A DICTIONARY OF CHEMICAL TERMS

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9781760574420

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

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THIRD PRINTING

NEW YORK
D. VAN NOSTRAND COMPANY, INC.
250 FOURTH AVENUE

Printed in the United States of America

LANCASTER PRESS, INC.
LANCASTER, PA.

PREFACE.

This volume occupies a territory which is, at present, covered by no other book and is designed to serve the convenience of anyone who has occasion to read chemical literature. The broad extension of chemical activities into apparently unrelated lines combined with specialization of interests has resulted in a complex and scattered terminology. It is often difficult and, in many cases, all but impossible, even with the best of library facilities, to find a definition for many of the more recently introduced terms. Under such conditions it is not easy for the chemist to read intelligently chemical literature which is not rather closely related to his own narrow specialty.

To assist in removing some of these difficulties this dictionary is offered to the chemical profession. It has been attempted to make it practical rather than academic and no pains have been spared to insure its accuracy and completeness. It has been subjected to detailed criticism and revision by a number of specialists in varied lines and the whole has been carefully edited.

The treatment of the terms has been designed to lie somewhere between that of a standard English dictionary and that of an encyclopaedia; in most cases elementary terms have received more extended treatment than more advanced terms. Controversy has been avoided where possible; usually the commonly accepted definition has been given and, often, the conflicting views are stated. The author, however, does not wish to be understood as assuming the position of referee in any controversial matter treated, nor must the definitions be considered to represent his private opinion in all cases. The definition given is intended to represent the idea generally accepted by chemists at this time.

Although every effort has been made to insure accuracy and completeness some errors in details and in conceptions may have escaped detection. The author, therefore, invites the fullest con-

structive criticism from any reader in order that such errors may be eliminated in future editions.

The author desires to express his indebtedness to Dr. H. H. Custis, Mr. J. N. Taylor, Dr. L. T. Giltner, and Mr. A. V. Fuller, for valuable advice, suggestion, and criticism, without whose assistance and encouragement it would have been difficult to have brought this work to a successful conclusion.

J. F. C.

A DICTIONARY OF CHEMICAL TERMS.

A.

Absorption. The imbibing or attracting into its mass of one substance by another so that the absorbed substance disappears physically. The phenomenon may be due either to molecular or chemical action but is distinct from "adsorption" which is characterized by surface tension and condensation.

Absorption Apparatus. Certain forms of apparatus which are used especially in gas analysis by means of which a portion of the sample under examination is absorbed and its quantity thus determined.

Absorption of Gases. (Invasion.) The solution of gases in liquids is termed absorption and, more recently, "invasion." Such solutions obey the laws of Dalton and Henry unless the dissolved gas reacts with the solvent or forms a constant-boiling mixture with it.

Absorption of Light. When a compound beam of light is passed through a certain medium one or more of the constituent rays may disappear so that the light which issues from the medium is of different composition from that which entered it. The rays which have disappeared are said to have been absorbed. The property of absorbing certain rays is characteristic of a large number of substances and appears to be a function of their constitutions.

Absorption, Unilateral and Bilateral. The degree of absorption varies with the wave-length of the light. When the absorption increases or decreases steadily with the wave-length the condition is termed unilateral absorption; when, however, there occurs a minimum absorption in the spectrum with increased absorption on either side whether the wave-length increases or decreases the condition is termed bilateral absorption.

Absorptiometer. A graduated tube closed at one end used for the analysis of gases by introducing an absorbing agent and noting the decrease in volume of the contents of the tube. Often incorrectly termed an eudiometer.

Absorptive Power, or Coefficient of Absorption. A term used to denote the fraction of radiant energy incident to a surface which is transformed into heat. It varies with the wave-length of the radiation and the angle of incidence. The reciprocal term is reflective power.

Acaulescent. (bot.) Nearly or completely stemless.

Acceleration. The rate of change of the velocity of a chemical reaction. When the acceleration is positive the reaction is increasing, when negative the reaction is diminishing in velocity.

Acceptor. A substance which unites with the active oxygen produced during the oxidation of certain other sub-

stances which will not unite with oxygen in the absence of the acceptor.

Acetals. Dialkyl ethers of hypothetical glycols. These glycols, if they existed, would contain two hydroxyl groups attached to one carbon atom as occurs in chloral hydrate. Acetals are formed by the union of two alcohol molecules with one of an aldehyde.

Acetimetry. The process of determining the acetic acid strength of vinegar.

Acetimeter. An instrument for acetimetry.

Acetenyl Group. A name applied to the group —C=CH when it occurs in organic compounds.

Acetyl. The important organic radical CH_3CO— derived from acetic acid.

Acetylate. **Acetylize.** **Acetylization.** The act or process of introducing the acetyl radical into an organic compound usually accomplished by boiling the substance with acetyl chloride or even by merely boiling with acetic acid.

Acetylene Series. Alkines. Aliphatic hydrocarbons of the general formula C_nH_{2n-2} characterized by a triple carbon linkage due to their content of the methenyl radical, ⋮CH. The name of the series is derived from that of the simplest member acetylene, and the name of each hydrocarbon is formed, according to the Geneva plan, by changing the "yl" termination of the alcohol radicals of like carbon content to "ine," e.g. alkyl—alkine, ethyl—ethine.

Achene. (bot.) A small fruit which is one celled, one seeded, dry, hard, and indehiscent.

Acicular. Needle-shaped; applied to crystals.

Acid. 1. Any substance which may ionize in solution to form hydrogen ions. 2. Any substance which contains hydrogen capable of being replaced by basic radicals. Acids are classified as monobasic, dibasic, tribasic, polybasic, etc., according to the number (one, two, three, many, etc.) of hydrogen atoms replaceable by bases contained in a molecule; as organic when the molecule contains carbon; as normal, if they are derived from nitrogen, phosphorus, arsenic, and antimony and contain three hydroxyl groups, e.g. ortho-phosphoric acid; as ortho, meta, or para, according to the location of the carboxyl group in relation to another substituent in a cyclic compound, or as ortho, meta, or pyro, according to the composition of the compound.

Acid Anhydrides. Compounds derived from the acids by the elimination of one or more molecules of water from one or more molecules of the acid. The corresponding acids may commonly be regenerated from them by the addition of water, the process being often accompanied by an evolution of heat. It is worthy of note that, in the early periods of chemical theory, the acid anhydrides were regarded as the true acids, e.g. SO_3 was considered the formula of sulphuric acid.

Acid Chlorides. Substances produced by substituting chlorine for hydroxyl in acid molecules, e.g., acetyl chloride, CH_3COCl. Termed also "acyl chlorides."

Acid Egg. An egg-shaped vessel of wrought iron fitted with appropriate piping which is used in the manufacture of sulphuric acid to pump the acid to the towers. Compressed air is the motive power employed.

Acids, Haloid. Acids which contain no oxygen in the molecule but are composed of hydrogen and an halogen element. Obsoletely "hydracids."

Acid Number. A term used in the analysis of fats or waxes to designate the number of milligrams of potassium hydroxide required to neutralize the free fatty acids in one gram of substance. The determination is performed by titrating an alcoholic solution of the wax or fat with tenth or half-normal alkali using phenolphthalein as indicator.

Acids, Oxygen. Acids which contain oxygen in contradistinction to the haloid acids. Obsoletely "oxyacids."

Acids, Pseudo. Substances which exhibit Ionic Isomerism (q.v.). Various compounds containing the group $-NO_2$ and which are neutral may become acid by the tautomeric change of the NO_2 group to $=NO.OH$ and exhibit the characteristic properties of acids.

Acid Radicals. 1. The portion of the acid molecule apart from the hydroxyl group. Thus, NO_2 is the acid radical of nitric acid. 2. The anionic portion of an acid, i.e. SO_4'', Cl'.

Acids, Sulphonic. An important class of organic acids characterized by content of the group $-SO_2.OH$, the "sulphonic acid" group. They are formed by digesting certain hydrocarbons or other compounds with either concentrated or fuming sulphuric acid and react as acids. They are usually very soluble in water and alcohol and only slightly soluble in ether and non-oxygenated solvents.

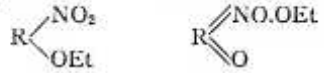
Acidimeter. (Obs.) A term formerly applied to a form of hydrometer used to determine the specific gravity of acid liquids.

Acidimetry. The process of determining the amount of an acid present in a sample by titration against a standard alkaline solution. The volume of reagent necessary exactly to neutralize the acid solution measures the number of gram-molecules of acid present. (V. analysis.)

Acidylate. To acylate.

Acidylation. Acylation.

Aci-Nitro Compounds. The colored isomers of the true nitro compounds e.g.



True nitro (ester) Aci-nitro (ester)
Cf. Pseudo acids.

Acivinyl Alcohols. The unsaturated ketols (q.v.).

Actinium. A radioactive element discovered by Debierne in 1899. It stands between Thorium and Radium in the genealogical table of active elements (Rutherford). Actinium has not yet been obtained in a pure enough condition for exact study.

Actinometry. The determination of the photo-chemical intensity of light.

Actinometer. An instrument for measuring the photo-chemical intensity of light by exposing to the vibrations some chemical system which is sensitive to the influence of light. The best known are: Draper's Chlorine-Hydrogen actinometer, Bunsen and Roscoe's Silver Chloride actinometer, the Mercury Oxalate actinometer, and the Electro-Chemical actinometer.

Action, Intermolecular, Principle of. In determining the constitution of molecules by studying their decomposition products it is assumed that