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**Bibliography of Research
on Deuterium and Tritium Compounds
1953 and 1954**

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

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Information on the Bureau's publications can be found in NBS Circular 460, Publications of the National Bureau of Standards (\$1.25) and its Supplement (\$0.75), available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Bibliography of Research
on Deuterium and Tritium Compounds
1953 and 1954

Virginia R. Johnson, Lawrence M. Brown
and Abraham S. Friedman



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Preface

Late in 1951, the Thermodynamics Section of the National Bureau of Standards became actively engaged in an Isotope Exchange Data Program, sponsored by the Atomic Energy Commission Division of Research, which involved, in part, the preparation of bibliographies of research on the hydrogen isotopes for the years subsequent to 1945. This bibliography supplements Circular 562, which covered the years 1945 to 1952. The importance of the hydrogen isotopes as research tools and the utility of these bibliographies as an aid to scientific research relating to them has prompted the compilation of this Circular.

A. V. ASTIN, *Director.*

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Bibliography of Research on Deuterium and Tritium Compounds

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A bibliography of 720 references to published research on the properties of deuterium and tritium compounds is given. The subject matter of each entry in the bibliography is indicated by letter codes related to a list of broad subject headings as shown in the Introduction. An index of deuterium and tritium compounds and a subject index are included.

1. Introduction

This Circular is a bibliography of research on deuterium and tritium compounds for the years 1953 and 1954. It is divided into three sections: the first contains a bibliography and author index, and the second and third contain the subject and compound indexes, respectively.

The 720 references were obtained from Chemical Abstracts for the years 1953 to 1954, inclusive.

The references in the bibliography are arranged alphabetically according to the last name of the leading author. The names of the coauthors are also included and are cross-referenced.

Each entry in the bibliography is numbered by a letter-number symbol that corresponds to the first letter of the leading author's last name and the numerical listing of the reference under that letter. This numbering system is used to identify the entries in the compound and subject indexes.

The subject matter of the references is indicated at the end of each entry by means of one or more of the letter codes related to the subject categories shown in the Principal Topics and Subject Code. In the letter codes the main headings of the subject categories are designated by two letters of the heading title, and the subheadings are represented by these two letters and one or two additional, appropriate letters. For example, the code symbol for Chemical Kinetics is Ki and that for the kinetics of photochemical reactions is KiP. The subject content was determined generally from the abstracts of the references; the original articles were consulted when the abstracts were not sufficiently informative. Review articles and abstracts are indicated as such. Research articles related to nuclear properties have been excluded, except where other pertinent information on deuterium or tritium was reported. Also the topic of Isotope Effects has been restricted pri-

marily to the isotopes of hydrogen, whereas the topic of Isotope Separation still contains references to works on the separation of isotopes of various elements.

In preparing the compound index, the nomenclature of Lange's Handbook of Chemistry¹ has been followed. However, common synonyms of many of the compound names used therein have been entered and cross-indexed. Compounds containing tritium have been named in accordance with the modified Boughton system,² in which the name of the hydrogen compound is followed by "-t". No subscript has been appended to the "-t" to indicate the extent of tritium substitution. The chemical formula for each compound containing deuterium or tritium is given.

No listing has been made in the compound index under Water or Water-t for the use of water as a solvent. A lower case "s" has been used to indicate other substances used as solvents (see, for example, under Ethyl alcohol). In addition, no listing has been made in the compound index for Hydrogen, Tritium, Water, or Water-t under the subjects of Abundance, Analytical Methods, General and Review, Nuclear Properties, Separation and Atomic Spectra. References to such research may be found under these headings in the subject index.

The arrangement and the methods of coding and indexing used here and in Circular 562 are consistent with those in the Bibliography of Research on Heavy Hydrogen Compounds, by Kimball, Urey, and Kirshenbaum,³ to which this work and Circular 562 are sequels.

¹ Handbook Publishers, Inc., Sandusky, Ohio (1949).

² E. J. Crane, *Ind. Eng. Chem. News*, Ed. 13, 200-01 (1935).

³ McGraw-Hill Book Company, Inc., New York, N. Y., Ed. 1 (1949).

2. Principal Topics and Subject Code

Ab	Abundance. AbG Geological. AbO Organic.	Me	Mechanical Properties. MeAc Acoustic properties. MeD Density and molar volume. MeDf Diffusion. MeSt Surface tension. MeV Viscosity.
Ad	Adsorption and Sorption. AdC Chromatography. AdG Gases on solids. AdL Liquids on solids.	No	Nomenclature.
An	Analytical Methods. AnC Counters, cloud chambers, electrometers, ionization chambers, and photographic emulsions. AnCl Colorimetric methods. AnDn Density methods. AnEl Optical rotation. AnMg Magnetic and magnetooptic methods. AnMs Mass spectrograph and mass spectrometer. AnRf Refractive index. AnSp Absorption spectra. AnTh Thermal conduction.	Nu	Nuclear Properties. NuB Beta ray spectra. NuH Hyperfine structure. NuIn Interactions (absorption of radiation, ranges, and scattering). NuM Masses and binding energies. NuMg Magnetic moments. NuQ Quadrupole moments. NuR Reactions. NuRe Magnetic resonances. NuS Spins, states, and wave functions. NuSt Statistics.
Bi	Biological Effects of Deuterium and Tritium Compounds and of Deuterons and Tritons. BiB Botanical. BiC Biochemical. BiZ Zoological.	Sd	Solid State. SdCr Crystal structure (including electron, neutron, and X-ray diffraction). SdEc Elastic constants. SdEl Electromagnetic properties. SdNu Nuclear properties. SdSp Spectra. SdTr Transitions (including phase transitions).
Ec	Electrochemical Properties. EcC Conductivities and mobilities. EcO Overvoltage. EcP Electrode potentials.	Se	Isotope Separation. SeAc Acoustics. SeAd Adsorption (including chromatography and ion exchange). SeCf Centrifuging. SeCh Chemical reaction. SeCr Crystallization. SeDf Diffusion (including thermal diffusion). SeDs Distillation. SeEl Electrolysis. SeEm Electromagnetic methods. SeMs Mass spectrometer and mass spectrograph. SeSo Solubility.
El	Electromagnetic and Optical Properties (Except Spectra). ElCl Color Effects. ElD Dielectric constants and dipole moments. ElGd Gas discharges. ElMg Magnetic susceptibilities and Curie constants. ElMm Magnetic moments. ElMr Magnetic rotatory power. ElP Polarization. ElRe Paramagnetic resonances. ElRf Refractive index and molar refraction. ElRo Optical rotatory power. ElSc Light scattering. ElT Relaxation times.	So	Solubility. SoG Gases in solids. SoH In H ₂ O, HDO, and D ₂ O. Sol In inorganic solvents. SoO In organic solvents.
Eq	Chemical Equilibria. EqG Gaseous. EqH Heterogeneous. EqI Ionic. EqL Liquid and solution.	Sp	Spectra and Spectroscopic Constants. SpA Atomic (line). SpEl Molecular electronic. SpFl Fluorescence. SpM Microwave. SpVi Vibrational (including Raman). SpX X-ray.
Ge	General and Review.	Sr	Mass Spectroscopy and Mass Spectrography.
In	Indicator and Tracer Techniques. InA Age determinations. InBi Biological. InKi Reaction kinetics. InSo Solubility determinations. InSp Spectra. InSt Structure determinations.	St	Molecular Structure. StA Molecular association. StD Molecular constants (interatomic distances, bond angles, moments of inertia, and force constants). StDi Electron, neutron, and X-ray diffraction.
Is	Isotope Effects. IsCr Crystal structure. IsEl Electromagnetic properties. IsEq Chemical equilibria. IsKi Reaction kinetics. IsMs Mass spectra. IsSp Spectra. IsTh Thermodynamic properties.	Sy	Synthesis and Preparation of Compounds.
Ki	Chemical Kinetics. KiB Biochemical. KiG Gaseous. KiH Heterogeneous. KiI Ionic. KiL Liquid and solution. KiP Photochemical. KiR Radiochemical. KiS Solid state.	Th	Thermodynamic and Related Properties. ThD Diffusion and heat conduction. ThF Thermodynamic functions for pure substances and reactions between them (E , H , S , C_p , C_v , F , K , ΔH , ΔS , ΔE , ΔC_p , ΔF , data of state, and thermal expansion). ThP Phase equilibria (melting points, triple points, boiling points, heats of transition, critical constants, and vapor pressures). ThS Statistical mechanics and statistical thermodynamics. ThSo Properties of solutions (activities, fugacities, pH , vapor pressures, heats of solution and dilution, and colligative properties).

3. Bibliography and Author Index

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- Van Hoomissen, J. E. See Hoomissen, J. E. van.
- Van Riet, R. See Riet, R. van.
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- Zaleski, P. See Ertaud, A.
- Zaretskaya, I. I. See Kursanov, D. N.; Nazarov, I. N.
- Zehle, F. See Braune, H.
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4. Subject Index

This index is divided into a number of principal and subsidiary subject headings to which are assigned appropriate letter-code symbols. The letter-number symbols following each heading refer to references in the bibliography.

- Ab** **Abundance:** F6.
AbG (geological): B55, C40, F7, F13, G26, J3, J9, J10, K7, L31, N9, O1, S3, S12, T13, V4, V5, V6.
AbO (organic): H16.
- Ad** **Adsorption and sorption:** B73.
AdG (gases on solids): S4.
- An** **Analytical methods:** A8, F14.
AnC (counters, cloud chambers, electrometers, ionization chambers, and photographic emulsions): B21, F1, F2, F7, G10, G21, H3, H12, H13, H20, H23, J5, J9, L2, L8, P4, R31, R32, V3, W39, W40.
AnDn (density methods): C32, S31, T13.
AnMs (mass spectrograph and mass spectrometer): B43, B58, C15, C26, D21, D30, D34, F13, G13, G27, H16, M55, W1, W6, W7.
AnRf (refractive index): I1.
AnSp (absorption spectra): B79, B80, D30, K30, L15, M56, T18.
AnTh (thermal conduction): H5.
- Bi** **Biological effects of deuterium and tritium compounds and of deuterons and tritons.**
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BiC (biochemical): B4, B28, B48, C3, C19, D11, E1, E7, E9, E10, F11, H33, H38, H39, K33, K39, M12, M29, O2, P9, P17, R3, S20, S21, S37, S38, S39, S40, T3, V2, W13, W42.
BiZ (zoological): B65, C16, G4, H37, K31, L29, O2, P22, P29, T10, T11, T12, T14.
- Ec** **Electrochemical properties.**
EcC (conductivities and mobilities): G6.
EcO (overtoltage): B86.
EcP (electrode potentials): B57, H36.
- EI** **Electromagnetic and optical properties (except spectra):**
EID (dielectric constants and dipole moments): A14, B14, H10, H34, M31, M32, M33, M34, M60, P11, P26, S33.
EIGd (gas discharges): B78, G9, H21, L13, R5, S13.
EIMg (magnetic susceptibilities and Curie constants): B9, T21.
EIMm (magnetic moments): J7, T21.
EIMr (magnetic rotatory power): I2.
EIP (polarization): D1, R9, S46.
EIRe (paramagnetic resonances): S35.
EIRf (refractive index and molar refraction): C31, D12, E13.
EIRo (optical rotatory power): F4, W16.
EIT (relaxation times): B17, P26.
- Eq** **Chemical equilibria:** B74, H19, K1, K5, S23.
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- Ge** **General and review:** A11, A12, B36, B40, B41, B74, B85, B87, C1, C21, C43, D33, E4, E5, G7, H19, H20, H22, H32, I3, L14, L27, M27, M28, M36, N2, N4, P1, R10, R25, R28, S5, S16, S23, S56, T6, T9, W41.
- In** **Indicator and tracer techniques:** B73, G20, H22, P13, S9, W5.
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InBi (biological): B4, B5, B27, B28, B47, C16, D17, E9, F3, F8, F17, F18, H38, K35, L28, M17, M18, P5, P28, S6, S44, T7, T8, T9, V2, W14, W15.
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InSt (structure determinations): B13, B76, C2, C36, J12, L20, L21, P27, S15, T1.
- Is** **Isotope effects:** M49, P21, R34, W12.
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IsSp (spectra): G15, I8, J16, K17, L33, M8, M57, N5, P12, S60, S63, T5, T16.
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KiL (liquid and solution): A4, B12, B25, B60, B61, B62, B66, B76, C20, D3, D37, D38, G12, H25, H27, H28, H29, K4, L10, L22, L25, M47, O5, P31, R21, R22, S19, S24, S26, S27, S49, W25, Y1.
KiP (photochemical): B83, D5, K25, K41, M11, M15, M16, N4, R11, S14, T20, W24, W30.
KiR (radiochemical): B94, B95, C30, D23, F5, G5, G14, H4, K14, P3, P27, P30, S37, W27.
KiS (solid state): H24, K8.

- Me** Mechanical properties:
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- MeDf** (diffusion): A11, A12, B70, C42, J6, N15, N17, U2, U3, W5.
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- MeV** (viscosity): A11, A12, B15, B16, D19, H15, M46, P21, R34.
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- NuIn** (interactions—absorption of radiation, ranges, and scattering): C28, D4, D25, E12, K34, M4, O10, O11.
- NuM** (masses and binding energy): D39, E14, M38, O3, O4, P5.
- NuMg** (magnetic moments): B8, B9, B71, B72, C21, C24, J7, P33, R7, R33.
- NuQ** (quadrupole moments): B9, B53, C21, D16, D35, F10, M58.
- NuR** (reactions): N20.
- NuRe** (magnetic resonances): A9, A10, B8, B9, B71, C4, C21, H9, M42, P33, R12, S36, S62.
- NuS** (spins, states, and wave functions): C4, C21, F10, J4, M1, M58, P6, R8, R9, S2, S36, S67.
- Sd** Solid state: A9, A10, K34, N19.
- SdCr** (crystal structure—including electron, neutron, and x-ray diffraction): B14, G1, L23, L24, M31, M32, M35, M43, S45, W26.
- SdEl** (electromagnetic properties): A14, P11, R12.
- SdNu** (nuclear properties): S62.
- SdSp** (spectra): D15, G11, H2, H11, J19, L33, P10.
- SdTr** (transitions—including phase transitions): B14, B59, K40, L3, M31, M32, M33, P11, S48.
- Se** Isotope separation: D7, D28, H18, H30, I3, K11, S16, S17, S50, W3, Y2.
- SeAd** (adsorption—including chromatography and ion exchange): A3.
- SeCh** (chemical reaction): B10, B32, B49, B84, C7, C18, E15, K24, N19, P8, S56, W2.
- SeCr** (crystallization): R26.
- SeDf** (diffusion—including thermal diffusion): B18, C7, G27, N8, P32, W8, W34.
- SeDs** (distillation): D27, E2, M5, M6, M7, W34.
- SeEl** (electrolysis): B90, H31, K28, O7, W4.
- SeEm** (electromagnetic methods): B19.
- SeMs** (mass spectrometer and mass spectrograph): K12, L16.
- So** Solubility.
- SoG** (gases in solids): L26.
- SoH** (in H₂O, HDO, and D₂O): C35, T17.
- SoI** (in inorganic solvents): B85, B86.
- Spectra and spectroscopic constants**: C21.
- SpA** (atomic-line): B79, C4, C40, D14, E4, P33, S1, S36, T19.
- SpEl** (molecular electronic): B24, B77, B78, C27, C36, D24, F9, G15, H21, I4, I5, I6, K27, L5, L12, L13, N3, N18, R6, S11.
- SpFl** (fluorescence): B34, J19.
- SpM** (microwave): A2, B1, B2, B3, B20, B50, B51, B91, B92, B93, C38, C39, D2, D31, E4, G16, G17, H34, J7, J8, K26, M34, M49, M60, N21, N22, P24, P25, R24, R35, S33, S41, S54, S57, S58, S59, W22, W23, W33.
- SpVi** (vibrational—including Raman): A4, A5, A6, B7, B11, B22, B23, B29, B30, B33, B67, B68, B69, B78, C2, C11, C12, C13, C22, C29, C33, C34, C36, C37, D9, D10, D15, D18, D19, D24, D29, D32, D36, E3, F22, F23, G2, G3, G11, G18, G23, G25, H1, H2, H8, H11, H14, H17, H35, I6, J14, J15, J16, J17, K2, K13, K29, K36, K43, K44, K45, L9, L14, L20, L21, L33, L35, L36, L37, M19, M20, M21, M22, M25, M30, M44, M54, N3, N7, N11, O6, O9, P10, P12, P13, P18, P20, P25, Q1, R13, R16, R17, R18, R19, R20, R22, S13, S15, S28, S30, S46, S47, S53, S60, S61, S64, S65, S66, T1, T2, T15, T22, W9, W16, W19, W26, W28, W29.
- Sr** Mass spectroscopy and mass spectrography: D23, E14, G14, J13, L38, M37, M38, M51, M53, M55, N16, O3, O4, S5.
- St** Molecular structure: D2, G7, J16, K45, L9, M19, M25, M34, N7, T2.
- StA** (molecular association): L33, T1.
- StD** (molecular constants—interatomic distances, bond angles, moments of inertia, force constants, and potential functions): A6, B1, B2, B3, B26, B67, C13, C37, D29, D31, G2, G3, H14, H34, I5, K13, K36, L12, L36, M21, M49, M54, M57, M60, N6, N14, O9, P12, P20, S29, S30, S33, S53, S54, T15, W33.
- Sy** Synthesis and preparation of compounds: B3, B6, B28, B30, B31, B34, B35, B83, B88, B89, B95, C31, C36, E8, F19, F20, F21, G9, G18, G24, H35, K20, K32, K42, L1, L6, L17, L18, L19, L22, L25, L32, L34, M33, N10, N12, N13, P11, P18, R27, S26, W14, W25, Z1.
- Th** Thermodynamic and related properties: B59.
- ThD** (diffusion and heat conduction): A11, A12, B59, C5, G22, G27, J6, M45, P32.
- ThF** (thermodynamic functions for pure substances and reactions between them—E, H, S, C_v, C_p, F, K, ΔH, ΔS, ΔE, ΔC_p, ΔF, data of state, and thermal expansion): B39, B54, B59, D8, D32, F12, H35, K29, L3, L35, M3, N2, N14, O8, P18, P20, S52, Z1.
- ThP** (phase equilibria—melting points, triple points, boiling points, heats of transition, critical constants, and vapor pressures): A13, B59, C14, C31, C35, D13, F12, G8, J18, L18, M59, N19, Z1.
- ThS** (statistical mechanics and statistical thermodynamics): B39, B59, O8, S56.
- ThSo** (properties of solutions—activities, fugacities, pH, vapor pressures, heats of solution and dilution, and colligative properties): H36.

5. Compound Index

This index will be useful in locating references dealing with a particular deuterium or tritium compound. Tritium compounds are designated by a "-t" following the compound name. Each entry in the index contains one or more letter codes and a series of letter-number symbols indicating, respectively, the subject content and the location of the references in the bibliography. A description of the coding system may be found in the Introduction.

- Acetaldehyde (C₂H₄O) **KiB**:V1; **KiP**:N4.
- Acetic acid (C₂H₄O₂) **EqG**:E6, F19; **EqH**:E6, F19, F20; **EqL**:R22, Y1; **IsKi**:E6, R21; **KiH**:E6; **KiL**:R21, R22, Y1; **SdSp**:H2; **SpVi**:F22, H2, S65.
- Acetic acid, cuprous salt of (C₂H₃O₂Cu) **EqH**:W35.
- Acetic acid, methyl ester of (C₃H₆O₂) **ElRf**:C31; **KiR**:C30; **ThP**:C31; **Sy**:C31.
- Acetic acid, zinc salt of (C₄H₆O₄Zn) **EqL**:Y1; **KiL**:Y1.
- Acetic acid-t (C₂H₄O₂-t) **EqG**:E6; **EqH**:E6; **IsKi**:E6; **KiH**:E6.
- Acetoacetic acid, methyl ester of (C₅H₈O₃) **EqL**:J12; **InSt**:J12.
- Acetone (C₃H₆O) **EqH**:K6; **IsKi**:M15, W:24; **KiG**:M7, M10, M15, T20, W24; **KiH**:K6; **KiP**:M11, M15, M16, N4, T20, W24.
- Acetone dicarboxylic acid (C₅H₆O₅) **EqL**:G24; **Sy**:G24.
- Acetylene (C₂H₂) **AnMs**:D30; **AnSp**:D30; **BiC**:C3; **ElGd**:S13; **EqH**:B63, D30; **IsMs**:M51; **KiH**:B63, D30, R2; **KiR**:G14; **SpEl**:I4, I5, I6, N18; **SpVi**:A5, I6, M30, R13, T15; **Sr**:G14, M51; **StD**:I5, T15; **Sy**:L18.
- Acetylene dibromide (C₂H₂Br₂) **SpVi**:M22.
- Acetylenedicarboxylic acid (C₄H₂O₄) **SdSp**:H2; **SpVi**:H2.
- Acetylene dicarboxylic acid dihydrate (C₄H₂O₄·2H₂O) **IsCr**:G1; **SdCr**:G1.
- Acetylene dichloride (C₂H₂Cl₂) **SpVi**:B29.
- Acetylglycine (C₄H₇NO₃) **IsSp**:L33; **SdSp**:L33; **SpVi**:L33; **StA**:L33.
- Acids **KiH**:B85s; **SoI**:B85s.
- Adenine-t (C₅H₅N₃-t) **EqL**:E8; **Sy**:E8.
- Adipic acid (C₆H₁₀O₄) **SdSp**:H2; **SpVi**:H2.
- Alanine (C₃H₇NO₂) **AnMs**:B58.
- Allene (C₃H₄) **SpVi**:L32, O9; **StD**:L36, O9.
- Allyl acetate (C₅H₈O₂) **KiL**:B12.
- Allylene (C₃H₄) **KiH**:R2; **SpVi**:G23; **Sy**:L17.
- Allyl radical (CH₂CHCH₂) **Sr**:L38.
- Aluminum hydride (AlH) **SpEl**:K27.
- Aluminum isopropionate ((C₃H₇O)₃Al) **InKi**:W32.
- Amidogen (NH₂) **ElGd**:L13; **SpEl**:L13.
- Aminoacetic acid. See Glycine.
- Amino ethanol (C₂H₇NO) **InBi**:W14; **Sy**:W14.
- Ammonia (NH₃) **ElGd**:H21, L13; **ElRo**:W16; **EqG**:B38, P7, **EqH**:E11, G28, K3, W36; **EqL**:D37, D38, S24; **KiH**:E11, G28, K3, W36; **KiL**:D37, D38, S24; **SpEl**:F9, H21, L13; **SpVi**:W16; **SpM**:B51, N21, N22, R35, S41, S54, S58; **StD**:S54.
- Ammonium arsenate, dihydrogen ((NH₄)H₂AsO₄) **SdTr**:S48.
- Ammonium bromide (NH₄Br) **SdCr**:L23, L24.
- Ammonium chloride (NH₄Cl) **StD**:B26.
- Ammonium iodide (NH₄I) **SdCr**:L24.
- Ammonium ion (NH₄⁺) **SpVi**:G2; **StD**:G2.
- Ammonium manganous sulfate ((NH₄)₂Mn(SO₄)₂) **ElP**:D1.
- Ammonium phosphate, dihydrogen ((NH₄)H₂PO₄) **ElD**:M31, M32, M33; **SdCr**:M31, M32, M33, M43; **SdTr**:M31, M32, M33, S48; **Sy**:M33.
- Amyl alcohol (C₅H₁₁OH) **EqL**:H29; **KiL**:H29; **SpVi**:Q1.
- Amyl benzene (C₁₁H₁₆) **InKi**:C8.
- Amyl chloride (C₅H₁₁Cl) **KiL**:S27.
- Anethole hydrochloride-t (C₁₀H₂₀O·HCl-t) **Sy**:L1.
- Anthracene (C₁₂H₁₀) **EqL**:G12; **KiL**:G12.
- Arsine (AsH₃) **SpM**:S59; **StD**:N6.
- Ascorbic acid (C₆H₈O₆) **InKi**:W11; **SpVi**:W9.
- Asparagine (C₄H₈N₂O₃) **SpVi**:D10.
- Aspartic acid (C₄H₇NO₄) **AnMs**:B58.
- Benzene (C₆H₆) **ElRf**:D12; **IsKi**:L10; **IsMs**:M51; **KiL**:L10; **KiR**:B94, G14, P3; **MeV**:D19; **NuRe**:A9, A10; **Sd**:A9; **SpVi**:D19, G18, K2, K36, S53, T15; **Sr**:G14, M51; **StD**:K36, S53, T15; **Sy**:G18; **ThP**:D13.
- Benzene hexachloride (C₆H₆Cl₆) **EqL**:C41.
- Benzoic acid (C₇H₆O₂) **SdSp**:H2; **SpVi**:H2.
- Benzoquinhydrone (C₁₂H₁₀O₄) **InKi**:G19.
- Benzyl radical (C₆H₅CH₂) **Sr**:L38.
- Bistrideuteromethyl mercury (CH₃)₂Hg **Sy**:B35.
- Borine carbonyl (BH₃CO) **Sy**:B89.
- Borine dimethylamine (C₂H₅NB) **Sy**:B89.
- Borine methyl ether (C₂H₆OBH₃) **Sy**:B89.
- Boron hydride (B₂H₆) **EqG**:M41; **EqH**:M41; **KiG**:M41; **KiH**:M41; **Sy**:B89.
- Bromobenzene-t (C₆H₅Br-t) **IsKi**:B25; **KiL**:B25.
- Bromoethylene (C₂H₃Br) **SpVi**:T15; **StD**:T15.
- Bromoform (CHBr₃) **SpM**:W33; **StD**:W33.
- Bromotoluene (C₇H₇Br) **InKi**:K41; **KiP**:K41.
- Butane (C₄H₁₀) **KiL**:B83; **KiP**:D5; **Sy**:B83.
- Butene. See Butylene.
- Butyl alcohol (C₄H₉OH) **EqL**:H29; **KiL**:H29; **SpVi**:Q1.
- Butylene (C₄H₈) **AnMs**:W1; **EqH**:W1; **KiH**:W1, W38; **KiP**:D5.
- Butyric acid (C₄H₈O₂) **EqL**:W25.
- Butyric acid, barium salt of (C₄H₇O₄Ba) **EqL**:W25; **KiL**:W25; **Sy**:W25.
- Butyric acid, methyl ester of (C₅H₁₀O₂) **EqL**:W25.
- Calcium hydride (CaH₂) **KiS**:H24, K8.
- Calcium hydroxide (Ca(OH)₂) **EcP**:H36s; **ThP**:H36.
- Calcium sulfate (CaSO₄· $\frac{1}{2}$ H₂O) (CaSO₄·2H₂O) **SpVi**:D36.
- Cellulose ((C₆H₁₀O₅)_x) **EqL**:A4; **KiL**:A4; **SpVi**:A4, M25; **St**:M25.

- Cesium arsenate, dihydrogen (CsH_2AsO_4) **SdTr**:S48.
- Chloramine (NH_2Cl) **SpVi**:M54; **StD**:M54.
- Chloroacetamide ($\text{CH}_2\text{ClCONH}_2$) **SpVi**:K45; **St**:K45.
- Chloroacetic acid (CH_2ClCOOH) **SpM**:A2.
- Chloroacetylene (C_2HCl) **SpM**:W22.
- Chlorobenzene ($\text{C}_6\text{H}_5\text{Cl}$) **NuRe**:M42.
- Chlorobutane ($\text{C}_4\text{H}_7\text{ClO}$) **KiL**:P31.
- Chlorodibromo methane (CHClBr_2) **SpVi**:M44, P20; **StD**:P20; **ThF**:P20.
- Chloroform (CHCl_3) **EqG**:S18; **EqL**:H27; **IsKi**:E15; **IsSp**:G15; **Ki**:E15; **KiL**:H27; **SpEl**:G15; **SpVi**:B33; **KiG**:S18.
- Chlorosilane (SiH_3Cl) **SpM**:B2, B3; **SpVi**:A6; **StD**:A6, B2, B3; **Sy**:B3.
- Cholestanol ($\text{C}_{27}\text{H}_{48}\text{O}$) **InKi**:D6.
- Δ^7 -Cholestenol-t **BiC**:B48.
- Cholesterol ($\text{C}_{27}\text{H}_{46}\text{O}$) **EqH**:F20; **Sy**:B88, F20, L6.
- Cholesterol-t ($\text{C}_{27}\text{H}_{46}\text{O-t}$) **BiC**:B48; **InBi**:B47.
- CH radical **KiG**:B77; **SpEl**:B77.
- C_2H radical **ElGd**:S13; **SpVi**:S13.
- C_2H_3 radical **ElGd**:S13; **SpVi**:S13.
- Chromic oxide **AdG**:V5, V6; **EqH**:V5, V6.
- Cortisone-t **Sy**:F21.
- Cyanuric acid ($(\text{HCNO})_3$) **SdCr**:W26; **SpVi**:W26.
- Cyclobutane (C_4H_8) **Sy**:L32.
- Cyclobutene (C_4H_6) **Sy**:L32.
- Cyclohexane (C_6H_{12}) **EIRf**:D12; **KiR**:B94; **MeV**:D19; **SpVi**:D19, L9; **St**:L9; **ThP**:D13.
- Cyclohexane carboxylic acid. See Hexahydrobenzoic acid.
- Cyclohexanone ($\text{C}_6\text{H}_{10}\text{O}$) **InKi**:W32.
- Cycloöctatetraene (C_8H_8) **Sy**:L32.
- Cycloöctatriene (C_8H_{10}) **Sy**:L32.
- Cytosine-t ($\text{C}_4\text{H}_5\text{N}_3\text{O-t}$) **EqL**:E8; **Sy**:E8.
- Decane ($\text{C}_{10}\text{H}_{22}$) **BiC**:B28; **InBi**:B27, B28; **Sy**:B28.
- Decyl alcohol ($\text{C}_{10}\text{H}_{21}\text{OH}$) **SpVi**:Q1.
- Diborane. See Boron hydride.
- Diborane dimethylamine ($\text{C}_2\text{H}_6\text{NB}_2\text{H}_5$) **Sy**:B89.
- Dibromo chloro methane. See Chloro dibromo methane.
- Dibromoethane ($\text{C}_2\text{H}_4\text{Br}_2$) **InKi**:S10; **SpVi**:B30; **Sy**:B30, L18.
- Dibromoethylene. See Acetylene dibromide.
- Dibromomethane. See Methylene bromide.
- Dibutyl isopropyl carbinol ($\text{C}_{12}\text{H}_{26}\text{O}$) **EqL**:H29; **KiL**:H29.
- Dichloroethylene. See Acetylene dichloride.
- Dichloropropene. See Dichloropropylene.
- Dichloropropylene ($\text{C}_3\text{Cl}_2\text{H}_4$) **Sy**:L17.
- Diethyl amine ($(\text{C}_2\text{H}_5)_2\text{NH}$) **EqL**:K23.
- Diethyl ketone ($(\text{C}_2\text{H}_5)_2\text{CO}$) **KiG**:W30; **KiP**:W30; **SpVi**:N11; **Sy**:L19.
- Digermane (Ge_2H_6) **ThF**:Z1; **ThP**:Z1; **Sy**:Z1.
- Dihydroxyanthraquinone ($\text{C}_{14}\text{H}_8\text{O}_4$) **SpVi**:H1.
- Diisopropyl chromate ($\text{C}_6\text{H}_{14}\text{CrO}_4$) **KiL**:L22; **Sy**:L22.
- Diphenyloxazole-t ($\text{C}_{15}\text{H}_{11}\text{NO-t}$) **AnC**:H13.
- Diphosphopyridine nucleotide **InBi**:F8, L28; **KiB**:F8, L28.
- Dodecane ($\text{C}_{12}\text{H}_{26}$) **BiC**:B28; **InBi**:B27, B28; **Sy**:B28.
- Estrone acetate **InBi**:P5.
- Ethane (C_2H_6) **EqH**:A7; **KiG**:R14, R15; **KiH**:A7, K9; **KiP**:D5; **SpVi**:R16, R17, R18, R19, R20.
- Ethanolamine. See Amino ethanol.
- Ethyl acetate ($\text{C}_4\text{H}_8\text{O}_2$) **Sy**:N10.
- Ethylacetoacetate ($\text{C}_6\text{H}_{10}\text{O}_3$) **SpVi**:R22.
- Ethyl alcohol ($\text{C}_2\text{H}_5\text{OH}$) **EqL**:C41, F8, H28, K23, R22; **InBi**:F8; **IsKi**:R21s; **KiB**:F8, V1; **KiL**:R21s, R22; **SpVi**:Q1.
- Ethyl amine ($\text{C}_2\text{H}_7\text{N}$) **EqL**:H29; **KiL**:H29.
- Ethyl benzene (C_8H_{10}) **ElRo**:F4.
- Ethyl diazoacetate ($\text{C}_4\text{H}_6\text{N}_2\text{O}_2$) **EqL**:R22.
- Ethylene (C_2H_4) **AnMs**:D30; **AnSp**:D30; **BiC**:C3; **EqH**:D30, L4, M24; **KiG**:L30, R1; **KiH**:D30, L4, M24, W38; **KiP**:D5; **SpVi**:C11, C13, C34, C37, H17, M20, S66, T15; **StD**:C13, C37, T15; **Sy**:B30, L18, R2.
- Ethyl naphthalene ($\text{C}_{12}\text{H}_{12}$) **SpVi**:G18; **Sy**:G18.
- Ethylene oxide ($\text{C}_2\text{H}_4\text{O}$) **IsTh**:L18; **Sy**:L18; **ThP**:L18.
- Ethyl ethoxyacetate ($\text{C}_6\text{H}_{12}\text{O}_3$) **SpVi**:R22.
- Fluoroform (CHF_3) **SpVi**:P18; **Sy**:P18; **ThF**:P18.
- Fluorosilane (SiH_3F) **SpM**:B1, B3, W23; **SpVi**:A6; **StD**:A6, B1, B3; **Sy**:B3.
- Formaldehyde (CH_2O) **SpVi**:D9, T15; **StD**:T15; **Sy**:B6.
- Formic acid (HCOOH) **SpVi**:S64.
- Formic acid dimer ($(\text{HCOOH})_2$) **SpVi**:S65.
- Formic acid, sodium salt of (CHO_2Na) **EqL**:B60; **KiL**:B60.
- Formyl radical (CHO) **KiG**:B77; **SpEl**:B77.
- Fumaric acid ($\text{C}_4\text{H}_4\text{O}_4$) **AnMs**:B58.
- Germane. See Germanium hydride.
- Germanium hydride (GeH_4) **ThF**:Z1; **ThP**:Z1; **Sy**:Z1.
- Germanium monochlorohydride (GeH_3Cl) **SpVi**:L35; **ThF**:L35.
- Glutamic acid ($\text{C}_5\text{H}_9\text{NO}_4$) **AnMs**:B58; **BiC**:K33; **EqL**:G24; **Sy**:G24, K32.
- Glutamic acid, N carbamyl ($\text{C}_6\text{H}_{10}\text{N}_2\text{O}_5$) **EqL**:G24; **Sy**:G24.
- Glutamic acid, N carboxyethyl ($\text{C}_8\text{H}_{13}\text{NO}_6$) **BiC**:K33; **Sy**:K32.
- Glutamic amide ($\text{C}_5\text{H}_{10}\text{N}_2\text{O}_3$) **SpVi**:D10.
- Glutamine. See Glutamic amide.
- Glutaric acid ($\text{C}_5\text{H}_8\text{O}_4$) **EqL**:G24; **SdSp**:H2; **SpVi**:H2; **Sy**:G24.

Glycine (C₂H₅NO₂) **EqL**:B61; **KiL**:B61.
 Glycollic acid (HOCH₂COOH) **EqL**:B62; **KiL**:B62.
 Guanine-t (C₅H₅N₅O-t) **EqL**:E8; **Sy**:E8.
 Hafnium hydride (HfH₂) **IsCr**:S29; **StD**:S29.
 Helium hydride (HeH) **NuM**:M38; **Sr**:M37, M38.
 Heptadecane (C₁₇H₃₆) **InBi**:B27.
 Heptane (C₇H₁₆) **EqH**:B96; **KiH**:B96.
 Heptylamine (C₇H₁₇N) **EqL**:H29; **KiL**:H29.
 Hexadecane (C₁₆H₃₄) **BiC**:B28; **InBi**:B28; **Sy**:B28.
 Hexahydrobenzoic acid (C₇H₁₂O₂) **SdSp**:H₂; **SpVi**:H₂.
 Hexane (C₆H₁₄) **KiL**:S49.
 Hexestrol-t (C₁₈H₂₂O₂-t) **Sy**:L1.
 Hexyl alcohol (C₆H₁₃OH) **SpVi**:Q1.
 Hexyl bromide (C₆H₁₃Br) **KiL**:H25.
 Hydrazine hydrobromide (N₂H₄-HBr) **SdSp**:D15; **SpVi**:D15.
 Hydrazine hydrochloride (N₂H₄-HCl) **SdSp**:D15; **SpVi**:D15.
 Hydroiodic acid (HI) **EID**:B14; **EqG**:T4; **IsEq**:B39; **IsKi**:B39; **KiG**:S14, T4; **KiP**:S14; **SdCr**:B14; **SdTr**:B14; **SpM**:B92, K26; **ThF**:B39; **ThS**:B39.
 Hydrobromic acid (HBr) **EID**:P26; **EIT**:P26; **EqG**:M13; **KiG**:M13, M14; **MeDf**:B70; **SpM**:G17; **SpVi**:K13; **Sy**:L18; **StD**:K13.
 Hydrochloric acid (HCl) **EqG**:S18; **EcO**:B86s; **EID**:P11; **IsSp**:P12; **KiG**:S18; **KiH**:B86s; **MeDf**:B70; **SdEl**:P11; **SdTr**:P11; **SoI**:B86s; **SpM**:A2; **SpVi**:G23, H8, P12; **Sr**:J13; **StD**:P12; **Sy**:P11.
 Hydrocyanic acid (HCN) **SpM**:G16, W22; **SpVi**:D29; **StD**:D29.
 Hydrogen (H₂) **AdG**:S4, S12, V5, V6; **BIB**:P16; **BiC**:E7, H39, M12, P17, S38, W13, W42; **EcP**:B57; **ElMg**:B9; **ElMr**:J2; **EIP**:R9, S46; **ElRf**:E13; **EIT**:B17; **Eq**:K5; **EqG**:B56, C23, E6, M41, P7, T4; **EqH**:A7, B64, B84, B96, D30, E6, E11, F19, F20, G28, K3, K6, K15, K16, K46, K47, L4, M23, M24, M41, M48, M52, T13, V5, V6, W1, W35, W36, W37; **EqL**:C44, D37, D38, L21; **In**:H22; **InBi**:H38, M18; **InKi**:B77, K21, K46, K47, K49, K50, S49; **InSt**:L21, P27; **Is**:P21; **IsEq**:B39; **IsKi**:B39, M15, W24; **KiB**:C44; **KiG**:B56, C23, M15, M41, S18, T4, W21, W24; **KiH**:A1, A7, B57, B64, B96, D30, E6, G28, K6, K10, K15, K16, K20, K22, L4, M23, M24, M41, M48, M52, S4, W1, W36, W37, W38; **KiL**:D37, D38; **KiP**:M15, M16, R11, W24; **KiR**:G5, P27, S37, W27; **KiS**:K8; **MeAc**:M2, S51; **MeD**:D8, S52; **MeDf**:A11, A12, N15, U2, U3; **MeV**:A11, A12, B15, B16, M46, P21; **NuM**:M38; **Sd**:K34; **SdCr**:M35; **SdEl**:R12; **SdNu**:S62; **SdTr**:B59, K40; **SeDf**:B18; **SeEl**:B90; **SeEm**:B19; **SoG**:L26; **SpEl**:L5; **SpVi**:D18, S46; **Sr**:E14, M37, M38, M55, N16, O3, O4, S5; **Th**:B59; **ThD**:A11, A12, B59, G22, G27; **ThF**:B39, B59, D8, F12, N2, O8, S52; **ThP**:B59, C14, F12; **ThS**:B39, B59, O8.
 Hydrogen peroxide (H₂O₂) **EID**:M34; **ElGd**:G9; **ElRe**:S35; **Ge**:G7; **SpM**:M34; **St**:G7, M34; **Sy**:G9; **ThP**:G8.
 Hydrogen selenide (H₂Se) **IsSp**:M57; **StD**:M57.
 Hydrogen sulfide (H₂S) **IsSp**:M57; **KiP**:D5; **SpEl**:R6; **SpM**:B50; **StD**:M57.
 Hydronium ion (H₃O⁺) **EcC**:G6.
 Hydroxylamine (H₃NO) **SpVi**:N7; **St**:N7.
 Hydroxyl ion (OH⁻) **EcC**:G6; **EqH**:K38; **KiB**:K38; **SpEl**:S11.
 Hydroxyl radical (OH) **ElGd**:B78; **KiG**:B77; **SpEl**:B77, B78; **SpVi**:B78; **ThF**:M3.

Hypophosphorous acid (H₃PO₂) **EqL**:M27; **KiL**:M27.
 Imidogen (NH) **ElGd**:L13; **SpEl**:F9, L13.
 Indium hydroxide (InO₃H₃) **SdSp**:G11; **SpVi**:G11.
 Isobutane (C₄H₁₀) **EqH**:K16; **KiH**:K16.
 Isothiocyanic acid (HNCS) **SpM**:D31; **StD**:D31.
 Ketoglutaric acid. See Acetone dicarboxylic acid.
 Lauric acid (C₁₂H₂₄O₂) **SdSp**:H2; **SpVi**:H2.
 Lithium aluminum hydride (LiAlH₄) **Ge**:M36.
 Lithium aluminum hydride-t (LiAlH₄-t) **Ge**:M36; **IsKi**:K4; **KiL**:K4.
 Lithium borohydride (LiBH₄) **EqH**:B84.
 Lithium borohydride-t (LiBH₄-t) **IsKi**:K4; **KiL**:K4.
 Lithium hydride (LiH) **IsCr**:N14; **SdCr**:S45; **StD**:N14; **ThF**:N14.
 Lithium hydride-t (LiH-t) **IsCr**:N14; **StD**:N14; **ThF**:N14.
 Lithium hydroxide monohydrate (LiOH·H₂O) **SpVi**:J14.
 Magnesium hydroxide (Mg(OH)₂) **SdSp**:H11; **SpVi**:H11.
 Maleic acid (C₄H₄O₄) **InSt**:C2; **SpVi**:C2.
 Maleic acid, potassium salt of (C₄H₃O₄K) **InSt**:C2; **SpVi**:C2.
 Malonic acid (C₃H₄O₂) **SdSp**:H2; **SpVi**:H2.
 Manganese hydride (MnH) **SpEl**:N3; **SpVi**:N3.
 Mercapto radical (HS) **SpEl**:L12, R6; **StD**:L12.
 Methane (CH₄) **AnMs**:D21; **EqG**:C23; **EqH**:K15, M23; **Is**:P21; **KiG**:C23, W31; **KiH**:K15, M23; **KiP**:R11; **KiR**:W27; **MeV**:P21; **SpVi**:B7, B67, B68, B69, W28; **Sr**:L38; **StD**:B67; **ThP**:A13.
 Methane-t (CH₄-t) **MeDf**:J6; **ThD**:C5, J6.
 Methionine (C₅H₁₁NO₂S) **InBi**:D17.
 Methyl acetate. See Acetic acid, methyl ester of.
 Methyl acetylene. See Allylene.
 Methyl alcohol (CH₃OH) **BiC**:R3, V2; **EqL**:J12; **InBi**:V2; **InSt**:J12, S15, T1; **IsSp**:S60; **KiR**:C30, P30; **SpVi**:B11, Q1, S15s, S30, S60, S61, T1; **StA**:T1; **StD**:S30.
 Methyl alcohol-t (CH₃OH-t) **BiC**:R3, V2; **InBi**:V2.
 Methyl aldehyde (CH₃CHO) **KiG**:R15.
 Methyl bromide (CH₃Br) **Is**:M49; **IsSp**:G15; **SpEl**:G15; **SpM**:M49; **SpVi**:C33, W29; **StD**:M49; **Sy**:N13.
 2-Methyl butyl alcohol (C₅H₁₂O) **InKi**:D20.
 2-Methyl butyric acid (C₅H₁₀O) **InKi**:D20.
 2-Methyl butyric acid, methyl ester of (C₆H₁₂O₂) **InKi**:D20.
 Methyl chloride (CH₃Cl) **Is**:M49; **NuQ**:D35; **SpM**:M49; **StD**:M49.
 Methylene chloride (CH₂Cl₂) **EID**:M60; **SpM**:M60; **StD**:M60.
 Methyl fluoride (CH₃F) **SpM**:G16.
 Methyl formamide (C₂H₅NO) **IsSp**:K17.

- Methyl iodide (CH_3I) **Is**:M49; **SpM**:M49; **StD**:M49.
- Methyl naphthalene ($\text{C}_{11}\text{H}_{10}$) **SpVi**:G18; **Sy**:G18.
- Methyl nitrite (CH_3NO_2) **KiR**:D23; **Sr**:D23.
- Methyl radical (CH_3) **IsKi**:M15, W24; **KiG**:M10, M15, T20, W24, W31; **KiP**:K25, M11, M15, M16, T20, W24; **Sr**:L38.
- Methyl silane (CH_3SiH_3) **SpM**:D2; **St**:D2.
- Methylene bromide (CH_2Br_2) **SpVi**:D32; **ThF**:D32.
- Naphthalene (C_{10}H_8) **IsMs**:M51; **SdSp**:P10; **SpEl**:C27; **SpVi**:G18, O6, P10; **Sr**:M51; **Sy**:G18.
- NH radical. See Imidogen.
- Nicotinamide, dihydromethyl ($\text{C}_7\text{H}_{10}\text{N}_2\text{O}$) **InKi**:R4.
- Nitric acid (HNO_3) **SpVi**:C22.
- Nitric acid, methyl ester of (CH_3NO_2) **SpVi**:T2; **St**:T2.
- Nitrobenzene ($\text{C}_6\text{H}_5\text{NO}_2$) **KiL**:B66.
- Nitrous acid (HNO_2) **SpEl**:D24; **SpVi**:D24.
- Octadecane ($\text{C}_{18}\text{H}_{38}$) **BiC**:B28; **InBi**:B27, B28; **Sy**:B28.
- Octadecene. See Octadecylene.
- Octadecylene ($\text{C}_{18}\text{H}_{36}$) **KiH**:K20; **Sy**:K20.
- Octane (C_8H_{18}) **BiC**:B28; **EqH**:B96; **InBi**:B27, B28; **KiH**:B96; **Sy**:B28.
- Octyl alcohol ($\text{C}_8\text{H}_{17}\text{OH}$) **SpVi**:Q1.
- Octyl bromide ($\text{C}_8\text{H}_{17}\text{Br}$) **KiL**:H25.
- Octyl chloride ($\text{C}_8\text{H}_{17}\text{Cl}$) **KiL**:H25.
- Oleic acid ($\text{C}_{18}\text{H}_{34}\text{O}_2$) **InBi**:F3; **KiH**:K20; **Sy**:K20.
- Oleic acid, methyl ester of ($\text{C}_{19}\text{H}_{36}\text{O}_2$) **InKi**:K21; **KiH**:K20; **Sy**:K20.
- Organic compounds-t **AnC**:V3, W39, W40; **AnDn**:C32.
- Oxalic acid ($\text{H}_2\text{C}_2\text{O}_4$) **SdSp**:H2; **SpVi**:H2.
- Pentaborane (B_5H_9) **EID**:I134; **EqG**:M41; **EqH**:M41; **KiG**:M41; **KiH**:M41; **SpM**:H34; **SpVi**:H35; **StD**:H34; **Sy**:H35; **ThF**:H35.
- Pentachlorophenol ($\text{C}_6\text{Cl}_5\text{OH}$) **SpVi**:K44.
- Pentane (C_5H_{12}) **KiL**:S49; **SpVi**:S28.
- 2-Pentylchlorosulfite ($\text{C}_5\text{H}_{11}\text{ClSO}_2$) **IsKi**:L25; **KiL**:L25; **Sy**:L25.
- Phenol ($\text{C}_6\text{H}_5\text{OH}$) **EqG**:B75; **KiG**:B75; **Sr**:M53.
- Phosphine (PH_3) **EID**:S33; **EqG**:W17; **EqH**:W17, W18, W19; **KiH**:W18; **SpM**:B93, S33, S57, S59; **SpVi**:W17; **StD**:S33.
- Phosphoric acid (H_3PO_4) **EcP**:H36s; **InKi**:K50, N1; **ThSo**:H36.
- Phosphoric acid-t (H_3PO_4 -t) **EqH**:T23; **KiH**:T23.
- Phyllanthol **InSt**:B13.
- Picolene ($\text{C}_6\text{H}_7\text{N}$) **SoH**:C35; **ThP**:C35.
- Polythene ($(\text{C}_2\text{H}_2)_n$) **Sy**:R27.
- Potassium amide (KNH_2) **EqL**:D37, D38, S24; **KiL**:D37, D38, S24.
- Potassium arsenate, dihydrogen (KH_2AsO_4) **SdTr**:S48.
- Potassium fluoride (HF_2K) **SpVi**:J15.
- Potassium hydroxide (KOH) **EcO**:B86s; **KiH**:B86s; **SoI**:B86s.
- Potassium phosphate, dihydrogen (KH_2PO_4) **IsSp**:L33; **SdSp**:L33; **SdTr**:S48; **SpVi**:L33; **StA**:L33.
- Propane (C_3H_8) **EqH**:A7, K6, K16; **KiH**:A7, K6, K16; **KiP**:D5.
- Propene. See Propylene.
- Propionic acid ($\text{C}_3\text{H}_6\text{O}_2$) **SdSp**:H2; **SpVi**:H2.
- Propyl alcohol ($\text{C}_3\text{H}_7\text{OH}$) **KiL**:C20, L22s; **SpVi**:Q1.
- Propyl bromide ($\text{C}_3\text{H}_7\text{Br}$) **KiL**:S26; **Sy**:S26.
- Propylene (C_3H_6) **EqH**:B64; **KiH**:B64; **KiP**:D5; **SpVi**:L37; **Sy**:R2.
- Propyne. See Allylene.
- Pyridine ($\text{C}_5\text{H}_5\text{N}$) **SpVi**:C29.
- Pyridine hydrochloride ($\text{C}_5\text{H}_5\text{N}\cdot\text{HCl}$) **IsSp**:L33; **SdSp**:L33; **SpVi**:L33; **StA**:L33.
- Pyrone ($\text{C}_5\text{H}_4\text{O}_2$) **EqL**:L34; **Sy**:L34.
- Pyrrole ($\text{C}_4\text{H}_5\text{N}$) **SpVi**:T22.
- Rubidium arsenate, dihydrogen (RbH_2AsO_4) **SdTr**:S48.
- Rubidium phosphate, dihydrogen (RbH_2PO_4) **IsCr**:M39; **SdTr**:S48.
- Serine ($\text{C}_3\text{H}_7\text{O}_3\text{N}$) **BiC**:E9, E10, T3; **InBi**:E9, S44; **KiB**:E10.
- Sodium borohydride (NaBH_4) **EqH**:B84.
- Sodium formate (HCOONa) **EqL**:B62; **KiL**:B62.
- Sodium hydroxide (NaOH) **EqL**:H27; **KiL**:H27.
- Sorbic acid ($\text{CH}_3(\text{CHCH})_2\text{CO}_2\text{H}$) **InSt**:C36; **SpEl**:C36; **SpVi**:C36; **Sy**:C36.
- Stearic acid ($\text{C}_{18}\text{H}_{36}\text{O}_2$) **AnC**:B21, R31; **SdSp**:H2; **SpVi**:H2; **InBi**:F3.
- Steroids **EqH**:F19; **IsSp**:J16; **SpVi**:J16; **St**:J16; **Sy**:F19, N12.
- Stibine (SbH_3) **SpVi**:G3, H14; **StD**:G3, H14.
- Stilbene-t ($\text{C}_{14}\text{H}_{12}$ -t) **SpFl**:B34; **Sy**:B34.
- Styrene-t (C_8H_8) **Sy**:B31.
- Succinic acid ($\text{C}_4\text{H}_6\text{O}_4$) **SdSp**:H2; **SpVi**:H2.
- Sulfuric acid (H_2SO_4) **EcO**:B86s; **EqL**:S19, S49; **KiH**:B86s; **KiL**:S19; **SoI**B86s.
- Testosterone ($\text{C}_{19}\text{H}_{28}\text{O}_2$) **InBi**:F17, F18.
- Tetrachloropropane ($\text{C}_3\text{Cl}_4\text{H}_4$) **Sy**:L17.
- Tetradecane ($\text{C}_{14}\text{H}_{30}$) **BiC**:B28; **InBi**:B27, B28; **Sy**:B28.
- Toluene (C_7H_8) **EqG**:K42; **EqL**:D37, K42; **InKi**:K41; **KiL**:B83, D37; **KiP**:K41; **Sy**:B83, K42.
- Toluene-t (C_7H_8 -t) **EqL**:O5; **KiL**:O5.
- p-Tolyldiazonium chloride ($\text{C}_7\text{H}_7\text{N}_2\text{Cl}$) **EqL**:M47; **KiL**:M47.

Trichloroacetic acid ($C_2HCl_3O_2$) **SdSp**:H2; **SpVi**:F22, H2, K43.

Triethoxy silane ($(C_2H_5O)_3SiH$) **EqL**:K23.

Triethylamine hydrochloride ($C_6H_{15}N \cdot HCl$) **IsSp**:L33; **SdSp**:L33; **SpVi**:L33; **StA**:L33.

Triethyl silane ($(C_2H_5)_3SiH$) **EqL**:K23.

Trifluoroacetic acid (CF_3COOH) **SpVi**:F22, F23.

Trifluoroacetic acid, trimer ($(CF_3COOH)_3$) **SpVi**:K29; **ThF**:K29.

Trigermane (Ge_3H_8) **ThF**:Z1; **ThP**:Z1; **Sy**:Z1.

Trimethyl acetic acid ($C_5H_{10}O_2$) **SdSp**:H2; **SpVi**:H2.

Trinitrobenzene ($C_6H_3N_3O_6$) **EqL**:K18.

Triphenylsilane ($(C_6H_5)_3SiH$) **EqL**:K23.

Triphenylsilane-t ($C_{18}H_{16}Si-t$) **IsKi**:K4; **KiL**:K4.

Tritium **BiB**:C19, W12; **BiC**:C19, E7, S39, S40, W13; **BiZ**:T11; **EqG**:D26, E6; **EqH**:E6, T13; **EqL**:O5; **Ge**:T9; **In**:S9; **InA**:U1; **InBi**:B5, T9; **Is**:W12; **KiG**:D26, M26; **KiH**:E6; **KiL**:O5; **KiR**:H4; **Sp**:C22; **SpVi**:D18.

Tryptophane ($C_{11}H_{12}N_2O_2$) **InBi**:S6.

Uracil-t ($C_4H_4N_2O_2-t$) **EqL**:E8; **Sy**:E8.

Uranium hydride (UH_3) **ElMg**:T21; **ElMm**:T21; **IsTh**:N19; **MeD**:N19; **Sd**:N19; **ThP**:N19.

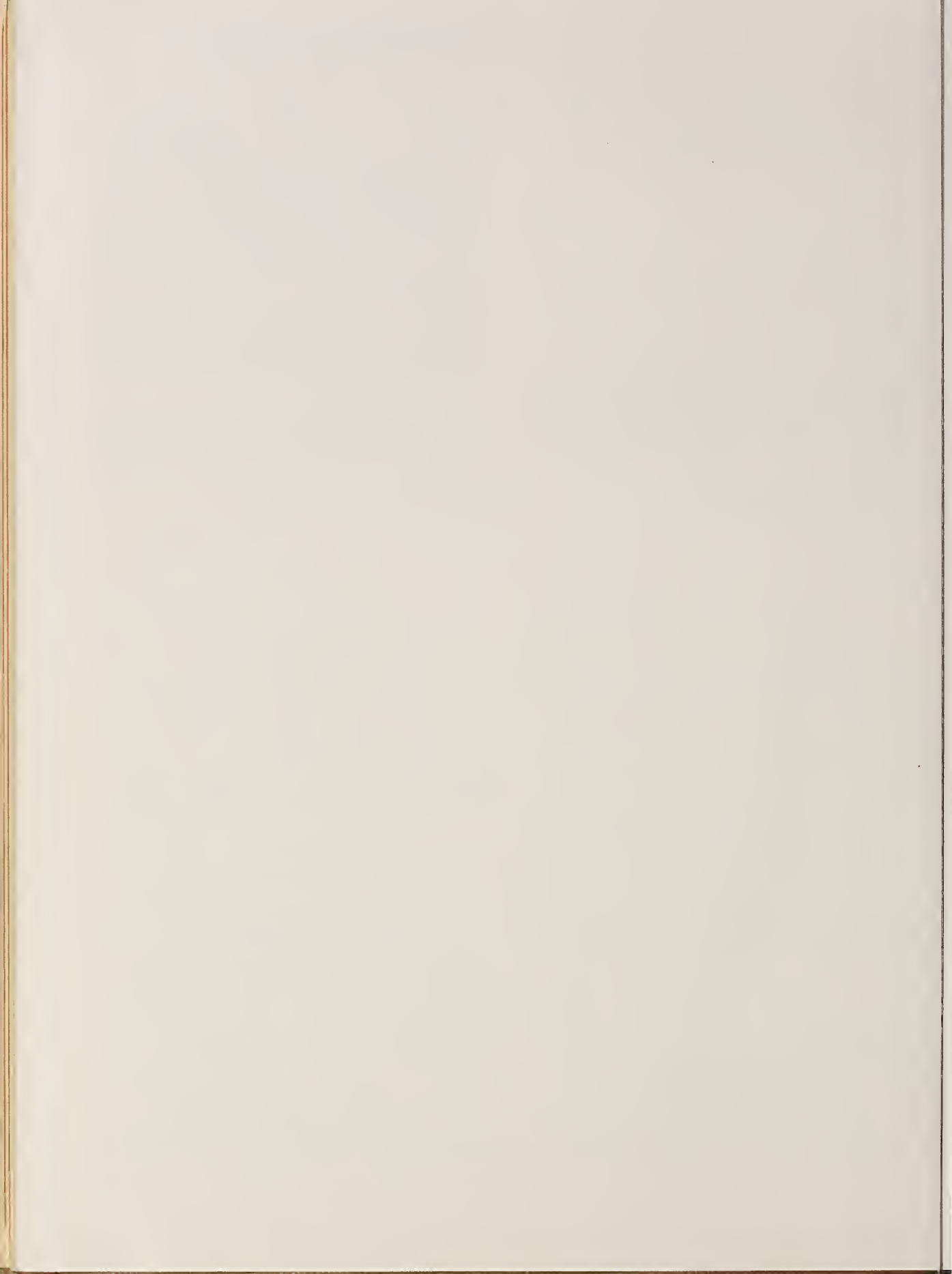
Valeric acid ($C_5H_{10}O_2$) **SdSp**:H2; **SpVi**:H2.

Vinyl bromide (C_2H_3Br) **SpVi**:C12, M21; **StD**:M21.

Water (H_2O) **Ad**:B73; **AdG**:S3; **BiB**:H33, K39, P19; **BiC**:F11, H33, K39, M29, P9, W13; **BiZ**:C16, G4, H37, K31, L29, P29, T10, T11; **EcC**:G6; **EID**:A14, H10; **ElGd**:B78, R5; **ElMm**:J7; **EIP**:D1; **ElRe**:S35; **Eq**:B74; **EqG**:W17; **EqH**:B10, K37, K38, P13, T13, W17, W18, W19; **EqL**:A4, B60, B61, B62, B76, F8, H27, H28, K18, K23, K42, K48, R22, W10; **In**:B73, N17, P13, W5; **InBi**:C16, F8, K35, M17, W15; **InKi**:B81, C1, C25, W10; **InSt**:B76; **Is**:P21, R34; **IsCr**:R36; **IsKi**:E15; **IsSp**:M57; **IsTh**:B54; **Ki**:B74, E15; **KiB**:C6, F8, J11, K37, K38, K39, M17, P14, S37; **KiH**:D22, W18; **KiL**:A4, B60, B61, B62, H27, H28; **KiR**:F5, K14; **MeAc**:L3, P2, S22; **MeD**:C9, H15, I7, L3; **MeDf**:N17, W5; **MeSt**:H15; **MeV**:H15, P21, R34; **SdEl**:A14; **SdTr**:L3; **SeCr**:R26; **SeCh**:B10, C7, E15; **SeDf**:C7; **SpEl**:B24, B78; **SpM**:B20, B91, C38, C39, J7, J8, P24, P25, R24; **SpVi**:B22, B23, G25, J17, L14, P13, P25; **StD**:M57; **ThD**:M45, P32; **ThF**:B54, L3; **ThP**:C35, G8, J18, M59.

Water-t (H_2O-t) **BiB**:B37, C10, C19, P23; **BiC**:B4, C19, P9, W13; **BiZ**:C16, L29, P22, T10, T11, T12; **In**:G20, W5, **InBi**:B4, C16, P28, T7, T8; **InSp**:M57; **MeDf**:C42, W5; **SdSp**:J19; **SpFl**:J19; **StD**:M57; **ThP**:J18.

WASHINGTON, January 4, 1957.



The National Bureau of Standards

The scope of activities of the National Bureau of Standards at its headquarters in Washington, D. C., and its major field laboratories in Boulder, Colorado, is suggested in the following listing of the divisions and sections engaged in technical work. In general, each section carries out specialized research, development, and engineering in the field indicated by its title. A brief description of the activities, and of the resultant publications, appears on the inside of the front cover.

WASHINGTON, D. C.

Electricity and Electronics. Resistance and Reactance. Electron Devices. Electrical Instruments. Magnetic Measurements. Dielectrics. Engineering Electronics. Electronic Instrumentation. Electrochemistry.

Optics and Metrology. Photometry and Colorimetry. Optical Instruments. Photographic Technology. Length. Engineering Metrology.

Heat and Power. Temperature Physics. Thermodynamics. Cryogenic Physics. Rheology. Engine Fuels. Free Radicals Research.

Atomic and Radiation Physics. Spectroscopy. Radiometry. Mass Spectrometry. Solid State Physics. Electron Physics. Atomic Physics. Neutron Physics. Nuclear Physics. Radioactivity. X-rays. Betatron. Nucleonic Instrumentation. Radiological Equipment. AEC Radiation Instruments.

Chemistry. Organic Coatings. Surface Chemistry. Organic Chemistry. Analytical Chemistry. Inorganic Chemistry. Electrodeposition. Gas Chemistry. Physical Chemistry. Thermochemistry. Spectrochemistry. Pure Substances.

Mechanics. Sound. Mechanical Instruments. Fluid Mechanics. Engineering Mechanics. Mass and Scale. Capacity, Density, and Fluid Meters. Combustion Controls.

Organic and Fibrous Materials. Rubber. Textiles. Paper. Leather. Testing and Specifications. Polymer Structure. Plastics. Dental Research.

Metallurgy. Thermal Metallurgy. Chemical Metallurgy. Mechanical Metallurgy. Corrosion. Metal Physics.

Mineral Products. Engineering Ceramics. Glass. Refractories. Enameled Metals. Concreting Materials. Constitution and Microstructure.

Building Technology. Structural Engineering. Fire Protection. Air Conditioning, Heating, and Refrigeration. Floor, Roof, and Wall Coverings. Codes and Specifications. Heat Transfer.

Applied Mathematics. Numerical Analysis. Computation. Statistical Engineering. Mathematical Physics.

Data Processing Systems. SEAC Engineering Group. Components and Techniques. Digital Circuitry. Digital Systems. Analog Systems. Application Engineering.

● Office of Basic Instrumentation

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BOULDER, COLORADO

Cryogenic Engineering. Cryogenic Equipment. Cryogenic Processes. Properties of Materials. Gas Liquefaction.

Radio Propagation Physics. Upper Atmosphere Research. Ionospheric Research. Regular Propagation Services. Sun-Earth Relationships.

Radio Propagation Engineering. Data Reduction Instrumentation. Modulation Systems. Navigation Systems. Radio Noise. Tropospheric Measurements. Tropospheric Analysis. Radio Systems Application Engineering.

Radio Standards. High Frequency Electrical Standards. Radio Broadcast Service. High Frequency Impedance Standards. Calibration Center. Microwave Physics. Microwave Circuit Standards.

