervades the liquid phase. A gel deforms elastically upon application of shear forces less than the yield stress. At shear forces above the yield stress, the flow properties are principally determined by the gel matrix.

generic term—relating to, or characteristic of, a whole group or class.

glare—harsh, uncomfortably bright light or, specifically, light that does not contribute to image formation.

glass transition—the reversible change in an amorphous polymer or in amorphous regions of a partially crystalline polymer from (or to) a viscous or rubbery condition to (or from) a hard and relatively brittle one.

goniometry—the measurement of the angle through which a specimen is rotated.

habit—the characteristic mode of growth or occurrence of a crystal; characteristic assemblage of forms (free faces) at crystallization leading to a usual appearance.

hardness—the resistance of a material to deformation, particularly permanent deformation, indentation, or scratching.

NOTE—Different methods of evaluating hardness give different ratings because they are measuring somewhat different characteristics and quantities of the material. There is no absolute scale for hardness, so that to express hardness quantitatively each type of test has its own scale or arbitrarily defined hardness.

hardness, impression—the result of an imprint or dent in the specimen by the indenter of a hardness-measuring device.

hardness, Knoop—that which is measured by calibrated machines to force a rhomb-shaped, pyramidal diamond indenter having specified edge angles under specified conditions, into the surface of the material under test and to measure the long diagonal after removal of the load.

NOTE—The microhardness Knoop tester uses a relatively small load (1 to 1000 gf) to measure surface hardness.

hardness, Mohs'—a scale of hardness first devised by Friedrich Mohs (1839), using pure minerals of selected species ranging from

talc (softest) to diamond (hardest). The number of standards is now revised from 10 natural minerals to 15, including natural, artificial, and synthetic abrasives: fused silica (No. 7), garnet (No. 10), fused zirconia (No. 11), fused alumina (No. 12), silicon carbide (No. 13), boron carbide (No. 14).

hardness, scratch—a micro-hardness (of a surface) obtained by moving a diamond point (for example, the corner of a cube) across a surface of the specimen.

illumination—the act of supplying light to the object by reflection, transmission, or at a grazing angle. In microscopy, each of the first two types has several kinds: axial bright-field, oblique or conical bright-field, dark-field, and phase-amplitude. Conical bright-field illumination can be so-called "critical" or Köhler's illumination.

illumination, critical—the formation of an image of the light source in the object field.

illumination, Köhler's (or Koehler's)—a method of microscopical illumination first described by A. Köhler, in which an image of the source is focused in the lower focal plane of the condenser.

illumination, oblique—the illumination from light inclined at an oblique angle to the optical axis.

imagination—the act or power of forming a mental image of something not present to the senses or never before wholly perceived in reality.

infrared (IR)—pertaining to the region of the electromagnetic spectrum lying beyond the red, having wavelengths from 750 nm to a few millimetres.

infrared (IR) spectroscopy or spectrometry—a method for observing or plotting the wavelengths in the electromagnetic spectrum lying beyond the red from about 750 nm to a few millimetres.

in situ—in the natural or original position.

intangible separation—a distinction between individuals (such as different phases or separate particles) without physical movement (tangible separation); effective microscopical resolution.

interface—a surface forming a common boundary of two bodies, spaces, or phases.

intrinsic—belonging to the essential nature or constitution of a thing.

intrinsic viscosity—the limiting value of reduced viscosity as the concentration in a solvent approaches zero. The IUPAC Committee of Nomenclature has recommended the expression "limiting viscosity number" for intrinsic viscosity, and the concentration is generally expressed as grams per millilitre.

isomer—a compound, radical, ion, or nuclide that contains the same number of atoms of the same elements but differ in structural arrangement and properties. See also **stereoisomer**.

isotactic—pertaining to a type of polymeric molecular structure containing a sequence of regularly spaced asymmetric atoms arranged in like configuration in a polymer chain ("head to tail" – "head to tail", etc.). Isotactic (and syndiotactic) polymers are crystallizable.

isotropic, optical—having the same visible properties in all directions.

lac—a resinous substance secreted by a scale insect and used chiefly in shellac.

lacquer—a coating formulation which is based on thermoplastic film-forming material dissolved in organic solvent, and which dries primarily by evaporation of the solvent. Typical lacquers include those based on lac, nitrocellulose, other cellulose derivatives, vinyl resins, acrylic resins, etc.

lamella—a thin, flat scale or part.

lot—a collection of units of product from which a sample is to be drawn and inspected to determine conformance with the criteria of acceptability, and is to be accepted or rejected as a whole.

macromolecule—a large to giant molecule of a polymer.

macroscopy—the interpretative use of the naked eye, or with a magnification of no greater than 10×.

mass spectrometry (MS)—an instrument that is capable of separating ionized molecules of different mass/charge ratios and measuring the respective ion currents.

material—relating to, derived from, or consisting of matter.

memory—the power or process of reproducing or recalling what has been learned and retained especially through associative mechanisms; persistent modification of structure or morphology resulting from treatment of a material.