Hawley's

Condensed Chemical

Dictionary

THIRTEENTH EDITION

Revised by

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continuous reflux extraction of alcohol- or ether-soluble components of food products. Named after its inventor, a German chemist.

space, chemistry in. Experiments carried out on the space shuttle in the early 1980s indicate that unique types of chemical reactions occur in outer space, and that actual products may result that are not achievable under the terrestrial environment. Several factors are believed to account for this, primarily zero gravity, though absence of oxygen and enhanced magnetic effects may also play a part. Several encouraging results have already been obtained, though until further experiments and operating data have been investigated, the conclusions must be considered tentative. Among projects that have been carried out or are contemplated are the following: (1) Uniform polymer microspheres that are over twice as large as possible on earth have been made due to zero gravity. (2) More effective electrophoresis reactions for making biological materials have been discovered, probably also because of zero gravity. (3) Possibilities exist for (a) making unique alloys in space that are not possible on earth, for example lead-copper, lead-zinc, and aluminum-indium; (b) purer crystals for microelectronics; (c) better glass for fiber optics; (d) new drugs and pharmaceuticals. Future experiments will involve human cells, enzymes, and hormones.

"Spacerite" *[ALCOA].* $Al_2O_3 \cdot 3H_2O$ TM for a spacer pigment of titanium dioxide in coatings and inks.
Properties: White powder.

space velocity. The volume of gas or liquid, measured at specified temperature and pressure (usually standard conditions) passing through unit volume in unit time.
Use: Comparing flow processes involving different conditions, rates of flow, and sizes or shapes of containers.

spalling. Chipping an ore for crushing, or the cracking, breaking, or splintering of materials due to heat.

spandex. Generic name for a fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 85% of a segmented polyurethane (Federal Trade Commission). Imparts elasticity to garments such as girdles, socks, special hosiery.

spanish white. (1) Chalk, $CaCO_3$. (2) Bismuth white, $BiO(NO_3)$, basic bismuth white.

spar. (1) A type of crystalline material such as Iceland spar or feldspar, usually containing calcium carbonate or an aluminum silicate; fluorspar is calcium fluoride. Iceland spar has unique optical properties. (2) A weather-resistant varnish originally used for coating wooden spars of sailing ships, which may be the reason for its name.
See spar varnish.

sparger. A perforated pipe through which steam, air, or water is sprayed into a liquid during a fermentation reaction.
Use: Brewing industry to remove traces of wort from the mash.

spar, Greenland. See cryolite.

spar, heavy. See barite.

spar, Iceland. See calcite.

sparking metal. See pyrophoric alloy.

spar, satin. See calcite; gypsum.

spar varnish. A durable, water-resistant varnish for severe service on exterior exposure. It consists of one or more drying oils (linseed, tung, or dehydrated castor oil), one or more resins (rosin, ester gum, phenolic resin, or modified phenolic resin), one or more volatile thinners (turpentine or petroleum spirits), and driers (linoleates, resinates, or naphthenates of lead, manganese, and cobalt). It is classed as a long-oil varnish and generally consists of 45–50 gals of oil for each 100 lb of resin.
See varnish.

SPE. Abbreviation for Society of Plastics Engineers.

spearmint oil. A yellowish essential oil, strongly levorotatory.
Use: Source of carvone and as flavoring for medicines, chewing gum, etc.

specific activity. (1) The activity of a radioelement per unit weight of the element. (2) The activity per unit mass of a pure radionuclide.

specific gravity. The ratio of the density of a substance to the density of a reference substance; it is an abstract number that is unrelated to any units. For solids and liquids, specific gravity is numerically equal to density, but for gases it is not, because of the difference between the densities of the reference substances, which are usually water (1 g/cc) for solids and liquids and air (0.00129 g/cc, or 1.29 g/L at 0C and 760 mm Hg) for gases. The specific gravity of a gas is the ratio of its density to that of air; since the *specific gravity* of air = 1.0 (1.29/1.29), this is usually stated to indicate the comparison with the gas under consideration. For example, the density of hydrogen is 0.089 g/L but its specific gravity is 0.069 (i.e., 0.089/1.29). The specific gravity of solids and liquids is the ratio of their density

to that of water at 4C, taken as 1.0, as 1 cc of water weighs 1 gram. Thus a solid or liquid with a density of 1.5 g/cc has a specific gravity of 1.5/1 or 1.5.

Since weights of liquids and gases vary with temperature, it is necessary to specify both temperatures involved, except for rough or approximate values. Thus the specific gravity of alcohol should be given as 0.7893 at 20/4C, the first temperature referring to the alcohol and the latter to the water. At 15.56C the specific gravity of alcohol is 0.816.

See density; API gravity; Baumé.

specification. A schedule of minimum performance requirements for specialized products such as those established by the various committees of the American Society for Testing and Materials and the Underwriters Laboratories. Such products are subject to inspection and test before acceptance.

See testing.

specific heat. The ratio of the heat capacity of a substance to the heat capacity of water, or the quantity of heat required for a 1 degree temperature change in a unit weight of material. Commonly expressed in Btu/lb/degree F or in cal/g/degree F. For gas the specific heat at constant pressure is greater than that at constant volume by the amount of heat needed for expansion.

specific susceptibility. See mass susceptibility.

specific volume. The volume of unit weight of a substance, as cubic feet per pound or gallons per pound, but more frequently milliliters per gram. The reciprocal of density.

specific weight. The weight per unit volume of a substance.

"Spectrograde" ***[International Crystal].*** TM for potassium bromide.

CAS: 7758-02-3.

Grade: IR, FTIR, and 99.999% pure XL.

Use: IR and FTIR spectroscopy and other high-purity applications.

spectrophotometry. See absorption spectroscopy.

spectroquality. A specially prepared chemical of higher purity than those generally available for spectrophotometric use.

spectroscopy. (instrumental analysis). A branch of analytical chemistry devoted to identification of elements and elucidation of atomic and molecular structure by measurement of the radiant energy absorbed or emitted by a substance in any of the wavelengths of the electromagnetic spectrum in response to excitation by an external energy source. The types of absorption and emission spectroscopy are usually identified by the wavelength involved, namely, γ-ray, X ray, UV, visible, infrared, microwave, and radiofrequency. The technique of spectroscopic analysis was originated by Fraunhofer who in 1814 discovered certain dark (D) lines in the solar spectrum, which were later identified as characterizing the element sodium. In 1861 Kirchhoff and Bunsen produced emission spectra and showed their relationship to Fraunhofer lines. X-ray spectroscopy was utilized by Moseley (1912) to determine the precise location of elements in the periodic system. Since then, a number of sophisticated and highly specialized techniques have been developed including Raman spectroscopy, nuclear magnetic resonance, nuclear quadrupole resonance, dynamic reflectance spectroscopy, laser, microwave, and γ-ray spectroscopy, and electron paramagnetic resonance.

spectrum. The radiant energy emitted by a substance as a characteristic band of wavelengths by which it can be identified.

See radiation; spectroscopy.

speculum metal. (1) 66% copper, 34% tin with trace of arsenic; (2) 64% copper, 32% tin, 4% nickel.

Properties: D 8.6, mp 750C.

Use: For mirrors for reflecting telescopes.

spelter. Relatively pure zinc as encountered in industrial operations such as galvanizing. Lead and/or iron are common impurities.

spent mixed acid. Mixed acid that has given up part of its nitric acid.

Hazard: Dangerous fire risk. Strong irritant to tissue.

spent oxide. See iron sponge, spent.

Sperry process. An electrolytic process for the manufacture of lead carbonate, basic (white lead) from desilverized lead containing some bismuth. The impure lead forms the anode. A diaphragm separates anode and cathode compartments, and carbon dioxide is passed into the solution. Impurities, including bismuth, remain on the anode as a slime blanket.

sphalerite. (blende, zinc blende). ZnS. Natural zinc sulfide, usually containing some cadmium, iron, and manganese.

Properties: Color yellow, brown, black, or red; resinous; good cleavage. Hardness 3.5–4, d 3.9–4.1. Soluble in hydrochloric acid.

Occurrence: Missouri, Kansas, Oklahoma, Colorado, Montana, Wisconsin, Idaho, Australia, Canada, Mexico.

Use: Most important ore of zinc, also a source of cadmium; phosphor; source of sulfur dioxide for production of sulfuric acid.