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HACKH'S CHEMICAL DICTIONARY

[*American and British Usage*]

Containing the Words Generally Used in Chemistry, and Many of the Terms Used in the Related Sciences of Physics, Astrophysics, Mineralogy, Pharmacy, Agriculture, Biology, Medicine, Engineering, etc.

Based on Recent Chemical Literature

FOURTH EDITION
Completely Revised and Edited by

JULIUS GRANT
M.SC., PH.D., F.R.I.C. CHEMICAL CONSULTANT

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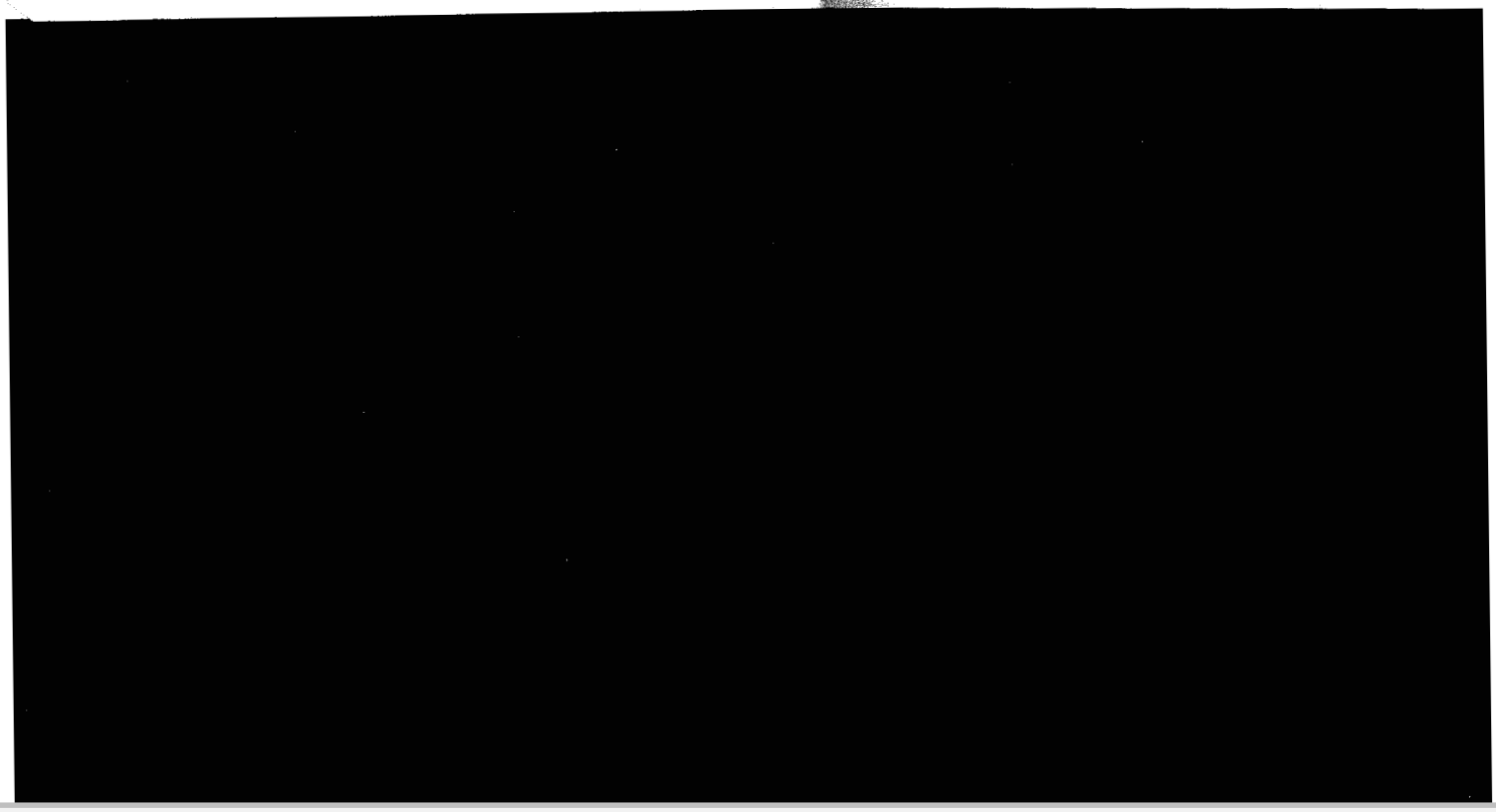
PREFACE

The unprecedented advances in science in general and chemistry in particu
the 25 years that have elapsed since the third edition of this Dictionary was
have created some special problems in the preparation of this new edition.
vances referred to have, of course, produced many new words, which have
defined. Coping numerically with these is a problem in itself, though by
an insuperable one. The author started "collecting" as soon as the manuscr
third edition left his hands; and although he does not presume to have recor
new word which has appeared, he feels fairly safe in claiming the inclusio
new words of any importance. A Dictionary of this nature must define new
even many obsolete terms (indicating, of course, that they are obsolete), and
the total number or words now defined, is nearly 55,000. Due attention has,
been given to the fact that the Dictionary is intended to include words fro
sciences, as well as from chemistry.

Since new organic compounds are being recorded in the literature at the rat
thousands a year, it is obvious that relatively few of them can be include
Dictionary. With compounds of minor importance however, a "definition"
little more than a chemical formula and a list of a few physical properties, and
easily obtainable from the chemical literature.

An explanation of the policies adopted in dealing with some special pr
desirable. Often, a commonly accepted or abbreviated name for a chemical c
or preparation has, in the course of years, become a registered trade name;
versa. Thus difficulties have occurred in the second and third editions of the D
when a company has wished to register a trade name, because the question
whether the name is already accepted as a common description of the compo
cerned. Since the Dictionary has been widely quoted as an authority in ar
decisions of this nature, it should be made clear that the listing of a word
chemical term does not necessarily mean that it has not been adopted as a tra
and that there is no intention to use a term in a generic sense if it is in fact a tra

In the present edition, product names have been given an initial capital le
described as trademarks when such information has been available. Other
have been shown similarly and identified as proprietary or trade names wh
information is known. The use of a general designation does not therefore exc
possibility that a more specific designation may properly apply. It has alw
the policy of the author not to mention by name individual companies owning
ated with trade-name entries, registered or otherwise, and this policy is still foll



oxime, m.195–200 water. A reagent a purple-red color). 152.06. Solbrol, n isomer of methyl

Propyl *p*-hydroxy- servative. = 129.09. 3- isomer of hygric

panese polyamide

awa); not verified.

astings: Cr 64, Co races of Si and Al. agnetic, weldable 5–7, Cr 1.5–4%; and in manifold

(OH)COOMe = l 2-hydroxy-5- kaloid. Colorless a local anesthetic. 5,5-Phenylethyl- hypnotic. Cf.

al nisin, an anti- *reptococcus lactis*; spoilage bacteria. duced by *Strepto-* rative for canned *unit*. 9. A highly un-

acid (d.1.42) in hing reagent for

Chile- or cubic- alcium nitrate. **rit of-** Spirit of

Crude sodium and nitrate; a f nitric acid by

-titanium inter- aft construction, ility and impact

i-Ni alloys, used

no. 86, which non, and thoron

12. Nitro-acet- **p-** m.92. **meta-**

riacidium ion. ponsible for the by nitric acid ium: $2HNO_3 \rightleftharpoons$

ment from the

ration of steel , pickling, and

immersion in fused potassium nitrate at 500°C. Blister formation is thereby minimized.

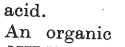
nitralloy. Cr-Al steels containing 0.2–0.6% C, surface-hardened by nitridation.

Nitram. Trade name for prills of ammonium nitrate fertilizer, with a deliquescence-preventing additive.

nitramide. NH_2NO_2 = 62.1. Colorless crystals, m.75. **phenyl-** $C_6H_5NH{\cdot}NO_2$ = 138.1. Colorless crystals, m.46, soluble in water.

nitramides. A group of compounds derived from nitramide and differing from nitramines by the presence of a radical —COO—; as, $NO_2{\cdot}NH{\cdot}COOH$, nitrocarbamic acid.

nitramine. (1) An organic compound containing the radical —NH·NO_2 or =N·NO_2. (2) Picryl methyl n. An indicator, changing at pH 10.5 from colorless (weakly alkaline) to brown (strongly alkaline). **diethyl-** $Et_2N{\cdot}NO_2$ = 118.1. Colorless liquid, b.206. **dimethyl-** $Me_2N{\cdot}NO_2$ = 90.1. Colorless crystals, m.58, soluble in water. **ethyl-** $EtNH{\cdot}NO_2$ = 90.1. Colorless liquid, m.3. **iso-** A compound containing the radical



phenyl- $NHPh{\cdot}NO_2$ = 138.1. Colorless crystals, m.46, soluble in water. **phenyl methyl-** $MeNPh{\cdot}NO_2$ = 152.2. Colorless crystals, m.39, soluble in water. **propyl-** $PrNH{\cdot}NO_2$. Colorless liquid, b.140.

nitramino. The radical NO_2NH—. **n. acetic acid.** $C_2H_4O_4N_2$ = 120.2. A homolog of nitrourethane. Colorless crystals, m.103, soluble in water (strongly acid).

nitranilic acid. $C_6H_2O_8N_2$ = 230.07. Dinitrodihydroxybenzoquinone, m.100, decomp. 170, soluble in water.

nitranilide. $C_6H_5N{:}NO{\cdot}OH$ = 138.1. Diazobenzene acid. Phenylisonitramine. An isomer of phenyl nitramine. Colorless crystals, m.46, soluble in water.

nitraniline. $NH_2{\cdot}C_6H_4{\cdot}NO_2$ = 138.1. **ortho-** or **1,2-** Colorless needles, m.71, soluble in water. **meta-** or **1,3-** Yellow needles, m.114, slightly soluble in water. **para-** or **1,4-** Yellow needles, m.146, soluble in water. All used in organic synthesis and as indicators for strong acids. **di-** See *dinitroaniline*.

nitranilines. Compounds derived from benzene by the substitution of 2 or more H atoms by one or more NH_2— and NO_2— radicals. The higher-nitrated anilines are powerful explosives.

nitrate. (1) A salt of nitric acid, or compound containing the radical —NO_3. (2) Nitration. **n. ion.** The NO_3^- ion, colorless, and forming no insoluble precipitates with metallic ions. **n. of lime.** Calcium n. **n. of potash.** Potassium n. **n. of soda.** Sodium n. **n. of soda-potash-** A crude Chilean saltpeter: sodium nitrate 75, potassium nitrate 25%; a fertilizer.

nitrated. Describing an organic compound containing the —NO_2 group.

nitratine. A mineral form of sodium nitrate.

nitration. The introduction of the NO_2 group into an organic compound, usually by means of a mixture of sulfuric and nitric acids.

nitrato- Prefix indicating an organic compound containing the radical —O·NO_2. Cf. *nitrito-*.

nitrator. A vessel, usually double-jacketed, with

heating or cooling coils and stirring device, used for nitration.

Nitrazine Paper. Trademark for a filter paper, impregnated with sodium dinitrophenyl azonaphthol disulfonate; used to indicate pH values: yellow 4.5, olive green 6.2, blue 7.0. **N. yellow.** An indicator dye (pH 6.5: yellow—acid to blue-green—alkaline).

nitre. Niter. **n. air.** See *oxygen*.

nitrenes. Compounds of the type $R_2C{:}NR{:}CR_2$.

nitriacidium ion. Nitracidium ion.

nitric acid. HNO_3 = 63.02. Colorless liquid, $d_0$1.53, m.—40.3, b.86, soluble in water; used extensively as its aqueous solutions: (1) Fuming: 86% HNO_3 with some N_2O_4. Brown-red fuming liquid, d.1.48–1.5; an energetic oxidizing agent in chemical analysis and synthesis. (2) Concentrated: 65% HNO_3. Aqua fortis, azotic acid. Faintly yellow liquid, d.1.40–1.42. Used as a solvent for metals and an oxidizing agent; in etching and many chemical operations; and to nitrate organic compounds. (3) 32–34% HNO_3. d.1.20. (4) Dilute: 10% HNO_3. Colorless liquid, d.1.06; a reagent, solvent, and acidifying agent. **chloro-** See *chloro-*. **per-** HNO_4. An acid of doubtful existence.

n. anhydride. Nitrogen pentoxide. **n. hydrate.** $HNO_3 + 32\%\ H_2O$. $d_{15.5}$1.414, b.121.

nitric ether. Ethyl nitrate.

nitric oxide. NO = 30.0. N_2O_2 = 60.0. Nitrogen dioxide. Colorless gas, $d_{air=1}$1.0366, b.—153, soluble in water. Formed in the electric arc from air; oxidizes readily to nitrogen peroxide.

nitridation. (1) Formation of metallic nitrides by heating metals in nitrogen to increase hardness. Cf. *nitration*. (2) De-electronation in the ammonia system, analogous to oxidation in the water system. Cf. *nitridizing agent*.

nitride. A binary compound of nitrogen and a metal. The alkali and earth-alkali nitrides are readily hydrolyzed: $Mg_3N_2 + 6H_2O = 3Mg(OH)_2 + 2NH_3$.

nitridizing agent. A substance that furnishes nitrogen or causes an exchange of electrons in liquid ammonia; as, hydrazoic acid (ammononitric acid), HN_3; analogous to nitric acid, HNO_3, as oxidizing agent.

nitrifiable. Descibing a nitrogen compound that can be transformed into nitrates by soil bacteria.

nitrification. Oxidation of the nitrogen in ammonia to nitrous and nitric acid or salts.

nitrifiers. Soil bacteria which oxidize ammonia and its derivatives to nitrites (as nitromonas) or to nitrates (as nitrobacter).

nitrifying. To cause the oxidation of ammonia or atmospheric nitrogen to nitrites and nitrates, e.g., by n. bacteria and n. catalysts.

nitrilase. A catalase that converts aldehydes to cyanohydrins, R·CHOH·CN.

nitrile. A cyanide prepared from an acid amide, $R{\cdot}CONH_2 - H_2O = R{\cdot}CN$; on hydrolysis they yield the corresponding acid and evolve ammonia. **n. group.** The negative ≡N from ammonia after substitution of its 3 H atoms. **n. rubber.** q. v.

nitriles. Cyanides. Organic compounds containing the radical —CN. **acid-** Nitrile. A name indicating the relation of n. with the —COOH group: —C(:O)·OH → —C(:O)·NH_2 → —C⋮N. **basic-** NR_3. A tertiary amine having 3 different C atoms attached to the same N. **di-** Dicyanide. A compound containing 2 —CN radicals. **mono-** A compound containing one —CN radical.

nitrilo- Prefix indicating a triple-bond nitrogen atom, ≡N.

Nitrilon. Trade name for a polyacrylonitrile synthetic fiber.

nitrine. N_3 = 42.02. A hypothetical allotropic form of nitrogen analogous to ozone, O_3. See *active nitrogen*.

nitrite. A salt of nitrous acid, or a compound containing the radical —NO_2. The inorganic nitrites of the type MNO_2 are all insoluble, except the alkali nitrites. The organic nitrites or nitrito compounds may be isomeric, but not identical with the corresponding nitro compounds.

nitrito- Describing an organic compound containing the radical —O·N:O (oxynitroso). **n. cobalomin.** Vitamin B_{12c}. The vitamin produced by replacing the —CN group of vitamin B_{12} by a —NO_2 group.

nitro- (1) A prefix which denotes the presence of the radical —NO_2 or —N<O/O. Nitro compounds are usually yellowish in color, and differ from the less stable, isomeric nitrito compounds. Cf. *nitroxyl*, *nitrite*, *nitrito*. (2) A misnomer for nitrate; as, nitroglycerin (glyceryl nitrate). **aci-** Isonitro-. The radical HOON=. **iso-** See *iso-nitro-*.

nitroacid. A compound containing both the radicals —COOH and —NO_2; as: $NO_2{\cdot}CH_2{\cdot}COOH$, nitroacetic acid; $NO_2{\cdot}CH_2{\cdot}CH_2{\cdot}COOH$, nitropropionic acid.

nitroalizarin. $C_{14}H_5O_2(OH)_2NO_2$ = 285.1. **α-** or **4,1,2-** Yellow crystals, decomp. 290. **β-** or **3,1,2-** Alizarin orange. Orange-yellow crystals, decomp. 244, slightly soluble in water, soluble in alcohol; used as dye, and as an intermediate in organic synthesis.

nitroamine. Nitramine.

nitroanisole. $C_6H_4(OMe)NO_2$ = 153.1. **ortho-** 1-Methoxy-2-nitrobenzene. Yellow liquid, d.1.268, m.9, b.265. **meta-** m.38, b.258. **para-** Colorless or yellowish plates, d.1.233, m.54, b.258. Insoluble in water, soluble in alcohol or ether.

nitroanthracene. $C_{14}H_9NO_2$ = 223.2. Nitroanthrone. Yellow needles, m.146, insoluble in water, soluble in benzene or chloroform.

nitroanthraquinone. $C_6H_4(CO)_2C_6H_3NO_2$ = 253.1. **α-** or **1-** Yellow needles, m.228, subliming when heated, insoluble in water, soluble in alcohol or ether. **β-** or **2-** Yellow needles, m.184, subliming when heated, insoluble in water, soluble in alcohol or ether.

n. sulfonic acid. A reagent for sugars.

Nitrobacter. A soil bacterium or other microorganism that oxidizes ammonia and its derivatives, or atmospheric nitrogen, to nitrites or nitrates.

nitrobacteria. Soil bacteria; as, Nitrobacter, Nitrosococcus, or Nitrosomonas.

nitrobarite. $Ba(NO_3)_2$. A native barium nitrate.

nitrobenzaldehyde. $C_6H_4(NO_2)CHO$ = 151.1. **ortho-** Yellow needles, m.44, slightly soluble in water. **meta-** Colorless needles, m.58. **para-** Colorless prisms, m.106, soluble in water; used in indigo synthesis.