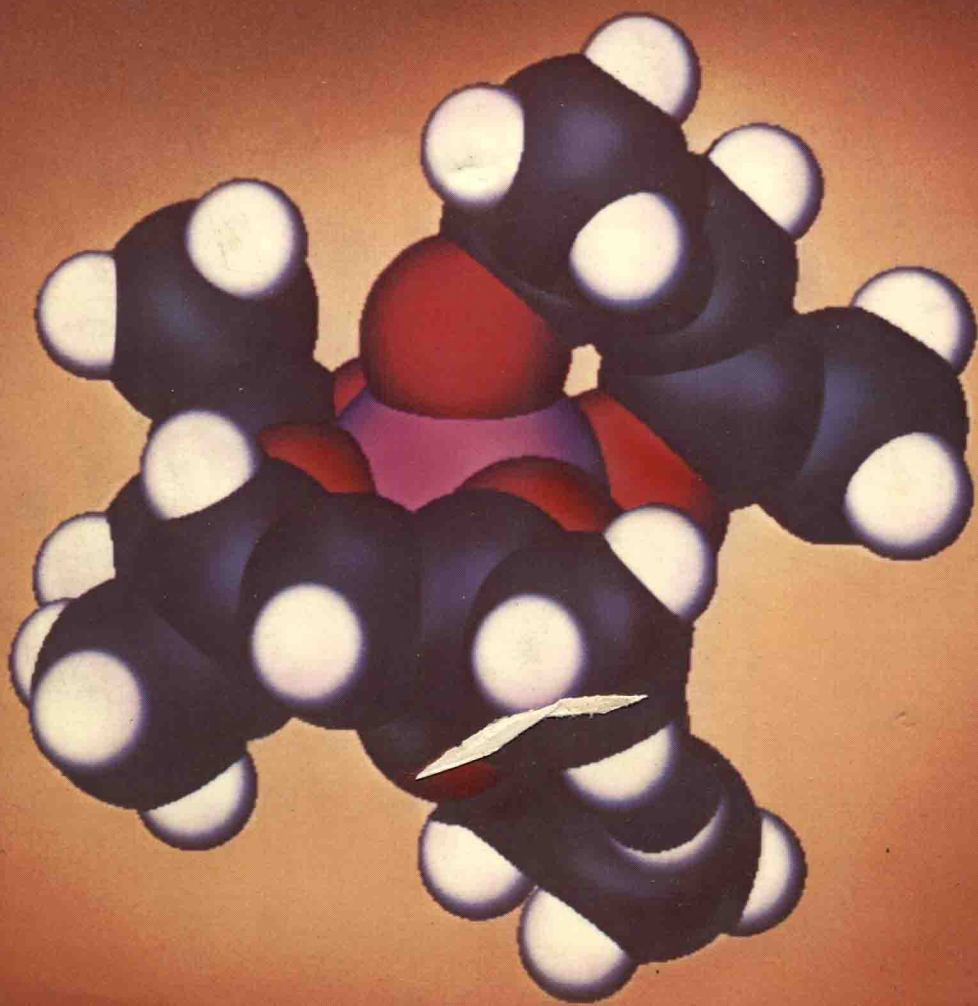


McGraw-Hill  
Dictionary of  
**CHEMISTRY**



*Continuing*

***the outstanding series of  
technical dictionaries  
from McGraw-Hill...***

- ***McGraw-Hill Dictionary of  
Scientific and Technical Terms, 3d Ed.***
- ***McGraw-Hill Dictionary of  
Science and Engineering***
- ***McGraw-Hill Dictionary of  
Earth Sciences***
- ***McGraw-Hill Dictionary of  
the Life Sciences***
- ***McGraw-Hill Dictionary of  
Physics and Mathematics***
- ***McGraw-Hill Dictionary of Engineering***
- ***McGraw-Hill Dictionary of  
Electronics and Computer Technology***

At your bookstore or write to Suite 26-1, McGraw-Hill

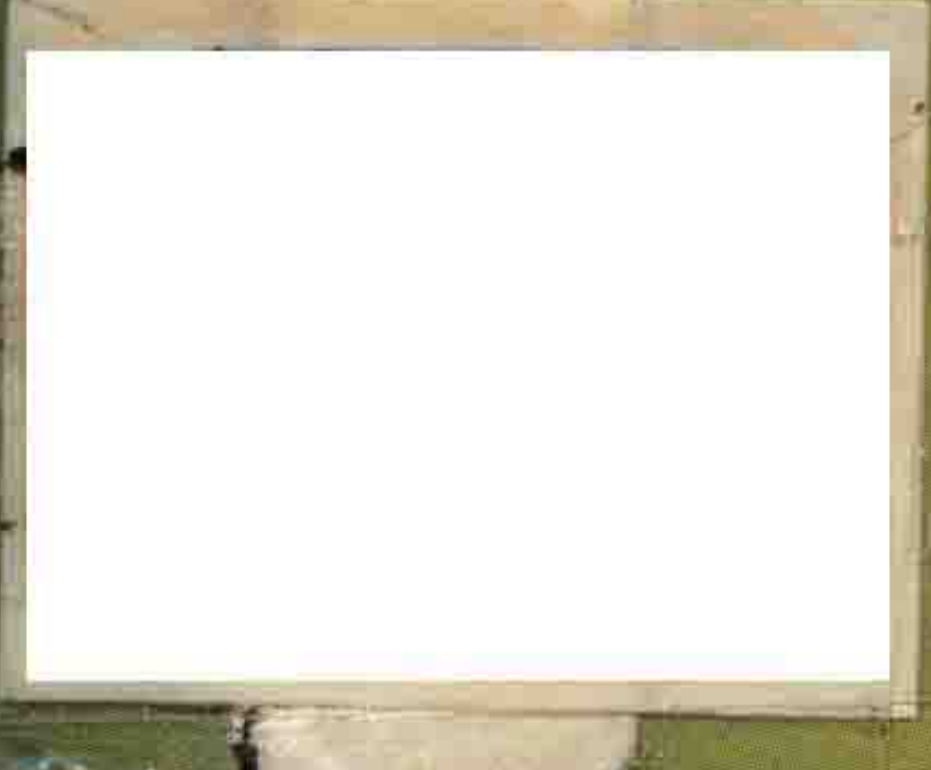
**McGraw-Hill Book Company**  
Serving the Need for Knowledge  
1221 Avenue of the Americas  
New York, NY 10020

ISBN 0-07-045420-5



McGraw-Hill Dictionary of  
SCIENCE AND  
ARTS

er





# McGraw-Hill Dictionary of CHEMISTRY

**Sybil P. Parker**

---

Editor in Chief

**McGraw-Hill Book Company**

New York   St. Louis   San Francisco

Auckland   Bogotá   Guatemala   Hamburg  
Johannesburg   Lisbon   London   Madrid   Mexico  
Montreal   New Delhi   Panama   Paris   San Juan  
São Paulo   Singapore   Sydney   Tokyo   Toronto

**McGRAW-HILL DICTIONARY OF CHEMISTRY**

The material in this Dictionary has been published previously in the **McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS**, Third Edition, copyright © 1984 by McGraw-Hill, Inc. All rights reserved. Philippines copyright 1984 by McGraw-Hill, Inc. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

1 2 3 4 5 6 7 8 9 0 DODO 8 9 1 0 9 8 7 6 5 4

ISBN 0-07-045420-5

**Library of Congress Cataloging in Publication Data**

McGraw-Hill dictionary of chemistry.

1. Chemistry—Dictionaries. I. Parker, Sybil P.  
II. McGraw-Hill Book Company. III. Title: Dictionary  
of chemistry.

QD5.M357 1984 540'.3'21 84-12205  
ISBN 0-07-045420-5

**McGraw-Hill  
Dictionary of  
CHEMISTRY**



# Preface

The *McGraw-Hill Dictionary of Chemistry* is a unique addition to the chemical literature in that it focuses on the vocabulary of theoretical and applied chemistry rather than on chemicals and materials, and includes the specialized terminology of atomic and nuclear physics.

The more than 9000 terms that are defined in the Dictionary represent 11 fields, including analytical chemistry, biochemistry, chemical engineering, crystallography, geochemistry, inorganic, organic, and physical chemistry, and spectroscopy, as well as related fields of physics. This multidisciplinary approach will prove to be invaluable for most professional or pedagogical needs.

Terms and definitions for this Dictionary were selected from the *McGraw-Hill Dictionary of Scientific and Technical Terms* (3d ed., 1984). Synonyms, acronyms, and abbreviations are given with the definitions and are also listed in the alphabetical sequence as cross-references to the defining term. Empirical or line formulas accompany all entries for compounds.

The *McGraw-Hill Dictionary of Chemistry* will serve as an indispensable reference tool for chemists and other scientists, chemical engineers, educators, students, and writers needing clear, concise definitions of chemical terminology.

**Sybil P. Parker**  
EDITOR IN CHIEF



# Editorial Staff

**Sybil P. Parker**, Editor in Chief

**Jonathan Weil**, Editor  
**Betty Richman**, Editor

**Edward J. Fox**, Art director

**Ann D. Bonardi**, Art production supervisor

**Joe Faulk**, Editing manager

**Ann Jacobs**, Editing supervisor  
**Frank Kotowski, Jr.**, Editing supervisor  
**Patricia W. Albers**, Senior editing assistant

## Consulting and Contributing Editors

from the McGraw-Hill Dictionary of Scientific and Technical Terms

**Prof. George S. Bonn**—Formerly, Graduate School of Library Science, University of Illinois. LIBRARY CONSULTANT.

**Robert L. Davidson**—Formerly, Editor in Chief, Business Books and Services, Professional and Reference Division. McGraw-Hill Book Company. CHEMICAL ENGINEERING.

**Prof. Roland H. Good, Jr.**—Department of Physics, Pennsylvania State University. PHYSICS.

**Dr. N. Karle Mottet**—Professor of Pathology, University of Washington School of Medicine. BIOCHEMISTRY.

**Dr. Charles Oviatt**—State Department of Education of Missouri. CHEMISTRY.

**Dr. Leonard Spero**—Walter Reed Hospital Unit, Fort Detrick, Maryland. CHEMISTRY.

**Dr. C. N. Touart**—Senior Scientist, Air Force Geophysics Laboratory. GEOCHEMISTRY.

# How to Use the Dictionary

## I. ALPHABETIZATION

The terms in the *McGraw-Hill Dictionary of Chemistry* are alphabetized on a letter-by-letter basis; word spacing, hyphen, comma, and prime in a term are ignored in the sequencing. Also ignored in the sequencing of terms (usually chemical compounds) are italic elements, numbers, small capitals, and Greek letters. For example, the following terms appear within alphabet letter "A":

1-aminoadamantane  
amino alcohol  
*para*-aminobenzoic acid  
 $\gamma$ -aminobutyric acid  
2-aminoisovaleric acid  
1-amino-2-propanol  
3',5'-AMP

## II. CROSS-REFERENCING

A cross-reference entry directs the user to the defining entry. For example, the user looking up "amyl carbinol" finds:

**amyl carbinol** *See* hexyl alcohol.

The user then turns to the "H" terms for the definition.

Cross-references are also made from variant spellings, acronyms, abbreviations, and symbols.

**AES** *See* Auger electron spectroscopy.

**aluminium** *See* aluminum.

**at. wt** *See* atomic weight

**Au** *See* gold.

The user turning directly to a defining entry will find the above type of information included, introduced by "Also known as . . .," "Also spelled . . .," "Abbreviated . . .," "Symbolized . . .," "Derived from . . ."

## III. CHEMICAL FORMULAS

Chemistry definitions may include either an empirical formula (say, for abscisic acid,  $C_{16}H_{20}O_4$ ) or a line formula (for acrylonitrile,  $CH_2CHCN$ ), whichever is appropriate.





**McGraw-Hill  
Dictionary of  
CHEMISTRY**



# A

**a axis** One of the crystallographic axes used as reference in crystal description, usually oriented horizontally, front to back.

**abalyn** A liquid rosin that is a methyl ester of abietic acid; prepared by treating rosin with methyl alcohol; used as a plasticizer.

**Abegg's rule** An empirical rule, holding for a large number of elements, that the sum of the maximum positive and negative valencies of an element equals eight.

**Abel tester** A laboratory instrument used in testing the flash point of kerosine and other volatile oils having flash points below 120°F (49°C); the oil is contained in a closed cup which is heated by a fixed flame below and a movable flame above.

**abietic acid**  $C_{20}H_{30}O_2$  A tricyclic, crystalline acid obtained from rosin; used in making esters for plasticizers.

**ABS** *See* acrylonitrile butadiene styrene.

**abscisic acid**  $C_{15}H_{20}O_4$  A plant hormone produced by fruits and leaves that promotes abscission and dormancy and retards vegetative growth. Formerly known as abscisin.

**abscisin** *See* abscisic acid.

**absolute alcohol** Ethyl alcohol that contains no more than 1% water. Also known as anhydrous alcohol.

**absolute boiling point** The boiling point of a substance expressed in the unit of an absolute temperature scale.

**absolute density** *See* absolute gravity.

**absolute gravity** Density or specific gravity of a fluid reduced to standard conditions; for example, with gases, to 760 mmHg pressure and 0°C temperature. Also known as absolute density.

**absolute reaction rate** The rate of a chemical reaction as calculated by means of the (statistical-mechanics) theory of absolute reaction rates.

**absorb** To take up a substance in bulk.

**absorbance** The common logarithm of the reciprocal of the transmittance of a pure solvent. Also known as absorbancy; extinction.

**absorbancy** *See* absorbance.

**absorbency** Penetration of one substance into another.



**absorbency index** *See* absorptivity.

**absorber** Equipment in which a gas is absorbed by contact with a liquid.

**absorptiometer** 1. An instrument equipped with a filter system or other simple dispersing system to measure the absorption of nearly monochromatic radiation in the visible range by a gas or a liquid, and so determine the concentration of the absorbing constituents in the gas or liquid. 2. A device for regulating the thickness of a liquid in spectrophotometry.

**absorptiometric analysis** Chemical analysis of a gas or a liquid by measurement of the peak electromagnetic absorption wavelengths that are unique to a specific material or element.

**absorption** The taking up of matter in bulk by other matter, as in dissolving of a gas by a liquid.

**absorption constant** *See* absorptivity.

**absorption edge** The wavelength corresponding to a discontinuity in the variation of the absorption coefficient of a substance with the wavelength of the radiation. Also known as absorption limit.

**absorption limit** *See* absorption edge.

**absorption line** A minute range of wavelength or frequency in the electromagnetic spectrum within which radiant energy is absorbed by the medium through which it is passing.

**absorption peak** A wavelength of maximum electromagnetic absorption by a chemical sample; used to identify specific elements, radicals, or compounds.

**absorption plant** A facility to recover the condensable portion of natural or refinery gas.

**absorption process** A method in which light oil is introduced into an absorption tower so that it absorbs the gasoline in the rising wet gas; the light oil is then distilled to separate the gasoline.

**absorption spectrophotometer** An instrument used to measure the relative intensity of absorption spectral lines and bands. Also known as difference spectrophotometer.

**absorption spectroscopy** The study of spectra obtained by the passage of radiant energy from a continuous source through a cooler, selectively absorbing medium.

**absorption spectrum** The array of absorption lines and absorption bands which results from the passage of radiant energy from a continuous source through a cooler, selectively absorbing medium.

**absorption tube** A tube filled with a solid absorbent and used to absorb gases and vapors.

**absorptive power** *See* absorptivity.

**absorptivity** The constant  $a$  in the Beer's law relation  $A = abc$ , where  $A$  is the absorbance,  $b$  the path length, and  $c$  the concentration of solution. Also known as absorptive power. Formerly known as absorbency index; absorption constant; extinction coefficient.

**ABS resin** *See* acrylonitrile butadiene styrene resin.

- acaroid resin** A gum resin from aloelike trees of the genus *Xanthorrhoea* in Australia and Tasmania; used in varnishes and inks. Also known as gum accroides; yacca gum.
- acceleration globulin** A globulin that acts to accelerate the conversion of prothrombin to thrombin in blood clotting; found in blood plasma in an inactive form.
- accelerator** In the manufacture of rubber, a substance that acts as a catalyst of vulcanization but undergoes a chemical change in the process.
- accelofilter** A filtration device that uses a vacuum or pressure to draw or force the liquid through the filter to increase the rate of filtration.
- acceptor** 1. A chemical whose reaction rate with another chemical increases because the other substance undergoes another reaction. 2. A species that accepts electrons, protons, electron pairs, or molecules such as dyes.
- accessory element** See trace element.
- accumulator** An auxiliary ram extruder on blow-molding equipment used to store melted material between deliveries.
- acediamine hydrochloride** See acetamidine hydrochloride.
- acenaphthene**  $C_{12}H_{10}$  An unsaturated hydrocarbon whose colorless crystals melt at  $92^{\circ}\text{C}$ ; insoluble in water; used as a dye intermediate and as an agent for inducing polyploidy.
- 1,2-acenaphthenedione** See acenaphthequinone.
- acenaphthequinone**  $C_{10}H_6(\text{CO})_2$  A three-ring hydrocarbon in the form of yellow needles melting at  $261\text{--}263^{\circ}\text{C}$ ; insoluble in water and soluble in alcohol; used in dye synthesis. Also known as 1,2-acenaphthenedione.
- acene** Any condensed polycyclic compound with fused rings in a linear arrangement; for example, anthracene.
- acenocoumarin** See acenocoumarol.
- acenocoumarol**  $C_{19}H_{15}\text{NO}_6$  A tasteless, odorless, white, crystalline powder with a melting point of  $197^{\circ}\text{C}$ ; slightly soluble in water and organic solvents; used as an anticoagulant. Also known as acenocoumarin.
- acephate**  $C_4H_{10}\text{NO}_3\text{PS}$  A white solid with a melting point of  $72\text{--}80^{\circ}\text{C}$ ; very soluble in water; used as an insecticide for a wide range of aphids and foliage pests. Also known as *O,S*-dimethyl acetylphosphoramidothioate.
- acephatemet**  $\text{CH}_3\text{OCH}_2\text{SPONH}_2$  A white, crystalline solid with a melting point of  $39\text{--}41^{\circ}\text{C}$ ; limited solubility in water; used as an insecticide to control cutworms and borers on vegetables. Also known as *O,S*-dimethylphosphoramidothioate; methamidophos.
- acetal** 1.  $\text{CH}_3\text{CH}(\text{OC}_2\text{H}_5)_2$  A colorless, flammable, volatile liquid used as a solvent and in manufacture of perfumes. Also known as 1,1-diethoxyethane. 2. Any one of a class of compounds formed by the addition of alcohols to aldehydes.
- acetaldehydase** An enzyme that catalyzes the oxidation of acetaldehyde to acetic acid.
- acetaldehyde**  $\text{C}_2\text{H}_4\text{O}$  A colorless, flammable liquid used chiefly to manufacture acetic acid. Also known as ethanal.

***para*-acetaldehyde** See paraldehyde.

**acetaldehyde ammonia** See aldehyde ammonia.

**acetaldehyde cyanohydrin** See lactonitrile.

**acetal resins** Linear, synthetic resins produced by the polymerization of formaldehyde (acetal homopolymers) or of formaldehyde with trioxane (acetal copolymers); hard, tough plastics used as substitutes for metals. Also known as polyacetals.

**acetamide**  $\text{CH}_3\text{CONH}_2$  The crystalline, colorless amide of acetic acid, used in organic synthesis and as a solvent. Also known as ethanamide.

**acetamidine hydrochloride**  $\text{C}_2\text{H}_6\text{N}_2 \cdot \text{HCl}$  Deliquescent crystals that are long prisms with a melting point reported as either  $174^\circ\text{C}$  or  $164\text{--}166^\circ\text{C}$ ; soluble in water and alcohol; used in the synthesis of imidazoles, pyrimidines, and triazines. Also known as acediamine hydrochloride;  $\alpha$ -amino- $\alpha$ -iminoethane hydrochloride; ethanamidine hydrochloride; ethenylamidine hydrochloride.

**acetamidoacetic acid** See aceturic acid.

***para*-acetamidobenzenesulfonyl chloride** See *N*-acetylsulfanilyl chloride.

**2-acetamido-4-mercaptobutyric acid- $\gamma$ -thiolactone** See *N*-acetylhomocysteinethiolactone.

**1- $\alpha$ -acetamido- $\beta$ -mercaptopropionic acid** See acetylcysteine.

**acetamidophenol** See acetaminophen.

**$\alpha$ -acetamido- $\gamma$ -thiobutyrolactone** See *N*-acetylhomocysteinethiolactone.

**acetaminophen**  $\text{C}_8\text{H}_9\text{O}_2\text{N}$  Large monoclinic prisms with a melting point of  $169\text{--}170^\circ\text{C}$ ; soluble in organic solvents such as methanol and ethanol; used in the manufacture of azo dyes and photographic chemicals, and as an analgesic and antipyretic. Also known as acetamidophenol; acetaminophenol; *N*-acetyl-*para*-aminophenol (APAP); *para*-hydroxyacetanilide.

**acetaminophenol** See acetaminophen.

**acetanilide** An odorless compound in the form of white, shining, crystalline leaflets or a white, crystalline powder with a melting point of  $114\text{--}116^\circ\text{C}$ ; soluble in hot water, alcohol, ether, chloroform, acetone, glycerol, and benzene; used as a rubber accelerator, in the manufacture of dyestuffs and intermediates, as a precursor in penicillin manufacture, and as a painkiller. Also known as *N*-phenylacetamide.

**acetanisidine** See methacetin.

**actarsonic acid** See 3-acetamido-4-hydroxybenzenearsonic acid.

**acetate** One of two species derived from acetic acid,  $\text{CH}_3\text{COOH}$ ; one type is the acetate ion,  $\text{CH}_3\text{COO}^-$ ; the second type is a compound whose structure contains the acetate ion, such as ethyl acetate.

**acetate C-8** See *n*-octyl acetate.

**acetate dye** 1. Any of a group of water-insoluble azo or anthroquinone dyes used for dyeing acetate fibers. 2. Any of a group of water-insoluble amino azo dyes that are treated with formaldehyde and bisulfate to make them water-soluble.