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INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

ORGANIC CHEMISTRY DIVISION
COMMISSION ON NOMENCLATURE OF ORGANIC CHEMISTRY (III.1)
COMMISSION ON PHYSICAL ORGANIC CHEMISTRY (III.2)

GLOSSARY OF CLASS NAMES OF ORGANIC COMPOUNDS AND REACTIVE INTERMEDIATES BASED ON STRUCTURE

(IUPAC Recommendations 1995)

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† Deceased

Names of countries given after members names are in accord with the *IUPAC Handbook 1994-1995.*

Glossary of class names of organic compounds and reactive intermediates based on structure (IUPAC Recommendations 1995)

Synopsis. This is a glossary of terms used to denote classes of compounds, substituent groups and reactive intermediates, in contrast to individual compounds. The overwhelming majority of the terms refer to organic compounds, but a few classes that may be considered inorganic are included for convenience. The principal criterion for inclusion is that the class be definable by structure.

Introduction

A class is a set of compounds sharing a common structural feature to which is attached a variable part (or parts) defining a specific compound of the class. The common feature is often a functional group to which one or a small number of variable parts are attached (*e.g.* aldehydes, ketones). The variable parts are in this glossary represented by hydrocarbyl groups (*q.v.*). The most simple representation of a class is thus defined. However membership of one class need not exclude membership of another class, and certain substitutions, as *e.g.* with heterocyclyl groups (*q.v.*) linked through a carbon atom in the R group, may be allowed. For instance, ethylamine as well as [1-(furan-2-yl)ethyl]amine and (2-methoxyethyl)amine belong to the class amines. The common feature may also be a sizeable part of the molecular structure, or a repetitive part of the molecular structure, possibly but not necessarily devoid of functionalities (*e.g.* steroids, terpenoids); quite often the attached variable groups may be many and of any functionality.

Classes defined by use, characteristics, or origin are excluded. Class names that are plurals of systematic names for parent compounds are occasionally cited. Some terms are included that are not actually class names, but are commonly encountered components of class names. These are mostly prefixes, and defining their meanings permits a host of class names beginning with them to be dispensed with.

There is some overlap with other IUPAC documents, especially the 'Glossary of Terms Used in Physical-Organic Chemistry'. Because the viewpoints are sometimes different, the wording of the definitions may in a few cases differ but most are reproduced verbatim.

The recommended class names, which are signalled by an asterisk, respect IUPAC nomenclature as presented in the 'Blue Book' (*Nomenclature of Organic Chemistry, Sections A, B, C, D, E, F, and H*, 1979 edition), the 'Revised Nomenclature for Radicals, Ions, Radical Ions and Related Species, Recommendations 1992' and *A Guide to IUPAC Nomenclature of Organic Chemistry, Recommendations 1993*, (including Revisions, Published and hitherto Unpublished, to the 1979 Edition of *Nomenclature of Organic Chemistry*).

Some class names are explicitly defined in the Blue Book, for others the meaning is implicit. Many more class names are to be found in the chemical literature. A selection of the more important ones appears in this glossary. Some class names occurring mainly in the older literature have been included too. The compilers have considered customary usage and the need for clearly defined limits of meaning. Some compromises were necessary, but the definitions have survived scrutiny by the Commissions and consultants.

Recommended class names carry a reference to an official IUPAC publication. The status of the remaining entries varies from unreserved acceptance to outright rejection. Class names not derived from an official source may carry a reference to other literature (a preference for the cited text over others is not implied). The definition of rejected class names is for information only; reasons for rejection are usually cited or indicated, and a cross-reference to the preferred class name is given.

A compound may belong to two or more different classes, *e.g.* it may be a ketone as well as an ester. Quite often composite names are then used, one class being denoted by an adjective, the second by a noun. The adjective and noun are separated by a space, thus oxo ester. However in the name of a specific compound there is no space between the prefix, indicating a specific substituent, and the name of the parent. Contrast *e.g.* α-amino carboxylic acids (class name) and 2-aminopentanoic acid (specific compound name).

Symbols

An asterisk (*) on an entry indicates that the definition is based on the contents of an official IUPAC source. Italicisation marks a relevant entry used in the definition of another entry. In formulae, charges are not circled and non-bonding electrons are not shown. However, in carbenes and related molecules, one electron pair is shown as a reminder of their lower-than-standard valency state. The dipolar bonds in sulfoxides, sulfones, *etc.*, are represented by formal double bonds. In the formulae to be found in the definitions, the symbol R means any hydrocarbyl group (*q.v.*) or H, unless its meaning is specifically qualified. When more than one R appears, it is to be understood that the R's may be the same or different, unless otherwise indicated. Two or more R's may be linked so as to form a ring, without changing the definition (*e.g.* $R_2C{=}O$ includes cyclopentanone as well as pentan-3-one and pentan-2-one). M indicates a metal or metal ion, Ar means an aryl group and Ph a phenyl group.

The abbreviations used for some frequently cited sources are as follows:

BNRD: *Biochemical Nomenclature and Related Documents*, Portland Press, London, 1992.

2-Carb: Nomenclature of Carbohydrates, revised 1994, in preparation.

CBN: Commission on Biochemical Nomenclature. IUPAC-IUB

CNIC: Commission on Nomenclature of Inorganic Chemistry, IUPAC.

CNOC: Commission on Nomenclature of Organic Chemistry, IUPAC.

CPOC: Commission on Physical Organic Chemistry, IUPAC.

EJB: *European Journal of Biochemistry.*

GNOC: *A Guide to IUPAC Nomenclature of Organic Compounds, Recommendations 1993, (including Revisions, Published and hitherto Unpublished, to the 1979 Edition of Nomenclature of Organic Chemistry)*, Blackwell Scientific Publications, Oxford, 1993.

GTPOC: Glossary of Terms Used in Physical Organic Chemistry, *PAC* **66**, 1077-1184 (1994).

JCBN: Joint Commission on Biochemical Nomenclature, IUBMB-IUPAC.

NOC: *Nomenclature of Organic Chemistry, Sections A, B, C, D, E, F and H*, Pergamon Press, Oxford, 1979.

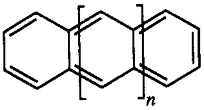
PAC: *Pure and Applied Chemistry.*

RNRI: Revised Nomenclature for Radicals, Ions, Radical Ions and Related Species, Recommendations 1993, *PAC* **65**, 1357-1455 (1993).

Glossary

acenes:*

Polycyclic aromatic *hydrocarbons* consisting of fused benzene rings in a rectilinear arrangement. NOC Rule A-21.2, GNOC Recom. R-2.4.1.3.1.



$n = 1,2,3...$

acetals:*

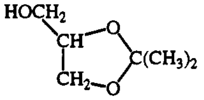
Compounds having the structure $R_2C(OR')_2$ ($R' \neq H$) and thus diethers of geminal *diols*. Originally, the term was confined to derivatives of *aldehydes* (one R = H), but now it applies equally to derivatives of *ketones* (neither R = H). NOC Rule C-331, GNOC Recom. R-5.6.4.1. Mixed acetals have different R' groups. See also *acetonides, ketals. Cf. acylals, hemiacetals.*

acetogenins: See *polyketides.*

acetonides:

Cyclic *acetals* derived from acetone and *diols*, usually vicinal diols, or polyhydroxy compounds.

E.g.



acetylenes:

Acyclic (branched or unbranched) and cyclic (with or without side chain) *hydrocarbons* having one or more carbon-carbon triple bonds. See also *alkynes.*

acetylides:*

Compounds arising by replacement of one or both hydrogen atoms of acetylene (ethyne) by a metal or other cationic group. *E.g.* $NaC\equiv CH$ monosodium acetylide. NOC Rule C-84.3. By extension, analogous compounds derived from terminal *acetylenes*, $RC\equiv CH$.

acids: See *carboxylic acids, oxoacids, sulfonic acids, etc.*

acid anhydrides:*

Compounds consisting of two *acyl groups* bonded to the same oxygen atom: acyl-O-acyl. Symmetric and mixed anhydrides have identical and different acyl groups, respectively. NOC Rule C-491, GNOC Recom. R-5.7.7. *E.g.* $CH_3C(=O)OC(=O)CH_3$ acetic anhydride, $CH_3C(=O)OS(=O)_2Ph$ acetic benzenesulfonic anhydride, $PhC(=S)OC(=S)Ph$ (thiobenzoic) anhydride.

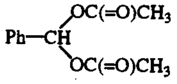
acid thioanhydrides: See *thioanhydrides.*

aci-nitro compounds: See *azinic acids*; see also aci-*nitro compounds* following *nitro compounds.*

acylals:*

Diesters of geminal *diols*; *i.e.* $R_2C[OC(=O)R]_2$. NOC Rule C-332.1, GNOC Recom. 5.6.4.3.

E.g.



$Ph{-}CH(OC(=O)CH_3)_2$

benzylidene diacetate

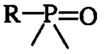
acyl anions: See *acyl species.*

acyl carbenes:

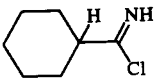
Any compound acyl-$\ddot{C}$-R. In organic chemistry, an unspecified acyl carbene is commonly a carboxylic acyl carbene, $RC(=O)\ddot{C}R$.

acyl cations: See *acyl species.*

acyl groups:*

Groups formed by removing one or more hydroxy groups from *oxoacids* that have the general structure $R_kE(=O)_l(OH)_m$ $(l \neq 0)$, and replacement analogues of such acyl groups. NOC Rules C-403, C-543.3, C-631.1, C-641.7, C-641.8, C-641.9, D-5.67, RNRI Rule RC-81.2.2. *E.g.* $CH_3C(=O)$-, $CH_3C(=NR)$-, $CH_3C(=S)$-, $PhS(=O)_2$-, $HP(\equiv N)$-,  $R{-}P(=O)<$. In organic chemistry an unspecified acyl group is commonly a carboxylic acyl group.

acyl halides:

Compounds consisting of an *acyl group* bonded to halogen. NOC Rule C-481, GNOC Recom. R-5.7.6. *E.g.* $CH_3S(=O)_2Cl$ methanesulfonyl chloride,  cyclohexanecarboximidoyl chloride, $CH_3C(=O)Cl$ acetyl chloride.

acyl radicals: See *acyl species.*

acyl species:

Acyl intermediates include acyl anions, acyl radicals and acyl cations (synonym: acylium ions) which are formally derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by removal of a hydroxyl cation HO^+, a hydroxyl radical $HO^\bullet$ or a hydroxyl anion HO^-, respectively, and replacement analogues of such intermediates. Acyl anions, radicals and cations can formally be represented by canonical forms having a negative charge, an unpaired electron or a positive charge on the acid-generating element of the oxoacid. See under *acyl groups*.

Acyl anions. *E.g.* $RC^-(=O)$, $RS^-(=O)_2$, $RC^-(=S)$, $RC^-(=NH)$.

Acyl radicals, RNRI Rule RC-81.2.2. *E.g.* $RC^\bullet(=O)$, $RS^\bullet(=O)_2$.

Acyl cations, RNRI Rule RC-82.2.3.2. *E.g.* $RC^+(=O) \leftrightarrow RC{\equiv}O^+$.

acylium ions: See *acyl species*.

acyloins:*

α-Hydroxy ketones, RCH(OH)C(=O)R. NOC Rule C-333. So named from the fact that they are formally derived from reductive coupling of carboxylic *acyl groups*. See also *ketones*.

acyloxyl radicals:

Oxygen-centered *radicals* consisting of an *acyl radical* bonded to an oxygen atom. *E.g.* $RC(=O)O^\bullet$, $RC(=NR)O^\bullet$, $RS(=O)O^\bullet$.

π-adducts:

Adducts, involving a dipolar bond with electron donation from and/or to π-orbitals. GTPOC (pi adduct).

aglycon:

The non-sugar compound remaining after replacement of the *glycosyl* group from a *glycoside* by a hydrogen atom. (The alternative spelling aglycone is discouraged because it suggests a ketonic structure, but in other languages it may be used, according to custom.) 2-Carb-33.1

alcohols:*

Compounds in which a hydroxy group, -OH, is attached to a saturated carbon atom: R_3COH. See also *enols*, *phenols*. NOC Rule C-201. The term 'hydroxyl' refers to the radical species, $HO^\bullet$. RNRI Rule RC-81.1.2, note 4.

alcoholates:

Synonymous with *alkoxides*. NOC Rule 206.1 Alcoholate should *not* be used for solvates derived from an *alcohol*, such as $CaCl_2{\cdot}n ROH$, for the ending -ate often occurs in names for anions.

aldaric acids:*

Polyhydroxy dicarboxylic acids having the general formula $HOC(=O)[CH(OH)]_nC(=O)OH$, formally derived from an *aldose* by oxidation of both terminal carbon atoms to carboxyl groups. 2-Carb-1.12.

aldazines:

Azines of *aldehydes*: RCH=NN=CHR.

aldehydes:*

Compounds RC(=O)H, in which a carbonyl group is bonded to one hydrogen atom and to one R group. NOC Rule C-301.1.

aldimines:*

Imines derived from *aldehydes*: RCH=NR. GNOC Recom. R-5.4.3. *E.g.* EtCH=NH, PhCH=NMe.

alditols:*

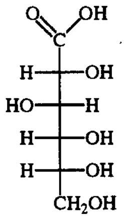
Acyclic polyols having the general formula $HOCH_2[CH(OH)]_nCH_2OH$ (formally derivable from an *aldose* by reduction of the carbonyl group). 2-Carb-1.8.

aldoketoses:*

A now less preferred synonym for *ketoaldoses*. 2-Carb-1.5.

aldonic acids:*

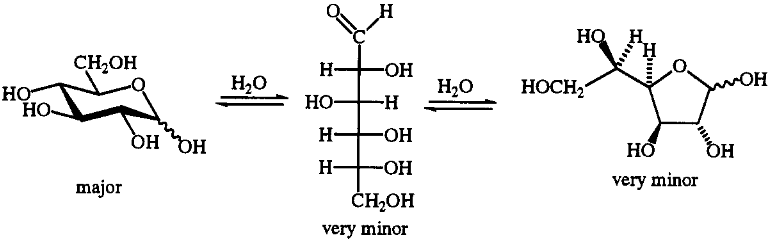
Polyhydroxy acids having the general formula $HOCH_2[CH(OH)]_nC(=O)OH$ and therefore derived from an *aldose* by oxidation of the *aldehyde* function. 2-Carb-1.9. *E.g.*



D-gluconic acid

aldoses:*

Aldehydic parent sugars (polyhydroxyaldehydes $H[CH(OH)]_nC(=O)H$, $n \geq 2$) and their intramolecular *hemiacetals*. 2-Carb-1.2. See also *monosaccharides*. *E.g.* D-glucose



aldoximes:*

Oximes of *aldehydes*: RCH=NOH. GNOC Recom. R-5.6.6.1.

alicyclic compounds:

Aliphatic compounds having a carbocyclic ring structure which may be saturated or unsaturated, but may not be a benzenoid or other aromatic system.

aliphatic compounds:

Acyclic or cyclic, saturated or unsaturated carbon compounds, excluding *aromatic compounds*.

alkaloids:

Basic nitrogen compounds (mostly heterocyclic) occurring mostly in the plant kingdom (but not excluding those of animal origin). Amino acids, *peptides*, *proteins*, *nucleotides*, *nucleic acids*, *amino sugars*, and antibiotics are not normally regarded as alkaloids. By extension, certain neutral compounds biogenetically related to basic alkaloids are included.

alkanes:*

Acyclic branched or unbranched *hydrocarbons* having the general formula C_nH_{2n+2}, and therefore consisting entirely of hydrogen atoms and saturated carbon atoms. NOC Rule A-1.1. *Cf. cycloalkanes*.

alkanium ions:

Carbocations derived from *alkanes* by *C*-hydronation containing at least one pentacoordinate carbon atom. RNRI Rule RC-82.1.1.2. *Cf. carbonium ions*. *E.g.* $^+CH_5$ methanium, $[C_2H_7]^+$ ethanium.

alkenes:*

Acyclic branched or unbranched *hydrocarbons* having one carbon-carbon double bond and the general formula C_nH_{2n} . Acyclic branched or unbranched hydrocarbons having more than one double bond are alkadienes, alkatrienes, *etc*. NOC Rule A-3.1. See also *olefins*.

alkoxides:*

Compounds, ROM, derivatives of *alcohols*, ROH, in which R is saturated at the site of its attachment to oxygen and M is a metal or other cationic species. NOC Rule C-206. *Cf. alcoholates.*

alkoxyamines:*

O-Alkyl *hydroxylamines* (with or without substitution on N): $R'ONR_2$ ($R' \neq H$). NOC Rules C-841.2, C-841.4.

alkyl groups:*

Univalent groups derived from *alkanes* by removal of a hydrogen atom from any carbon atom: C_nH_{2n+1}-. The groups derived by removal of a hydrogen atom from a terminal carbon atom of unbranched alkanes form a subclass of normal alkyl (*n*-alkyl) groups: $H[CH_2]_n$-. NOC Rule A-1.2. The groups RCH_2-, R_2CH- ($R \neq H$), and R_3C- ($R \neq H$) are primary, secondary and tertiary alkyl groups respectively. See also *cycloalkyl groups. Cf. hydrocarbyl groups.*

alkyl radicals:*

Carbon-centered *radicals* derived formally by removal of one hydrogen atom from an *alkane*. RNRI Rule RC-81.1.1. *E.g.* $CH_3CH_2\dot{C}H_2$ propyl.

alkylenes:

1. An old term, which is not recommended, for *alkenes*, especially those of low molecular weight.
2. An old term for alkanediyl groups commonly but not necessarily having the free valencies on adjacent carbon atoms. *E.g.* $-CH(CH_3)CH_2-$ propylene (systematically called propane-1,2-diyl).

alkylidenes:*

Carbenes R_2C: formed by mono or dialkyl substitution of methylene, H_2C:. RNRI Rule RC-81.1.3. *E.g.* CH_3CH_2CH: propylidene.

alkylidene groups:*

The divalent groups formed from *alkanes* by removal of two hydrogen atoms from the same carbon atom, the free valencies of which are part of a double bond. GNOC Recom. R-2.5. *E.g.* $(CH_3)_2C=$ propan-2-ylidene.

alkylideneamino carbenes: See under *nitrile ylides.*

alkylideneaminoxyl radicals:

Radicals having the structure $R_2C{=}N{-}O^{\bullet}$. Synonymous with *iminoxyl radicals.*

alkylideneaminyl radicals:

Radicals having the structure $R_2C{=}N^{\bullet}$. Synonymous with *iminyl radicals.*

alkylidynes:*

Carbenes $RC\vdots$ formed by alkyl substitution of methyne, $HC\vdots$. RNRI Rule RC-81.1.3. *E.g.* $CH_3CH_2C\vdots$ propylidyne.

alkynes:*

Acyclic branched or unbranched *hydrocarbons* having a carbon-carbon triple bond and the general formula C_nH_{2n-2}, $RC{\equiv}CR$. Acyclic branched or unbranched hydrocarbons having more than one triple bond are known as alkadiynes, alkatriynes, *etc.* NOC Rule A-3.2. See also *acetylenes.*

allenes:

Hydrocarbons (and by extension, derivatives formed by substitution) having two double bonds from one carbon atom to two others: $R_2C{=}C{=}CR_2$. (The simplest member, propadiene, is known as allene.) See also *cumulenes, dienes.*

allylic groups:

The group $CH_2=CHCH_2$- (allyl) and derivatives formed by substitution. The term 'allylic position' or 'allylic site' refers to the saturated carbon atom. A group, such as -OH, attached at an allylic site is sometimes described as 'allylic'.

allylic intermediates:

Carbanions, *carbenium ions*, or *radicals*, formally derived by detachment of one hydron, hydride or hydrogen from the CH_3 group of propene or derivatives thereof. *E.g.* $H_2C=CHCH_2^+$ allyl cation.

amic acids:*

Carbamoyl carboxylic acids, *i.e.* compounds containing a carboxy and a carboxamide group. *E.g.* 5-carbamoylnicotinic acid.

Note. In systematic nomenclature replacement of the "-ic" suffix of a dicarboxylic acid by "-amic" is limited to dicarboxylic acids that have a trivial name. NOC C-431. *E.g.* $HOC(=O)CH_2C(=O)NH_2$ malonamic acid (2-carbamoylacetic acid).

amides:*

1. Derivatives of *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) in which an acidic hydroxy group has been replaced by an amino or substituted amino group. Chalcogen replacement analogues are called thio-, seleno- and telluro-amides. Compounds having one, two, or three *acyl groups* on a given nitrogen are generically included and may be designated as primary, secondary and tertiary amides, respectively. See also *e.g. carboxamides, lactams, peptides, phosphoramides, sulfonamides.* NOC Rule C-821. *E.g.* $PhC(=O)NH_2$ benzamide, $CH_3S(=O)_2NMe_2$ *N,N*-dimethylmethanesulfonamide, $[RC(=O)]_2NH$ secondary amides (see *imides*), $[RC(=O)]_3N$ tertiary amides, $PhP(=O)(OH)NH_2$ phenylphosphonamidic acid.

Note 1. Amides with $-NH_2$, -NHR, and $-NR_2$ groups should *not* be distinguished by means of the terms primary, secondary, and tertiary. NOC Rule C-824, footnote.

Note 2. Derivatives of certain acidic compounds $R_nE(OH)_m$, where E is not carbon (*e.g. sulfenic acids*, RSOH, *phosphinous acids*, R_2POH) having the structure $R_nE(NR_2)_m$ may be named as amides but do not belong to the class amides proper. NOC Rules C-641.8, D-5.21. *E.g.* $CH_3CH_2SNH_2$ ethanesulfenamide or ethylsulfanylamine.

2. The term applies also to metal derivatives of ammonia and *amines*, in which a cation replaces a hydrogen atom on nitrogen. Such compounds are also called azanides. RNRI Rule RC-83.1.5. *E.g.* $LiN(i\text{-}Pr)_2$ lithium diisopropylamide, synonym lithium diisopropylazanide.

amide hydrazones: See *amidrazones.*

amide oximes:*

Compounds having the structure $RC(NH_2)=NOH$ and derivatives formed by substitution; formally the *oximes* of *carboxamides*. NOC Rule C-952.

amidines:*

Derivatives of *oxoacids* $R_nE(=O)OH$ in which the hydroxy group is replaced by an amino group and the oxo group is replaced by =NR. Amidines include carboxamidines, sulfinamidines and phosphinamidines, $R_2P(=NR)NR_2$. In organic chemistry an unspecified amidine is commonly a carboxamidine. See also *carboxamidines, sulfinamidines.*

amidium ions:*

Cations formally derived by the addition of one hydron to the N or O atom of an *amide* and N-*hydrocarbyl* derivatives thereof. In organic chemistry an unspecified amidium ion is commonly a carboxamidium ion: $RC(OH)=N^+R_2 \leftrightarrow RC(=O^+H)NR_2$ or $RC(=O)N^+R_3$. The term does not imply knowledge concerning the position of the cationic centre. RNRI Rule RC-82.1.2. *E.g.* $PhC(=O)N^+Me_3$ *N,N,N*-trimethylbenzamidium.

amidrazones:*

Compounds having the structure $RC(=NH)NHNH_2$ or $RC(NH_2)=NNH_2$, formally derived from *carboxylic acids*. These tautomers are named hydrazide imides and amide hydrazones, respectively. NOC Rule C-953. Also included are N-*hydrocarbyl* derivatives.

aminals:

Compounds having two amino groups bonded to the same carbon, $R_2C(NR_2)_2$. Also called geminal diamines. [The term aminal has also been used, with consequent ambiguity, for α-amino ethers (hemiaminal ethers); such use is discouraged.] Cf. *hemiaminals.*

amines:*

Compounds formally derived from ammonia by replacing one, two, or three hydrogen atoms by *hydrocarbyl groups*, and having the general structures RNH_2 (primary amines), R_2NH (secondary amines), R_3N (tertiary amines). NOC Rule C-811.2.

amine imides:*

Compounds formally derived from the attachment of an amine R_3N to a nitrene RN:. The structure $R_3N^+\text{-}N^-\text{-}R$ expresses the 1,2-dipolar character of amine imides. They may be named systematically as substituted diazan-2-ium-1-ides. RNRI Rule RC-84.1.1. *E.g.* $Me_3N^+\text{-}N^-Me$ 1,2,2,2-tetramethyldiazan-2-ium-1-ide or trimethylamine *N*-methylimide. See also *ylides.*

amine imines: An undesirable synonym for *amine imides.* See under *imides* (2), *ylides.*

amine oxides:*

Compounds derived from tertiary *amines* by the attachment of one oxygen atom to the nitrogen atom: $R_3N^+\text{-}O^-$. NOC Rule C-843. By extension the term includes the analogous derivatives of primary and secondary amines.

amine ylides: Synonymous with *ammonium ylides.*

aminimides: An undesirable synonym for *amine imides.* See under *ylides.*

aminium ions:

Cations HR_3N^+ formed by hydronation of an *amine* R_3N. RNRI Rule RC-81.1.1.2. "Non-quaternary ammonium ions" is a synonymous term. *E.g.* prolinium, PhN^+HMe_2 *N,N*-dimethylanilinium.

Note. If a class X can be hydronated to Xium ions the class Xium ions commonly includes the derivatives formed by the replacement of the added hydron with a *hydrocarbyl group.* Aminium ions form an exception, made possible by the availability of the class name ammonium ions. See also *onium compounds.*

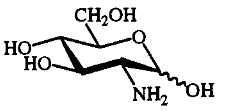
aminiumyl radical ions:

Radicals cations, $R_3N^{\bullet +}$, derivable from *aminium ions*, R_3NH^+, by removal of a hydrogen atom. Aminiumyl radical ions are, except for $H_3N^{\bullet +}$, synonymous with the ammoniumyl radical ions. As the term ammonium is well known, ammoniumyl radical ions is the more desirable class name. *Cf. ammoniumyl radical ions.* RNRI Rule RC-85-3.1.

amino radicals: A non-IUPAC term for *aminyl radicals.*

amino sugars:*

Monosaccharides having one alcoholic hydroxy group (commonly but not necessarily in position 2) replaced by an amino group; systematically known as *x*-amino-*x*-deoxymonosaccharides. (Glycosylamines are excluded.) 2-Carb-1.7, 2-Carb-14.



D-glucosamine or
2-amino-2-deoxy-D-glucopyranose

aminonitrenes: An incorrect name for *isodiazenes*. See under *carbene analogues*.

aminooxyl radicals:

A spelling for *aminoxyl radicals* used in NOC (NOC Rules C-841.2, C-81.1). *Aminoxyl radicals* is now preferred. RNRI Rule RC-81.2.4.

aminoxides:*

The anion H_2N-O^-, aminoxide, and its N-*hydrocarbyl* derivatives R_2N-O^-; formally derived from *hydroxylamines*, R_2NOH, by removing a hydron from the hydroxy group. RNRI Rule RC-83.1.4.1. *E.g.* $(CH_3)_2N-O^-$ dimethylaminoxide.

aminoxyl radicals:*

Compounds having the structure $R_2NO^\bullet \leftrightarrow R_2N^{\bullet+}-O^-$; they are *radicals* derived from *hydroxylamines* by removal of the hydrogen atom from the hydroxy group, and are in many cases isolable. RNRI Rule RC-81.2.4. The synonymous terms "nitroxyl radicals" and "nitroxides" erroneously suggest the presence of a nitro group; their use is not desirable. *E.g.* $(ClCH_2)N-O^\bullet$ bis(chloromethyl)aminoxyl.

aminyl oxides: Obsolete term for *aminoxyl radicals*.

aminyl radicals:*

The nitrogen-centered radical $H_2N^\bullet$, formally derived by the removal of a hydrogen atom from ammonia, and its *hydrocarbyl* derivatives $R_2N^\bullet$. NOC Rule C-81.1. RNRI Rule RC-81.1.2.

aminylenes:* See *nitrenes*.

aminylium ions:* See *nitrenium ions*.

ammonium compounds: See *onium compounds*.

ammonium imines:

An undesirable synonym for *amine imides*. See under *ylides*.

ammonium ylides:

1,2-*Dipolar compounds* of general structure $R_3N^+-C^-R_2$. See also *ylides*.

ammoniumyl radical ions:

$H_3N^{\bullet+}$ and its *hydrocarbyl* derivatives. RNRI RC-85.2. *E.g.* $(CH_3)_3N^{\bullet+}$ trimethylammoniumyl, $PhN^{\bullet+}H_2$ phenylammoniumyl or benzenaminiumyl.

ampholytes: See *zwitterionic compounds*.

anhydrides: See *acid anhydrides*.

anhydro bases:

Compounds resulting from internal acid-base neutralization (with loss of water) in *iminium* hydroxides containing an acidic site conjugated with the iminium function. *Cf. pseudo bases*.

anils:

A term for the subclass of *Schiff bases* $R_2C{=}NR'$, where R' = *N*-phenyl or substituted phenyl group. Thus *N*-phenyl imines.

anilides:*

1. Compounds derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing an -OH group by the -NHPh group or derivative formed by ring substitution; *N*-phenyl amides. NOC Rule C-641.8. See *amides*. *E.g.* $CH_3C(=O)NHPh$ acetanilide.

2. Salts formed by replacement of a nitrogen-bound hydron of aniline by a metal or other cation. *E.g.* NaNHPh sodium anilide.

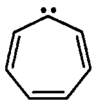
annulenes:*

Mancude monocyclic *hydrocarbons* without side chains of the general formula C_nH_n (n is an even number) or C_nH_{n+1} (n is an odd number). In systematic nomenclature an annulene with seven or more carbon atoms may be named [n]annulene, where n is the number of carbon atoms. GNOC Recom. R-2.3.1.2. *E.g.* [9]annulene for cyclonona-1,3,5,7-tetraene.

annulenylidenes:

Carbenes, derived by formal insertion of a divalent carbon atom into an even-membered *annulene*.

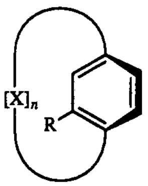
E.g.



cycloheptatrienylidene

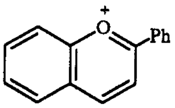
ansa compounds:

Benzene derivatives having *para* positions (or *meta*) bridged by a chain (commonly 10 to 12 atoms long) (Latin *ansa*, handle). By extension, any *arene* bridged by a chain constrained to lie over one of the two faces of the arene. *Cf. cyclophanes.*



anthocyanidins:

Aglycons of *anthocyanins*; they are oxygenated derivatives of flavylium (2-phenylchromenylium) salts. *Cf. flavonoids.*



anthocyanins:

Plant pigments of the *flavonoid* class; they are *glycosides* that on hydrolysis yield coloured *aglycons* called *anthocyanidins.*

antiaromatic compounds:

Compounds that contain $4n$ ($n \neq 0$) π-electrons in a cyclic planar, or nearly planar, system of alternating single and double bonds. *Cf. aromatic compounds. E.g.* cyclobuta-1,3-diene.

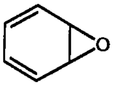
arenes:*

Monocyclic and polycyclic aromatic *hydrocarbons.* NOC Rule A-12.4. See *aromatic compounds.*

arene epoxides:

Epoxides derived from *arenes* by 1,2-addition of an oxygen atom to a formal double bond.

E.g.



5,6-epoxycyclohexa-1,3-diene.

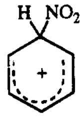
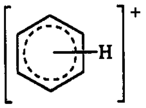
(Common usage has extended the term to include examples with the epoxy group bridging nonadjacent atoms.)

arene oxides: See *arene epoxides.*

arenium ions:

Cations derived formally by the addition of a hydron or other cationic species to any position of an arene. *E.g.* $C_6H_7^+$, benzenium. Cf. *aryl cations.*

The term includes:

1. Arenium σ-adducts (*Wheland intermediates*) such as  (which are considered to be intermediates in electrophilic aromatic substitution reactions) and other cyclohexadienyl cations.
2. Arenium π-adducts, such as 

GTPOC [σ-adduct (sigma adduct), π-adduct (pi adduct)].

arenols: Synonymous with *phenols* (but rarely used).

arenonium ions: An obsolescent name for *arenium ions*.

aromatic compounds:

Historically, the term "aromatic" originally referred to the smell of selected compounds that later were found to contain benzene or fused benzene rings in the structure. In a structural sense, it designates compounds that, in accordance with the theory of Hückel, have a cyclic, delocalized ($4n+2$) π-electron system. This includes arenes and their substitution products. *E.g.* benzene, naphthalene, toluene. The term has been generalized to include aromatic heterocyclic structures, such as thiophene and pyridine, but it is more precise to call compounds of the latter type heteroaromatic. See also *arenes, heteroarenes*. GTPOC (aromatic).

arsanes:*

The saturated hydrides of tervalent arsenic, having the general formula As_nH_{n+2}. Individual members having an unbranched arsenic chain are named arsane, diarsane, triarsane, *etc.* The name of a saturated hydride of arsenic where one or more arsenic atoms have bonding number 5 is formed by prefixing locants and λ^5 symbols to the name of the corresponding arsane. CNOC, Treatment of Variable Valence in Organic Nomenclature (lambda convention), *PAC* **56**, 769-778 (1984). Rule Lm.1. GNOC Recom. R-2.1, R-2.2. *E.g.* $H_2AsAsHAsH_2$ triarsane, $H_4AsAsH_3AsH_4$ $1\lambda^5,2\lambda^5,3\lambda^5$-triarsane. *Hydrocarbyl* derivatives of AsH_3 belong to the class *arsines*.

arsanylidenes:*

Recommended name for *carbene analogues* having the structure R-As: (former IUPAC name is arsinediyls). A common non-IUPAC synonym is *arsinidenes*. RNRI Rule RC–81.1.3.2.

arsanylium ions:

The arsanyl cation, H_2As^+, and derivatives by substitution. The name arsinylium (systematically derived from arsine) is not applied as it already designates $H_2As(=O)^+$, the *acylium ion* derived from *arsinic acid*. RNRI Rule RC-82.2.2.2.

arsenides:*

Compounds obtained from *arsines* AsR_3 by replacing one or more hydrogen atoms by a metal. NOC Rule D-5.19. *E.g.* CaAsPh calcium phenylarsenide.

arsines:*

AsH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by *hydrocarbyl groups*: R_3As. $RAsH_2$, R_2AsH, R_3As ($R \neq H$) are called primary, secondary and tertiary arsines, respectively. NOC Rule D-5.11. A specific arsine is preferably named as a substituted arsane. GNOC Recom. R-5.1.3.2. *E.g.* $CH_3CH_2AsH_2$ ethylarsane. *Cf.* *arsanes*.

arsine oxides:*

$H_3As{=}O$ and its *hydrocarbyl* derivatives. (Analogously arsine *imides* and arsine *sulfides*.) NOC Rule D-5.41. *E.g.* $(CH_3)_3As{=}O$ trimethylarsine oxide or trimethylarsane oxide. See under *imides* (2).

arsinic acids:*

$H_2As(=O)OH$ and its As-*hydrocarbyl* derivatives. NOC Rule D-5.51. *E.g.* $Me_2As(=O)OH$ dimethylarsinic acid.

arsinidenes: See *arsanylidenes.*

arsinous acids:*

H_2AsOH and its As-*hydrocarbyl* derivatives. NOC Rule D-5.21.

arsonic acids:*

$HAs(=O)(OH)_2$ and its As-*hydrocarbyl* derivatives. NOC Rule D-5.51.

arsonium compounds:*

Salts (including hydroxides) $[R_4As]^+ X^-$ containing tetracoordinate arsonium ion and the associated anion. NOC Rule D-5.31. See also *onium compounds.*

arsonous acids:*

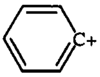
$HAs(OH)_2$ and its As-*hydrocarbyl* derivatives. NOC Rule D-5.21.

arsoranes:*

The mononuclear hydride AsH_5, systematically named λ^5-arsane, and its *hydrocarbyl* derivatives. NOC Rule D-5.71. See also *arsanes*. By extension the term also applies to arsonium ylides. See under *ylides.*

aryl cations:

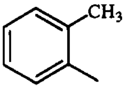
Carbocations formally derived by removal of a hydride ion from a ring carbon atom of an *arene.* *Cf.* *arenium ions. E.g.*



phenyl cation or phenylium

aryl groups:*

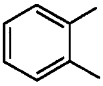
Groups derived from *arenes* by removal of a hydrogen atom from a ring carbon atom. NOC Rule A-13.5. Groups similarly derived from *heteroarenes* are sometimes subsumed in this definition (see *heteroaryl groups*). *E.g.*



o-tolyl.

arylene groups:*

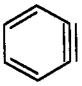
Bivalent groups derived from *arenes* by removal of a hydrogen atom from two ring carbon atoms. A synonym is arenediyl groups. NOC Rule A-13.5. *E.g.*



o-phenylene or
benzene-1,2-diyl

arynes:

Hydrocarbons derived formally from *arenes* by the abstraction of two hydrogen atoms from adjacent carbon atoms; thus 1,2-didehydroarenes. Arynes are commonly represented with a formal triple bond. *Cf.* *benzynes, dehydroarenes, heteroarynes. E.g.*



benzyne

azamines: See *isodiazenes.*

azanes:

Saturated acyclic nitrogen hydrides having the general formula N_nH_{n+2}.

azides:*

1. Compounds bearing the group $-N_3$, *viz.* $-N=N^+=N^-$; usually attached to carbon. NOC Rule C-941.1. *E.g.* PhN_3 phenyl azide or azidobenzene.

2. Salts of hydrazoic acid, HN_3. *E.g.* NaN_3 sodium azide.

azimines:

A commonly used but undesirable term for *azo imides*. (Should not be confused with 'azimino', the name for the bridging group, –N=NNH– . NOC Rule B-15.1.)

azines:*

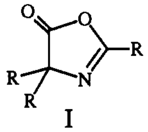
Condensation products, $R_2C=NN=CR_2$, of two moles of a carbonyl compound with one mole of *hydrazine*. NOC Rule C-923.1. See also *aldazines* and *ketazines*. (This term should not be confused with the ending -azine appearing in Hantzsch-Widman names for some heterocycles.)

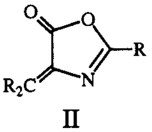
azinic acids:*

Derivatives of the parent structure $H_2N^+(O^-)OH$, (GNOC Recom. R-5.3.2) of which the alkylidene derivatives, $R_2C=N^+(O^-)OH$ (tautomers of nitroalkanes), are the most commonly encountered. The alkylideneazinic acids are known as *nitronic acids* or, synonymously as aci-*nitro compounds*. *E.g.* $CH_2=N^+(O^-)OH$ methylideneazinic acid.

azlactones:

Oxazol-5(4*H*)-ones (I), compounds derived by cyclisation of *N*-acyl α-amino carboxylic acids, RC(=O)NHCR$_2$C(=O)OH, through formal loss of the elements of water. 4-Hydrocarbylideneazlactones (II) are often referred to as 'unsaturated azlactones'.


I


II

azo compounds:*

Derivatives of diazene (diimide), HN=NH, wherein both hydrogens are substituted by *hydrocarbyl groups*. NOC Rules C-911, C-912. GNOC Recom. R-5.3.3.1 *E.g.* PhN=NPh azobenzene or diphenyldiazene.

azo imides:

N-*Imides* of *azo compounds*, analogous to *azoxy compounds*, having a delocalised structure $RN=N^+(R)N^-R \leftrightarrow RN^-N^+(R)=NR$; commonly but undesirably referred to as *azimines*. See under *dipolar compounds, imides* (2), *ylides*.

azo ylides: See *azomethine imides*.

azomethines:*

Compounds having the structure $RN=CR_2$ ($R \neq H$). NOC Rule C-815.3. Many consider the term to include the compounds RN=CRH ($R \neq H$), thus making azomethines synonymous with *Schiff bases*. *Cf. imines*.

azomethine imides:

The 1,3-*dipolar* N-*imides* of *azomethines* having the structure $RN^--N^+(R)=CR_2 \leftrightarrow RN=N^+(R)C^-R_2$. The term azo ylides, derived from the second resonance form, has also been used. See under *imides* (2), *ylides*.

azomethine oxides: Synonymous with *nitrones*.

azomethine ylides:

1,3-*Dipolar compounds* having the structure $R_2C^--N^+(R)=CR_2 \leftrightarrow R_2C=N^+(R)C^-R_2$. See also *ylides*.

azonic acids:*

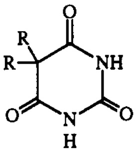
N-*Hydrocarbyl* derivatives of the parent structure $HN^+(O^-)(OH)_2$. GNOC Recom. R-3.3, Table VII. *Cf. phosphonic acids*.

azoxy compounds:*

N-Oxides of *azo compounds*, of structure $RN=N^+(O^-)R$. NOC Rule C-913. GNOC Recom. R-5.3.3.2. See under *dipolar compounds*. *E.g.* $PhN=N^+(O^-)Ph$ azoxybenzene or diphenyldiazene oxide.

barbiturates:

1. Pyrimidine-2,4,6(1*H*,3*H*,5*H*)-trione (trivial name barbituric acid) and derivatives:



(keto tautomeric form)

2. Salts of barbituric acid and its derivatives.

benzenium ions:*

Arenium ions, derived from benzene or substituted derivatives. RNRI Rule RC-82.1.1.2.

benzenonium ions: Obsolescent name for *benzenium ions*.

benzylic groups:

Arylmethyl groups and derivatives formed by substitution: $ArCR_2$- . Benzyl, $C_6H_5CH_2$- , is the prototype. The term 'benzylic position' or 'benzylic site' refers to the saturated carbon atom. A group, such as -OH, attached at a benzylic site is sometimes referred to as 'benzylic'.

benzylic intermediates:

Carbanions, *carbenium ions*, or *radicals*, derived formally by detachment of one hydron, hydride or hydrogen, respectively, from the CH_3 group of toluene or substitution derivatives thereof. *E.g.* $C_6H_5\dot{C}H_2$ benzyl radical.

benzynes:

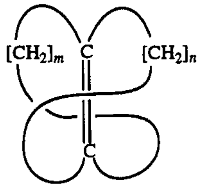
1,2-Didehydrobenzene (the *aryne* derived from benzene) and its derivatives formed by substitution. *Cf. arynes, dehydroarenes.* The terms *m*- and *p*-benzyne are occasionally, but erroneously, used for 1,3- and 1,4-didehydrobenzene, respectively (benzene-1,3-diyl and benzene-1,4-diyl, according to RNRI Rule RC-81.1.3.1).

betaines:*

Originally, the compound betaine, $(CH_3)_3N^+CH_2C(=O)O^-$ *N,N,N*-trimethylammonioacetate, and similar zwitterionic compounds derived from other amino acids. NOC Rule C-816.1, footnote. By extension, neutral molecules having charge-separated forms with an *onium* atom which bears no hydrogen atoms and that is not adjacent to the anionic atom. Betaines cannot be represented without formal charges. See also *dipolar compounds, mesoionic compounds, ylides, zwitterionic compounds. E.g.* $(CH_3)_3P^+CH_2S(=O)_2O^-$, $(Ph)_3P^+CH_2CH_2O^-$.

betweenanenes:

Bicyclic *alkenes* having a double bond between the bridgehead atoms and a *trans* attachment of each branch to the double bond. Thus *trans*-bicyclo[*m.n*.0]alk-1(*m*+2)-enes. J. Marshall, *Acc. Chem. Res.*, **13**, 213-218 (1980).



biradicals:

Although this term has been recommended in the past for *diradicals*, specialists working in the field prefer the latter term. GTPOC (biradical)

bismuthanes:*

The saturated hydrides of tervalent bismuth, having the general formula Bi_nH_{n+2}. GNOC Recom. R-2.1, R-2.2. *Hydrocarbyl* derivatives of BiH_3 belong to the class *bismuthines*.

bismuthines:*

BiH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by *hydrocarbyl groups*: R_3Bi. $RBiH_2$, R_2BiH, R_3Bi ($R \neq H$) are called primary, secondary and tertiary bismuthines, respectively. NOC Rule D-5.11. A specific bismuthine is preferably named as a substituted bismuthane. GNOC Recom. R-5.1.3.2. *E.g.* $(CH_3)_3Bi$ trimethylbismuthane. *Cf. bismuthanes.*

bisphenols:

By usage, the methylenediphenols, $HOC_6H_4CH_2C_6H_4OH$, commonly *p,p*-methylenediphenol, and their substitution products (generally derived from condensation of two equivalent amounts of a *phenol* with an *aldehyde* or *ketone*).

boranes:*

The molecular hydrides of boron. NOC Rule D-7.1. *E.g.* B_5H_9 pentaborane(9).

boranylidenes:*

The species RB: containing an electrically neutral univalent boron atom with two formally non-bonding electrons. See *carbene analogues.*

borenes: A traditional term for *boranylidenes.*

borinic acids:*

Compounds having the structure R_2BOH. NOC Rule D-7.42, footnote.

boronic acids:*

Compounds having the structure $RB(OH)_2$. NOC Rule D-7.42, footnote.

borylenes: A traditional term for *boranylidenes.*

bromohydrins: See *halohydrins.*

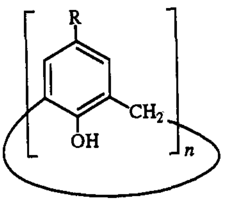
bromonium ions:* See under *halonium ions.*

Bunte salts:

Salts (usually sodium salts) of *S*-alkylthiosulfuric acid, of general structure $RSS(=O)_2O^- M^+$. Use of this term is discouraged.

calixarenes:

Originally macrocyclic compounds capable of assuming a basket (or "calix") shaped conformation. They are formed from p-*hydrocarbyl phenols* and formaldehyde. The term now applies to a variety of derivatives by substitution of the hydrocarbon cyclo{oligo[(1,3-phenylene)methylene]}. C. D. Gutsche, *Calixarenes*, The Royal Society of Chemistry, 1989.

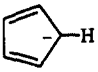


carbaboranes: See *carboranes.*

carbamates:

Salts or esters of carbamic acid, $H_2NC(=O)OH$, or of *N*-substituted carbamic acids: $R_2NC(=O)OR'$, (R' = *hydrocarbyl* or a cation). The *esters* are often called *urethanes* or urethans, a usage that is strictly correct only for the ethyl esters.

carbanions:

Anions containing an even number of electrons in which the excess negative charge is formally located on one or more carbon atoms. *E.g.* H_3C^- methyl anion or methanide, $H_3CC^-(=O)$ acetyl anion or 1-oxoethanide, $H_3CC^-HCH_3$ isopropyl anion or propan-2-ide,  cyclopenta-2,4-dienyl anion or cyclopenta-2,4-dien-1-ide.

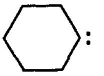
See also *acyl intermediates, enolates.* GTPOC (carbanions).

carbena:

This prefix is now rejected. It has been used in the past, especially in cyclic systems, to name *carbenes. E.g.* 'carbenacycloheptane', now cycloheptylidene.

carbenes:*

The electrically neutral species H_2C: and its derivatives, in which the carbon is covalently bonded to two univalent groups of any kind or a divalent group and bears two nonbonding electrons, which may be spin-paired (singlet state) or spin-non-paired (triplet state). In systematic name formation, carbene is the name of the parent hydride $:CH_2$; hence, the name dichlorocarbene for $:CCl_2$. However, names for acyclic and cyclic hydrocarbons containing one or more divalent carbon atoms are derived from the name of the corresponding all-λ^4-hydrocarbon using the suffix -ylidene. RNRI Rule RC-81.1.3. NOC Rule C-81.1.

E.g. CH_2=CHCH: prop-2-en-1-ylidene; : cyclohexylidene, H_2C=C: ethenylidene.

Subclasses of carbenes include *acyl carbenes* $RC(=O)\ddot{C}R$, *imidoyl carbenes,* $RC(=NR)\ddot{C}R$, and *vinyl carbenes.*

carbene analogues:

The electrically neutral mononuclear hydrides of group 14 having two non-bonding electrons, the electrically neutral mononuclear hydrides of group 15 having four non-bonding electrons, and also the compound HB:. The names of a number of these, formed according to RNRI Rules RC-81.1.3.1, RC-81.1.3.2, are shown below. These names are entries in this Glossary.

RB:	boranylidenes	RN:	nitrenes
R_2Si:	silylenes	RP:	phosphanylidenes
R_2Ge:	germylidenes	RAs:	arsanylidenes
R_2Sn:	stannylidenes	RSb:	stibanylidenes
R_2Pb:	plumbylidenes		

Note that if R = H, these compounds are parent hydrides; derivatives formed by substitution are named accordingly. However, if the substituent's first atom, bearing the free valence, is of the same element as the atom of the carbene analogue, other parent compounds may be required (see carbenes), *E.g.* HN: nitrene; CH_3N: methylnitrene; H_2NN: *diazanylidene* (synonym *isodiazene*, not *aminonitrene*).

carbene metal complexes: See *metal carbene complexes.*

carbene radical anions:

Species $R_2C\vdots^{-}$, having three non-bonding electrons, formally derived by addition of an electron to a *carbene.*

carbene radical cations:

Species $R_2C^{\bullet+}$, having one non-bonding electron, formally derived by subtraction of an electron from a *carbene. E.g.* $H_2C^{\bullet+}$ methyliumyl.

carbenium ions:

A structure, real or hypothetical, representing a *carbocation* which contains at least one carbon atom having only six valence electrons, *i.e.* 'formally trivalent'. GTPOC (carbenium ions). *Cf. carbonium ions, vinylic cations. E.g.* $CH_3C^+HCH_3$ propan-2-ylium, $CH_3OCH_2^+$ methoxymethylium.

carbenoids:

Complexed carbene-like entities that display the reactivity characteristics of *carbenes*, either directly or by acting as sources of carbenes.

carbinols:

An obsolete term for substituted methanols, in which the name carbinol is synonymous with methanol.

carbinolamines: An obsolete term for *hemiaminals*.

carbinyl cations: An obsolete term, derived from carbinol, once used for *carbenium ions*.

carbocations:*

Cations containing an even number of electrons in which the positive charge is formally located on one or more carbon atoms. See also *alkanium ions*, *carbenium ions, vinyl cations.* GTPOC (carbocations). RNRI Rule RC-82.1.1.1, footnote ***.

carbocyclic compounds:

Cyclic compounds in which all of the ring members are carbon atoms. *E.g.* 1,2-dihydronaphthalene. See also *homocyclic compounds.*

carbodiimides:*

Carbodiimide, HN=C=NH, and its *hydrocarbyl* derivatives. NOC Rule C-956.

carbohydrates:

Originally, compounds such as *aldoses* and *ketoses*, having the stoichiometric formula $C_n(H_2O)_n$, hence "hydrates of carbon". The generic term carbohydrate includes *monosaccharides*, *oligosaccharides* and *polysaccharides* as well as substances derived from monosaccharides by reduction of the carbonyl group (*alditols*), by oxidation of one or more terminal groups to *carboxylic acids*, or by replacement of one or more hydroxy group(s) by a hydrogen atom, an amino group, thiol group or similar groups. It also includes derivatives of these compounds. 2-Carb-1.1.

carbonitriles:

In systematic nomenclature, the suffix -carbonitrile is used to name compounds $RC\equiv N$ where the suffix includes the carbon atom of the -CN. NOC Rule C-832.2. However carbonitrile is not a class name for *nitriles.*

carbonium ions: An older term applied usually to *carbenium ions* but also to *alkanium ions* and other carbocationic species. The term is then ambiguous and not recommended. *Cf. carbocations.*

carbonyl compounds:

1. Compounds containing the carbonyl group, C=O. The term is commonly used in the restricted sense of *aldehydes* and *ketones*, although it actually includes *carboxylic acids* and derivatives. See under *oxo compounds.*
2. Metal carbonyls, in which carbon monoxide is a formal ligand.

carbonyl imides:

1,3-*Dipolar compounds* having the structure $R_2C=O^+\text{-}N^-R \leftrightarrow R_2C^+\text{-}O\text{-}N^-R$. See also *oxonium ylides* (2).

carbonyl imines: An undesirable synonym for *carbonyl imides*. See under *ylides*.

carbonyl oxides:

1,3-*Dipolar compounds* having the structure $R_2C^-{-}O^+{=}O \leftrightarrow R_2C{=}O^+{-}O^-$. Also called peroxo compounds. See also *oxonium ylides* (2).

carbonyl ylides:

1,3-*Dipolar compounds* having the structure $R_2C{=}O^+{-}C^-R_2 \leftrightarrow R_2C^+\text{-}OC^-R_2$. See also *oxonium ylides* (2).

carboranes:

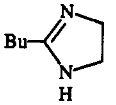
(A contraction of *carbaboranes.*) Compounds in which a boron atom in a polyboron hydride is replaced by a carbon atom with maintenance of the skeletal structure. (NOC Rule D-7.45 uses 'carbaboranes', but the contracted form is almost universally used.)

carboxamides:*

Amides of *carboxylic acids*, having the structure $RC(=O)NR_2$. The term is used as a suffix in systematic name formation to denote the $-C(=O)NH_2$ group including its carbon atom. NOC Rule C-821.1.

carboxamidines:

Compounds having the structure $RC(=NR)NR_2$. The term is used as a suffix in systematic nomenclature to denote the $-C(=NH)NH_2$ group including its carbon atom. NOC Rule C-951.1. *E.g.* $CH_3C(=NH)NH_2$ acetamidine,



2-butyl-4,5-dihydroimidazole.

carboxylic acids:*

Oxoacids having the structure $RC(=O)OH$. The term is used as a suffix in systematic name formation to denote the $-C(=O)OH$ group including its carbon atom. NOC Rule C-401.2.

carbylamines: An obsolete term, which should not be used, for *isocyanides*. NOC Rule C-833.1.

carbynes:

The neutral species HC⁝ and its derivatives formed by substitution in which a univalent carbon atom is covalently bonded to one group and also bears three nonbonding electrons. (This term carries no implication about spin-pairing.) RNRI Rule RC-81.1.3.1.

carbyne metal complexes: See *metal carbyne complexes.*

carbynium ions:

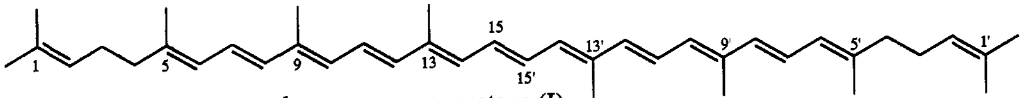
The cationic species $H_2C^{\cdot +}$ or substitution derivatives thereof, formally derived by adding a hydron to a *carbyne* or subtracting an electron from a *carbene.*

carotenes:

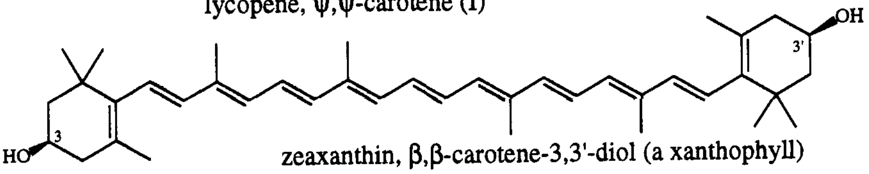
Hydrocarbon carotenoids (a subclass of tetraterpenes). See also *terpenes.* See under *carotenoids.*

carotenoids:

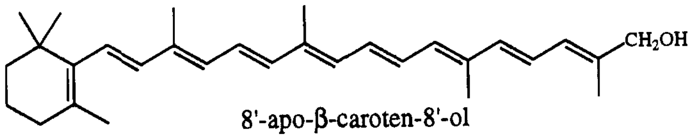
Tetraterpenoids (C_{40}), formally derived from the acyclic parent ψ,ψ-carotene (I) by hydrogenation, dehydrogenation, cyclization, oxidation, or combination of these processes. This class includes *carotenes, xanthophylls* and certain compounds that arise from rearrangement of the skeleton of (I) or by loss of part of this structure. *Retinoids* are excluded. BNRD Rule Carotenoid-1 (p. 226, 237). See also *retro. E.g.*



lycopene, ψ,ψ-carotene (I)



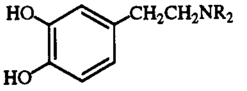
zeaxanthin, β,β-carotene-3,3'-diol (a xanthophyll)



8'-apo-β-caroten-8'-ol

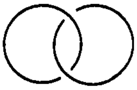
catecholamines:

4-(2-Aminoethyl)pyrocatechol [4-(2-aminoethyl)benzene-1,2-diol] and derivatives formed by substitution.



catenanes/catena compounds:

Hydrocarbons having two or more rings connected in the manner of links of a chain, without a covalent bond. More generally, the class catena compounds embraces functional derivatives and hetero analogues. *E.g.*



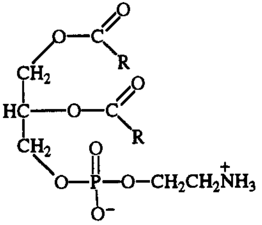
a [2]catenane

cavitands:

Compounds constrained by structure to having or accommodating a cavity large enough to host other molecules. See *inclusion compounds*.

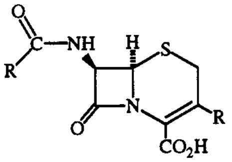
cephalins (kephalins):

Compounds derived from glycerol in which a primary and the secondary hydroxy groups are esterified with long-chain *fatty acids*, and the remaining primary one with the mono(2-aminoethyl) ester of phosphoric acid, or with the monoserine ester of phosphoric acid. The term is not recommended. BNRD Nomenclature of Phosphorus Containing Compounds, Table 4, p. 262. These compounds are preferably designated as (3-phosphatidyl)ethanolamines and (3-phosphatidyl)serines respectively. See also *phosphatidic acids*.



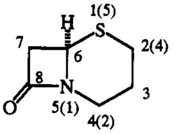
cephalosporins:

Cephems having the basic structure shown. See also *cephams*, *cephems*, *penams*, *penems*, *penicillins*.



cephams:

Natural and synthetic antibiotics containing the 5-thia-1-azabicyclo[4.2.0]octan-8-one nucleus; generally assumed to have the 6*R* configuration, unless otherwise specified. The numbering used differs from that of the von Baeyer named bicyclic system. Where they differ, the von Baeyer numbering is shown in parentheses.



cephems:

2,3-Didehydrocephams: 5-thia-1-azabicyclo[4.2.0]oct-2-en-8-ones. See *cephalosporins*, *cephams*.

chalcones:

1,3-Diphenylpropenone (benzylideneacetophenone) and its derivatives formed by substitution. ArCH=CHC(=O)Ar.

charge-transfer complexes:

Electron-donor—electron-acceptor complexes, characterised by electronic transition(s) to an excited state in which there is a partial transfer of electronic charge from the donor to the acceptor moiety. GTPOC (charge-transfer complexes).

chelates:

Compounds in which a multidentate ligand, such as an enolate anion of a β-diketone, is bound to a receptor center (central atom of a coordination complex).

chloramines:

Amines substituted at nitrogen with one or two chlorine atoms (a contracted form of *N*-chloroamines).

chlorocarbons:

Compounds consisting wholly of chlorine and carbon.

chlorohydrins: See *halohydrins.*

chloronium ions: See *halonium ions.*

clathrates:

Inclusion compounds in which the guest molecule is in a cage formed by the host molecule or by a lattice of host molecules.

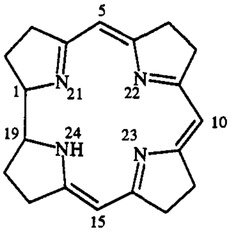
cobalamines: See *corrinoids.*

π-complexes: See *π-adducts.*

coronands/coronates: See *crown compounds.*

corrinoids (cobalamines, corphyrins, corrins, vitamin B_{12} compounds):

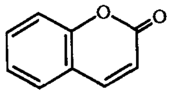
Derivatives of the corrin nucleus, which contains four reduced or partly reduced pyrrole rings joined in a macrocycle by three =CH- groups and one direct carbon-carbon bond linking alpha positions. BNRD Nomenclature of Corrinoids (p. 272).



corrin

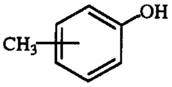
coumarins:

2*H*-Chromen-2-one (older name 1,2-benzopyrone), trivially named coumarin, and its derivatives formed by substitution. *Cf. isocoumarins.*



cresols:

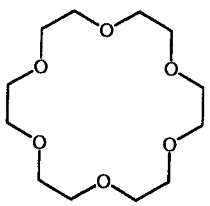
The monomethylphenols and their derivatives formed by substitution on the ring with substituents other than -OH.



crown compounds:

Macrocyclic polydentate compounds, usually uncharged, in which three or more coordinating ring atoms (usually oxygen or nitrogen) are or may become suitably close for easy formation of chelate complexes with metal ions or other cationic species. (Planar analogues, such as *porphyrins*, are excluded.) They are also known as *coronands* and the chelate complexes are called coronates. GTPOC (crown).

E.g.



a crown ether
(a subclass containing only oxygen
as coordinating atom.)

M. Hiraoka, *Crown Compounds: their Characteristics and Applications*, Elsevier Science Publishers, 1982.

cryptands/cryptates:

Cryptands are macrobicyclic, macrotricyclic, *etc.* compounds generally having nitrogen atoms at the bridgehead positions, having sufficient space within its cage structure for polydentate ligation to metal ions or other cationic species; the resulting complexes are called cryptates. E. Weber and F. Vögtle, *Inorg. Chim. Acta*, **45**, L65-L67 (1980).

cumulenes:*

Hydrocarbons (and by extension, derivatives formed by substitution) having three or more cumulative double bonds. *E.g.* $R_2C{=}C{=}C{=}CR_2$. (Cumulative double bonds are those present in a chain in which at least three contiguous atoms are joined by double bonds.) NOC Rule A-21.1, footnote. See also *allenes*, *heterocumulenes.*

cyanates:*

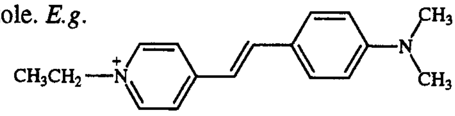
Salts and *esters* of cyanic acid, HOC≡N. NOC Rule C-833.1. *E.g.* KOCN potassium cyanate, PhOCN phenyl cyanate. *Cf. isocyanates.*

cyanides:*

Salts and *C-organyl* derivatives of hydrogen cyanide, HC≡N. NOC Rule C-831.1. GNOC Recom. R-5.7.9.1. See also *isocyanides, nitriles, carbonitriles. E.g.* $CH_3C{\equiv}N$ methyl cyanide (acetonitrile), NaCN sodium cyanide, PhC(=O)CN benzoyl cyanide.

cyanine dyes:

Synthetic dyes with the general formula $R_2N[CH{=}CH]_nCH{=}N^+R_2 \leftrightarrow R_2N^+{=}CH[CH{=}CH]_nNR_2$ (n is a small number) in which the nitrogen and part of the conjugated chain usually form part of a heterocyclic system, such as imidazole, pyridine, pyrrole, quinoline and thiazole. *E.g.*



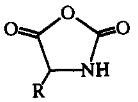
F. M. Hamer, *The Cyanine Dyes and Related Compounds*, Interscience, 1964.

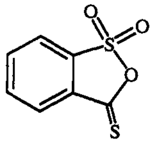
cyanohydrins:

Alcohols substituted by a cyano group, most commonly, but not limited to, examples having a cyano and a hydroxy group attached to the same carbon atom, formally derived from *aldehydes* or *ketones* by the addition of hydrogen cyanide. An individual cyanohydrin can systematically be named as a hydroxy nitrile. See under *halohydrins. E.g.* $(CH_3)_2C(OH)C{\equiv}N$ 'acetone cyanohydrin' (2-hydroxy-2-methylpropanenitrile), $HOCH_2CH_2C{\equiv}N$ 'ethylene cyanohydrin' (3-hydroxypropanenitrile).

cyclic acid anhydrides/cyclic anhydrides:*

Acid anhydrides derived by loss of water between two *oxoacid* functions $R_kE({=}O)_l(OH)_m$ ($l \neq 0$) (carboxylic, sulfonic, *etc.*) in the same molecule so as to close a ring. NOC Rules C-491.4, C-643.2. Oxo oxygen replacement analogues are included. *Cf. thioanhydrides. E.g.*



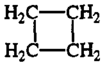


cyclitols:*

Hydroxylated *cycloalkanes* containing at least three hydroxy groups, each attached to a different ring carbon atom. BNRD, Nomenclature of Cyclitols (p. 149).

cycloalkanes:*

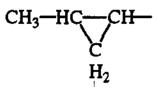
Saturated monocyclic *hydrocarbons* (with or without side chains). See *alicyclic compounds*. NOC Rule A-11.1. *E.g.*



cyclobutane. Unsaturated monocyclic hydrocarbons having one endocyclic double or one triple bond are called cycloalkenes and cycloalkynes, respectively. Those having more than one such multiple bond are cycloalkadienes, cycloalkatrienes, *etc.* The inclusive terms for any cyclic hydrocarbons having any number of such multiple bonds are cyclic *olefins* or cyclic *acetylenes*.

cycloalkyl groups:*

Univalent groups derived from *cycloalkanes* by removal of a hydrogen atom from a ring carbon atom. *E.g.*

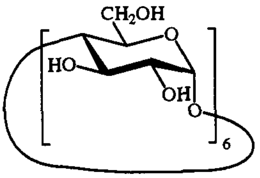


2-methylcyclopropyl. NOC Rules A-11.1, A-11.2.

cyclodepsipeptides: See *depsipeptides*.

cyclodextrins:

Cyclic oligoglucosides containing 5 to *ca.* 10 glucose residues in which an enclosed tubular space allows reception of a guest molecule to form a *clathrate*. The synonymous term Schardinger dextrins is not recommended. (α-Cyclodextrin has 6 glucose residues; β-cyclodextrin has 7.) Semi-systematically α-cyclodextrin is called cyclomaltohexaose. 2-Carb-37.4.1. See also *dextrins*.

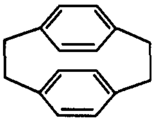


cyclohexadienyl cations:

A subclass of *arenium ions*.

cyclophanes:

The term originally applied to compounds having two *p*-phenylene groups held face to face by -$[CH_2]_n$- bridges. It now designates compounds having (i) *mancude-ring systems*, or assemblies of mancude-ring systems, and (ii) atoms and/or saturated or unsaturated chains as alternate components of a large ring. GNOC Recom. R-2.4.5. Many chemists include in this class any bridged aromatic system, irrespective of the attachment positions of the bridge. *E.g.*

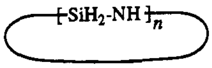


[2.2](1,4)(1,4)cyclophane or 1(1,4),4(1,4)-dibenzenacyclophane according to the provisional CNOC document on Phane Nomenclature, Part 1.

F.N. Diederich, *Cyclophanes*, The Royal Society of Chemistry, 1991.

cyclosilazanes:*

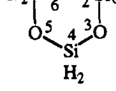
Compounds having rings of alternating silicon and nitrogen atoms: NOC Rule D-6.42.



cyclosiloxanes:*

Compounds having rings of alternating silicon and oxygen atoms. NOC Rule D-6.23.

E.g.

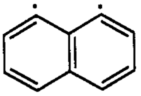


2,2-dimethylcyclotrisiloxane.

dehydroarenes:

Species, usually transient, derived formally by the abstraction of a hydrogen atom from each of two ring atoms of an *arene*. The name for specific compounds requires the numerical prefix di-.

E.g



1,8-didehydronaphthalene or naphthalene-1,8-diyl. RNRI Rule RC-81.3.1.

1,2-Didehydroarenes are called *arynes* and are commonly represented with a formal triple bond.

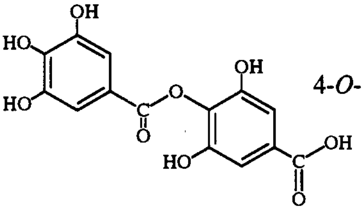
dehydrobenzenes: A subclass of *dehydroarenes*. See *benzynes*.

deoxyribonucleic acids (DNA):

Nucleic acids made up of *nucleotide* units having a 2-deoxy-α-D-ribosyl component. BNRD Rule N-1.3 (p.110).

depsides:

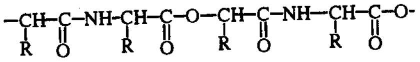
Intermolecular *esters* formed from two or more molecules of the same or different phenolic benzoic acids. Depending on the number of the component units, di-, tri-, *etc.* depsides may result. *E.g.*



4-*O*-galloylgallic acid.

depsipeptides:

Natural or synthetic compounds having sequences of amino and hydroxy carboxylic acid residues (usually α-amino and α-hydroxy acids), commonly but not necessarily regularly alternating. In cyclodepsipeptides, the residues are connected in a ring. *Cf. carboxylic acids.*



$-\underset{\mathrm{R}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{O}}{\underset{\|}{\mathrm{C}}}-\mathrm{NH}-\underset{\mathrm{R}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{O}}{\underset{\|}{\mathrm{C}}}-\mathrm{O}-\underset{\mathrm{R}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{O}}{\underset{\|}{\mathrm{C}}}-\mathrm{NH}-\underset{\mathrm{R}}{\underset{|}{\mathrm{CH}}}-\underset{\mathrm{O}}{\underset{\|}{\mathrm{C}}}-\mathrm{O}-$

dextrans:

Branched poly-α-D-glucosides of microbial origin having glycosidic bonds predominantly C-1→ C-6. *Cf. glycosides.*

dextrins:

Poly-α-D-glucosides of intermediate chain length derived from starch components (amylopectins) by the action of amylases (starch hydrolysing enzymes). See also *cyclodextrins*, *dextrans*.

diacylamines:*

Compounds having two *acyl groups* substituted on ammonia or a primary amine: acyl-NR-acyl. They are also known as secondary *amides* and, especially the cyclic examples derived from diacids, as *imides*. NOC Rule C-826. *E.g.* $[RC(=O)]_2NR$, $RS(=O)_2NHC(=O)R$.

diamidides:

Analogues of acyclic carboxylic *acid anhydride* in which =O has been replaced by =NR and -O- by -NR-: RC(=NR)NRC(=NR)R, *N*-imidoyl amidines. The name 1,3,5-triazapentadienes, formed in contravention of NOC Rule C-61, is sometimes applied as a class name to diamidides. See *imidines*.

dianions:

Molecular entities bearing two negative charges, which may be located on a single atom or on different atoms or may be delocalized.

diazanylidenes: An alternative term for *isodiazenes*.

1,1-diazenes:

An incorrectly formed name for *isodiazenes*. Use of this name is discouraged. See also *nitrenes*.

diazenyl radicals:

Radicals of structure $RN{=}N^{\bullet}$.

diazo compounds:

Compounds having the divalent diazo group, $=N^{+}{=}N^{-}$, attached to a carbon atom. See also *dipolar compounds*. *E.g.* $CH_2{=}N_2$ diazomethane.

diazoamino compounds:*

Compounds having the structure $RN{=}N{-}NR_2$ (not all R = H, and one R commonly aryl). See also *triazenes*. In systematic nomenclature, diazoamino prefixed to the name of RH names the compound RN=NNHR' (R = R'). NOC Rule C-942.2. *E.g.* PhN=N-NPhMe N-methyldiazoaminobenzene.

diazoates:*

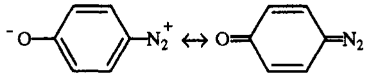
Salts $RN{=}NO^{-}M^{+}$ (R commonly *aryl*) of the compounds RN=NOH, (hydrocarbon)diazohydroxides. NOC Rule C-931.3. *E.g.* $PhN{=}NO^{-}K^{+}$ potassium benzenediazoate. In GNOC Recom. R-5.3.3.4 these compounds are named as hydrocarbyldiazenolates and hydrocarbyldiazenols respectively. *E.g.* PhN=NOH phenyldiazenol. $RN{=}NO^{-}M^{+}$ are also known by the non-IUPAC name diazotates.

diazonium salts:

Compounds of structure $RN_2^{+}\,Y^{-}$, in which R is generally but not necessarily *aryl*, and the cations of which are usually formulated as $RN^{+}{\equiv}N$. NOC Rule C-931. *E.g.* $PhN^{+}{\equiv}N\ Cl^{-}$ benzenediazonium chloride. They may also be named, from the canonical form $RN{=}N^{+}$, hydrocarbyldiazenylium salts. RNRI Rule RC-82.2.2.3.

diazooxides:

Diazocyclohexadienones, which may also be considered as dipolar diazonio phenoxides, obtained by diazotizing aromatic primary *amines* having a hydroxy group in an *ortho* or *para* position. Also known as diazophenols. See also *diazo compounds*, *phenoxides*, *quinone diazides*.



diazotates: See *diazoates*.

dicarbenium ions:

Species carrying two positive charges, formally located on tervalent carbon atoms.
E.g. $^{+}CH_2{-}^{+}CH_2$ ethane-1,2-diyl dication, $^{+}CH_2CH_2{-}^{+}CH_2$ propane-1,3-bis(ylium).

dienes:

Compounds that contain two fixed double bonds (usually assumed to be between carbon atoms). See *alkenes*, *olefins*. Dienes in which the two double-bond units are linked by one single bond are termed conjugated, *e.g.* $CH_2{=}CH{-}CH{=}CH_2$ buta-1,3-diene. Dienes in which the double bonds are adjacent are called cumulative, *e.g.* $CH_3CH{=}C{=}CH_2$ buta-1,2-diene. See also *allenes*, *cumulenes*. Those in which one or more of the unsaturated carbon atoms is replaced by a heteroatom may be called heterodienes.

diols:

Compounds that contain two hydroxy groups, generally assumed to be, but not necessarily, alcoholic. *Aliphatic* diols are also called *glycols*.

diosphenols:

Cyclic α-diketones, which exist predominantly in an enolic form.

dipolar compounds:

Electrically neutral molecules carrying a positive and a negative charge in one of their major canonical descriptions. In most dipolar compounds the charges are delocalized; however the term is also applied to species where this is not the case. 1,2-Dipolar compounds have the opposite charges on adjacent atoms. The term 1,3-dipolar compounds is used for those in which a significant canonical resonance form can be represented by a separation of charge over three atoms (in connection with 1,3-dipolar cycloadditions). Subclasses of 1,3-dipolar compounds include:

(i) Allyl type
$X{=}Y^+{-}Z^- \leftrightarrow {}^-X{-}Y^+{=}Z \leftrightarrow {}^+X{-}Y{-}Z^- \leftrightarrow {}^-X{-}Y{-}Z^+$ (X, Z = C, N, or O; Y = N or O) See *azo imides, azomethine imides, azomethine ylides, azoxy compounds, carbonyl imides, carbonyl oxides, carbonyl ylides, nitrones, nitro compounds.*

(ii) Propargyl type
$X{\equiv}N^+{-}Z^- \leftrightarrow {}^-X{=}N^+{=}Z \leftrightarrow {}^-X{=}N{-}Z^+ \leftrightarrow X{-}N{=}Z$ (X = C or O, Z = C, N, or O) See *nitrile imides, nitrile oxides, nitrile ylides, nitrilium betaines, azides, diazo compounds.*

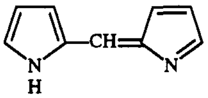
(iii) Carbene type
$:X{-}C{=}Z \leftrightarrow {}^+X{=}C{-}Z^-$ (X = C or N; Z = C, N, or O) See *acyl carbenes, imidoyl carbenes, vinyl carbenes.*

See *betaines.* R. Huisgen, in *1,3-Dipolar Cycloaddition Chemistry*, A. Padwa, Ed.,Vol. 1, Wiley, New York, 1984, p. 3.
E.g. $RN^-{-}N^+{\equiv}N \leftrightarrow RN{=}N^+{=}N^- \leftrightarrow RN^-{-}N{=}N^+$; $RC{\equiv}N^+{-}O^- \leftrightarrow RC^-{=}N^+{=}O \leftrightarrow RC^+{=}N{-}O^-$

dipolar ions: See *zwitterionic compounds.*

dipyrrins:

Compounds containing two pyrrole rings linked through a methine, -CH=, group. BNRD Rule TP-7.2 (p.310).



dipyrromethenes: See *pyrromethenes.*

diradicals:

Molecular species having two unpaired electrons, in which at least two different electronic states with different multiplicities [electron-paired (singlet state) or electron-unpaired (triplet state)] can be identified. *E.g.* $H_2C^{\bullet}{-}CH_2C^{\bullet}H_2$ propane-1,3-diyl (trimethylene). See *biradicals.* GTPOC (biradicals).

disaccharides:*

Compounds in which two *monosaccharides* are joined by a glycosidic bond. 2-Carb-36.1. See *saccharides, glycosides.*

diterpenoids:

Terpenoids having a C_{20} skeleton.

dithioacetals:* See *thioacetals.*

dypnones:

1,3-Diphenylbut-2-en-1-one [$PhC({=}O)CH{=}C(CH_3)Ph$] and its ring-substituted derivatives.

eicosanoids: See under *icosanoids.*

enamines:

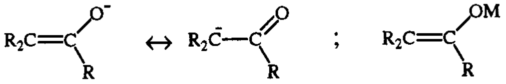
Alkenylamines; by usage the term refers specifically to *vinylic amines*, which have the structure $R_2NCR{=}CR_2$.

enols:

Alkenols; the term refers specifically to *vinylic alcohols*, which have the structure $HOCR'{=}CR_2$. Enols are tautomeric with *aldehydes* (R' = H) or *ketones* (R' ≠ H). See also *phenols*.

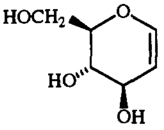
enolates:

Salts of *enols* (or of the tautomeric *aldehydes* or *ketones*), in which the anionic charge is delocalized over oxygen and carbon, or similar covalent metal derivatives in which the metal is bound to oxygen.



enoses: *

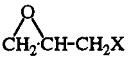
Monosaccharides having a carbon-carbon double bond anywhere in the backbone chain. Glycals (term not recommended) designates the enoses that are generated by formal elimination of the hemiacetal hydroxy group and an adjacent hydrogen atom. Thus glycals are cyclic *enol ethers*. 2-Carb-17. Unsaturated hexoses, for example, are called hexenoses. *E.g.*



(the hex-1-enopyranose derived from D-glucopyranose)

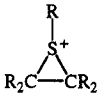
epihalohydrins:

Compounds having the (halomethyl)oxirane skeleton:



episulfonium ions:

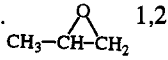
Ions derived from thiiranes, in which a trivalent sulfur atom bears a positive charge:



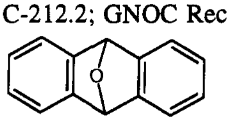
epoxides: See under *epoxy compounds*.

epoxy compounds: *

Compounds in which an oxygen atom is directly attached to two adjacent or non-adjacent carbon atoms of a carbon chain or ring system; thus cyclic *ethers*. The term epoxides represents a subclass of epoxy compounds containing a saturated three-membered cyclic ether; thus oxirane derivatives. NOC Rule C-212.2; GNOC Recom. R-5.5.4.4. *E.g.*



1,2-epoxypropane, or 2-methyloxirane (an epoxide);



9,10-epoxy-9,10-dihydroanthracene (an epoxy compound)

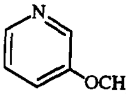
esters: *

Compounds formally derived from an *oxoacid* $R_kE({=}O)_l(OH)_m$ ($l \neq 0$), and an *alcohol*, *phenol*, heteroarenol, or *enol* by linking with formal loss of water from an acidic hydroxy group of the former and a hydroxy group of the latter. By extension *acyl* derivatives of alcohols, *etc.* Acyl derivatives of chalcogen analogues of alcohols (thiols, selenols, tellurols) *etc.* are included. See also *acylals*, *ortho esters*, *depsides*, *depsipeptides*, *glycerides*, *lactides*, *lactones*, *macrolides*. NOC Rules C-463, C-464, C-641.5, C-641.6, D-5.61. *E.g.* $R'C({=}O)OR$, $R'C({=}S)OR$, $R'C({=}O)SR$, $R'S({=}O)_2OR$, $(HO)_2P({=}O)OR$, $(R'S)_2C({=}O)$, ROCN (but not R-NCO) (R ≠ H).

Note: *O*-Alkyl derivatives of other acidic compounds [See *amides* (1) note] may be named as esters but do not belong to the class esters proper. NOC Rule D-5.21. *E.g.* $(Ph)_2POCH_3$ methyl diphenylphosphinite.

ethers: *

Compounds ROR (R ≠ H). NOC Rule C-211. (Compounds R_3SiOR, silicon analogues of ethers, are trialkylsilyloxy compounds). *Cf. acetals*, *epoxy compounds*, *ortho esters*. *E.g.* $CH_3CH_2OCH_2CH_3$

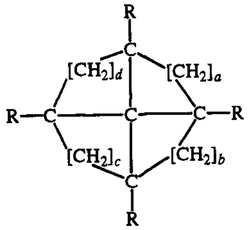


fatty acids:*

Aliphatic monocarboxylic acids derived from or contained in esterified form in an animal or vegetable fat, oil or wax. BNRD Rule Lip-1.1 (p. 180). Natural fatty acids commonly have a chain of 4 to 28 carbons (usually unbranched and even-numbered), which may be saturated or unsaturated. By extension, the term is sometimes used to embrace all acyclic aliphatic *carboxylic acids*.

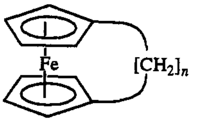
fenestranes:

Compounds of the general formula shown below. They may be considered to be *spiro compounds* having bridges of carbon atoms connecting the α and α' positions. A. Greenberg and J. Liebman, *Strained Organic Molecules*, Academic Press, 1978, p. 373; R. Keese, in *Organic Synthesis: Modern Trends*, O. Chizhov, Ed., Blackwell Scientific Publications, 1988, p. 43 ff.



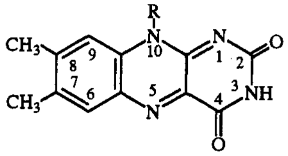
ferrocenophanes:

Compounds in which the two ring components of ferrocene are linked by one or more bridging chains. See also *cyclophanes, metallocenes, sandwich compounds.*



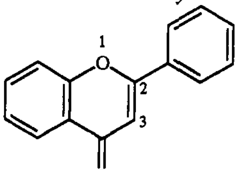
flavins:*

Derivatives of the dimethylisoalloxazine (7,8-dimethylbenzo[*g*]pteridine-2,4(3*H*,10*H*)-dione) skeleton, with a substituent on the 10 position. (Riboflavin, having a 10-D-ribityl group, is the most prominent member). CBN, Trivial Names of Miscellaneous Compounds of Importance in Biochemistry, *EJB* **2**, 1-2 (1967), Rule M-6.

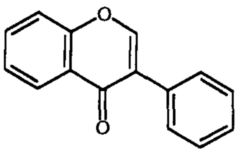


flavonoids (isoflavonoids and neoflavonoids):

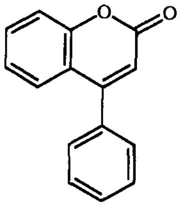
Flavonoids, isoflavonoids and neoflavonoids are natural products derived from 2-phenylchromen-4-one (flavone), 3-phenylchromen-4-one, and 4-phenylcoumarin, respectively. Derivations include reduction of the 2(3) carbon-carbon double bond (flavanones), reduction of the keto group (flavanols), and hydroxylation at various positions. See also *anthocyanins, chalcones.*



2-phenylchromen-4-one



3-phenylchromen-4-one



4-phenylcoumarin

J.B. Harborne, T. H. Mabry and H. Mabry, *The Flavonoids*, Chapman & Hall, 1975.

flavoproteins:

Flavins tightly bound or covalently attached to a protein chain, commonly through the 8-methyl carbon atom.

flavylium salts: See *anthocyanidins.*

fluoresceins: See *xanthenes.*

fluorocarbons:

Compounds consisting wholly of fluorine and carbon.

fluorohydrins: See under *halohydrins.*

formamidine disulfides:*

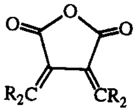
The compound $H_2NC(=NH)SSC(=NH)NH_2$ and its derivatives formed by substitution at nitrogen. NOC Rule C-951.5.

formazans:*

The parent compound $H_2NN=CHN=NH$ and its derivatives formed by substitution at carbon and/or nitrogen. NOC Rule C-955.1.

fulgides:

Dialkylidenesuccinic anhydrides (generally photochromic).



fullerenes:

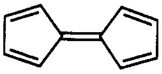
Compounds composed solely of an even number of carbon atoms, which form a cage-like fused-ring polycyclic system with twelve five-membered rings and the rest six-membered rings. The archetypal example is [60]fullerene, where the atoms and bonds delineate a truncated icosahedron. The term has been broadened to include any closed cage structure consisting entirely of three-coordinate carbon atoms. *Buckminsterfullerenes*, W. E. Billups and M. A. Ciufolini, Eds., VCH, 1993.

fulminates:*

1. Compounds having the structure RON=C:. NOC Rule C-833.1; GNOC Recom. R-5.9.7.2. So called because fulminic acid (actually $HC{\equiv}N^+{-}O^-$ formonitrile oxide) was previously considered to be HON=C:.
2. Salts of fulminic acid. *E.g.* $Na^+[^-C{\equiv}N^+{-}O^-]$.

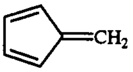
fulvalenes:

The hydrocarbon fulvalene and its derivatives formed by substitution (and by extension, analogues formed by replacement of one or more carbon atoms of the fulvalene skeleton by a heteroatom).


fulvalene

fulvenes:

The hydrocarbon fulvene and its derivatives formed by substitution (and by extension, analogues formed by replacement of one or more carbon atoms of the fulvene skeleton by a heteroatom).

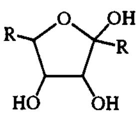


fulvene

furanocoumarins: An alternative name for *furocoumarins.*

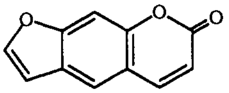
furanoses:*

Cyclic hemiacetal forms of *monosaccharides* in which the ring is five-membered (*i.e.* a tetrahydrofuran skeleton). 2-Carb-5.1.

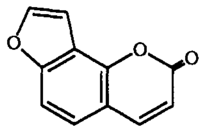


furocoumarins:

Derivatives (mostly of natural origin) of the linear furocoumarin skeleton, psoralen, or its angular isomer, angelicin, variously substituted with hydroxy, methoxy, alkyl, or hydroxymethyl groups, among others.



psoralen



angelicin

germylenes: See *germylidenes*.

germylidenes:*

Carbene analogues having the structure R_2Ge:. The older synonym germylenes is no longer recommended. RNRI Rule RC-81.1.3.2.

glycals: See under *enoses*.

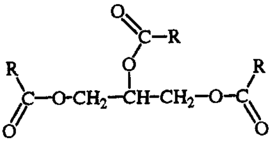
glycans:*

Synonymous with *polysaccharides*. Glycans composed of a single type of monosaccharide residue (homopolysaccharide, synonym homoglycan) are named by replacing the ending '-ose' of the sugar by '-an'. *E.g.* mannans, fructans, xylans, arabinans. 2-Carb-39.1. *Dextrans* and *dextrins* belong to the class glucans

glycaric acids: An obsolescent synonym for *aldaric acids*.

glycerides:

Esters of glycerol (propane-1,2,3-triol) with *fatty acids*, widely distributed in nature. They are by long-established custom subdivided into triglycerides, 1,2- or 1,3-diglycerides, and 1- or 2-monoglycerides, according to the number and position of acyl groups (not, as one might suppose, the number of glycerol residues). The recommended method for naming individual glycerides is mono-, di- or tri-*O*-acylglycerol, as appropriate. BNRD, Rule Lip-1.2(b) (p. 181).



(a triglyceride)

glycitols: An obsolescent synonym for *alditols*.

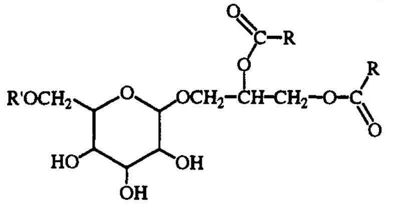
glycols:

Dihydric *alcohols*, also known as *diols*, in which the two hydroxy groups are on different carbon atoms, usually but not necessarily adjacent. *E.g.* $HOCH_2CH_2OH$ 'ethylene glycol' (ethane-1,2-diol), $HO[CH_2]_4OH$ butane-1,4-diol.

glycolipids:*

Naturally occurring 1,2-di-O-acylglycerols joined at oxygen 3 by a glycosidic linkage to a carbohydrate part (usually a mono-, di-, or tri-saccharide). Some substances classified as bacterial glycolipids have the sugar part acylated by one or more *fatty acids* and the glycerol part may be absent. See also *glycosides*, *lipids*, *lipopolysaccharides*. BNRD Rule Lip-3.1 (p. 187).

E.g.



(R' = H or glycosyl)

glyconic acids: An obsolescent synonym for *aldonic acids*.

glycopeptides/glycoproteins:*

Compounds in which a *carbohydrate* component is linked to a *peptide/protein* component. BNRD, Nomenclature of Glycoproteins, Glycopeptides, and Peptidoglycans, (p. 84).

glycoproteins: See *glycopeptides.*

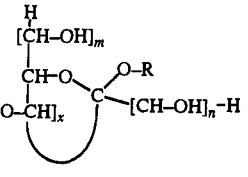
glycosamines:

A term synonymous with *amino sugars*; now restricted to some trivial names. 2-Carb-14.

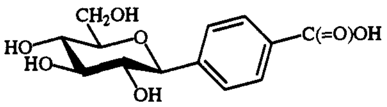
glycoses: A less frequently used term for *monosaccharides.*

glycosides:*

Originally mixed *acetals* resulting from the attachment of a *glycosyl group* to a non-acyl group RO- (which itself may be derived from a *saccharide*) and chalcogen replacements thereof (RS-, RSe-). The bond between the *glycosyl group* and the OR group is called a glycosidic bond. 2-Carb-33.1. Also called osides. By extension, the terms *N*-glycosides and *C*-glycosides are used as class names for *glycosylamines* and for compounds having a glycosyl group attached to a *hydrocarbyl group* respectively. These terms are misnomers and should not be used. The preferred terms are *glycosylamines* and *C*-glycosyl compounds, respectively. 2-Carb-33.1. 2-Carb-33.5, 2-Carb-33.7. *Cf. glycosylamines.*



m and *n* may be 0, 1, 2, *etc.;* and *x* usually 2 or 3



4-β-D-glucopyranosylbenzoic acid
a *C*-glycosyl compound

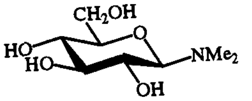
glycosyl group:

The structure obtained by removing the hydroxy group from the *hemiacetal* function of a *monosaccharide* (2-Carb-31.1) and, by extension, of a lower *oligosaccharide.*

glycosylamines:

Compounds having a *glycosyl group* attached to an amino group, $-NR_2$; less elegantly called *N*-glycosides. *Cf. glycosides.* 2-Carb-33.1, 2-Carb-33.5

E.g.



N,N-dimethyl-β-D-glucopyranosylamine

glycuronic acids: An obsolescent synonym for *uronic acids.* BNRD, Polysaccharide Nomenclature 5 (p. 174).

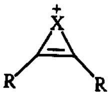
Grignard reagents:

Organomagnesium halides, RMgX, having a carbon-magnesium bond (or their equilibrium mixtures in solution with $R_2Mg + MgX_2$).

haems: An alternative spelling for *hemes.*

halirenium ions:

Cyclic cations having the structure



X = F, Cl, Br, I

haloforms:

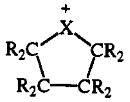
Trihalomethanes CHX_3.

halohydrins:

A traditional term for *alcohols* substituted by a halogen atom at a saturated carbon atom otherwise bearing only hydrogen or *hydrocarbyl groups* (usually used to mean β-halo alcohols). *E.g.* $BrCH_2CH_2OH$ 'ethylene bromohydrin' (2-bromoethanol), $ClCH_2CH_2CH_2OH$ 'trimethylene chlorohydrin' (3-chloropropan-1-ol), $PhCH(OH)CH_2Cl$ 'styrene chlorohydrin' (2-chloro-1-phenylethanol).

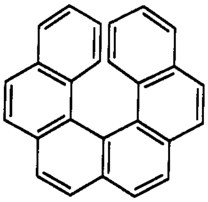
halonium ions:*

Ions of the form R_2X^+, where X is any halogen ($X = Br^+$, bromonium ions; $X = Cl^+$, chloronium ions; $X = F^+$, fluoronium ions; $X = I^+$, iodonium ions). They may be open-chain or cyclic. GNOC Recom. R-5.8.2. *E.g.*



helicenes:*

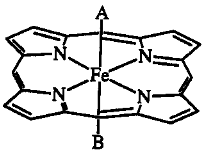
ortho-Fused polycyclic *aromatic* or *heteroaromatic* compounds in which all rings (minimum five) are angularly arranged so as to give helically shaped molecules, which are thus chiral. GNOC Recom. R-2.4.1.3.6. *E.g.*



hexahelicene

hemes and heme derivatives:*

Complexes consisting of an iron ion coordinated to a *porphyrin* acting as a tetradentate ligand, and to one or two axial ligands. BNRD, Rules TP-8.1, TP-8.4.3 (p. 311, 316).



hemiacetals:*

Compounds having the general formula $R_2C(OH)OR'$ ($R' \neq H$). NOC Rule C-331.4. GNOC Recom. R-5.6.4.2. See also *lactols*, *hemiketals*.

hemiaminals:

α-Amino alcohols, improperly called *carbinolamines* (the adducts of ammonia, or of primary or secondary *amines* to the carbonyl group of *aldehydes* and *ketones*): $R_2C(OH)(NR_2)$. Compounds of structure R2C(OR')NR2 ($R' \neq H$) are hemiaminal ethers, or α-amino ethers. See *alcohols*, *aminals*, *ethers*.

hemiketals:*

Hemiacetals having the structure $R_2C(OH)OR$ ($R \neq H$), derived from *ketones* by formal addition of an *alcohol* to the carbonyl group. This term, once abandoned (NOC Rule C-331.4, footnote) has been reinstated as a subclass of *hemiacetals*. GNOC Recom. R-5.6.4.2.

hemins:*

Chloro(porphyrinato)iron(III) complexes. See also *hemes and heme derivatives*. BNRD, Rule TP-8.4.3 (p. 316).

hemochromes:*

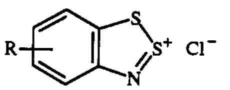
Iron-*porphyrin* complexes, having one or two basic ligands (*e.g.* piperidine, *amines*). See also *hemes and heme derivatives*. BNRD, Rule TP-8.4.3 (p. 316).

hemoglobins:

Heme derivatives having a *protein* chain as axial ligand.

Herz compounds:

$1,2\lambda^4,3$-Benzodithiazolium chlorides (formed in the reaction of aniline and derivatives thereof with disulfur dichloride).



hetarenes: Synonymous with *heteroarenes.*

hetaryl groups: Synonymous with *heteroaryl groups.*

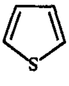
hetarynes: Synonymous with *heteroarynes.*

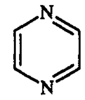
heteroalkenes:

Analogues of *alkenes* in which a doubly bonded carbon atom is replaced by a heteroatom. *E.g.* $H_2Si{=}CH_2$ methylidenesilane (silene less preferred), $MeN{=}CH_2$ *N*-methylmethanimine.

heteroarenes:

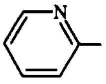
Heterocyclic compounds formally derived from *arenes* by replacement of one or more methine (-C=) and/or vinylene (-CH=CH-) groups by trivalent or divalent heteroatoms, respectively, in such a way as to maintain the continuous π-electron system characteristic of aromatic systems and a number of out-of-plane π-electrons corresponding to the Hückel rule ($4n + 2$); an alternative term is hetarenes. *Comprehensive Heterocyclic Chemistry*, Vol. 1, Ed. O. Meth-Cohn, Pergamon, 1984, p. 3. *E.g.*



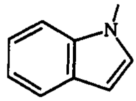


heteroaryl groups:

The class of *heterocyclyl groups* derived from *heteroarenes* by removal of a hydrogen atom from any ring atom; an alternative term is hetaryl. *E.g.*



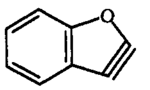
2-pyridyl (pyridin-2-yl),

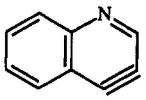


indol-1-yl.

heteroarynes:

Compounds derived from *heteroarenes* by replacement of a formal carbon-carbon double bond by a formal triple bond (with loss of two hydrogen atoms). Also known as hetarynes and as 1,2-didehydroheteroarenes. See *arynes*. H. J. den Hertog and H. C. van der Plas, in *Advances in Heterocyclic Chemistry*, Ed. A. R. Katritzky, Vol. 4, Academic Press, 1965, p. 121. *E.g.*





heterocumulenes:

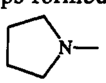
Cumulenes in which one or more carbon atoms of the cumulative bond system have been replaced by heteroatoms. *E.g.* O=C=C=C=O, but not $CH_2{=}C{=}O$, ketene, nor O=C=O, carbon dioxide, which are heteroallenes.

heterocyclic compounds:

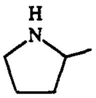
Cyclic compounds having as ring members atoms of at least two different elements. *E.g.* quinoline, 1,2-thiazole, bicyclo[3.3.1]tetrasiloxane. *Cf. homocyclic compounds, carbocyclic compounds.*

heterocyclyl groups:

Univalent groups formed by removing a hydrogen atom from any ring atom of a *heterocyclic compound.* *E.g.* 4-pyridyl,



pyrrolidin-1-yl,



pyrrolidin-2-yl. See *organyl.*

homocyclic compounds:

Cyclic compounds having as ring members atoms of the same element only. *E.g.* benzene, pentazole, cyclohexasilane.

hydrazides:*

Compounds derived from oxoacids $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing -OH by $-NRNR_2$ (R groups are commonly H), as in carbohydrazides, $RC(=O)NHNH_2$, NOC Rule C-921.5, (GNOC Recom. R-5.7.8.4), sulfonohydrazides, $RS(=O)_2NHNH_2$, (NOC Rule C-641.9); and phosphonic dihydrazides, $RP(=O)(NHNH_2)_2$.

hydrazide hydrazones: See *hydrazidines.*

hydrazide imides: See *amidrazones.*

hydrazidines:*

Compounds, $RC(-NHNH_2)=NNH_2$, derived from *carboxylic acids* by replacing -OH by $-NHNH_2$ (or *N*-substituted analogues) and =O by $=NNH_2$ (or substituted analogues). NOC Rule C-954.1. A specific hydrazidine is named as a *hydrazide* hydrazone. *E.g.* hexanohydrazide hydrazone.

hydrazines:

Hydrazine (diazane), H_2NNH_2, and its *hydrocarbyl* derivatives. When one or more substituents are *acyl groups*, the compound is a *hydrazide.* NOC Rule C-921. *N*-Alkylidene derivatives are *hydrazones. Cf. azines, hydrazo compounds.*

hydrazinylidenes: Synonymous with *isodiazenes.* RNRI Rule RC-81.1.3.2.

hydrazo compounds:

Compounds containing the divalent hydrazo group, -NHNH-, such as hydrazoarenes (1,2-diarylhydrazines or 1,2-diaryldiazanes, usually with both aryl groups the same) and their *N*-substituted derivatives: ArNRNRAr. See also *hydrazines.* NOC Rule C-921.2.

hydrazones:*

Compounds having the structure $R_2C=NNR_2$, formally derived from *aldehydes* or *ketones* by replacing =O by $=NNH_2$ (or substituted analogues). NOC Rule C-922.

hydrazonic acids:*

Compounds derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing a double-bonded oxygen atom by $=NNR_2$, as in carbohydrazonic acids, $RC(OH)=NNH_2$ (NOC Rule C-451.1) and sulfonohydrazonic acids, $RS(=O)(=NNH_2)OH$ (GNOC Recom. R-5.7.2.1).

hydrocarbons:

Compounds consisting of carbon and hydrogen only.

hydrocarbyl groups:

Univalent groups formed by removing a hydrogen atom from a *hydrocarbon. Cf. heterocyclyl, organoheteryl, organyl groups. E.g.* ethyl, phenyl.

hydrocarbylene groups:

Divalent groups formed by removing two hydrogen atoms from a *hydrocarbon,* the free valencies of which are not engaged in a double bond. *E.g.* 1,3-phenylene, $-CH_2CH_2CH_2-$ propane-1,3-diyl, $-CH_2-$ methylene.

hydrocarbylidene groups:

Divalent groups, $R_2C=$, formed by removing two hydrogen atoms from the same carbon atom of a *hydrocarbon,* the free valencies of which are engaged in a double bond.

hydrocarbylidyne groups:

Trivalent groups, $RC\equiv$, formed by removing three hydrogen atoms from the same carbon atom of a *hydrocarbon,* the free valencies of which are engaged in a triple bond.

hydrocarbylsulfanyl nitrenes:

Nitrenes substituted with hydrocarbylsulfanyl groups, $RS\text{-}N{:} \leftrightarrow RS^+{=}N^- \leftrightarrow RS{\equiv}N$. Sulfenyl nitrenes is a older synonymous term. *E.g.* MeSN methylsulfanylnitrene or methylthionitrene. The synonymous term thiazynes (from the third canonical form; confusable with the *hetarynes* derivable from 1,2- and 1,4-thiazine) is best avoided.

hydroperoxides:*

Monosubstitution products of hydrogen peroxide (dioxidane), HOOH, having the skeleton ROOH, in which R is any *organyl group*. Compounds in which R is acyl are known as *peroxy acids*. NOC Rule C-218.1.

hydropolysulfides:*

Compounds having the structures RS_2H, RS_3H...RS_nH, in which S_n is a chain of sulfur atoms, and R is *hydrocarbyl*. NOC Rule C-513.1. GNOC Recom. R-5.5.6. Some people exclude hydrodisulfides from the class hydropolysulfides.

hydrosulfides: Term used in radicofunctional nomenclature of *thiols*. NOC C-511.5. Hydrosulfides is not commonly used as a class name for thiols.

hydroxamic acids:*

Compounds, RC(=O)NHOH, derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing -OH by -NHOH, and *hydrocarbyl* derivatives thereof. NOC Rule 451.3. Specific examples are preferably named as *N*-hydroxy amides. NOC Rules C-841.3, C-841.4; GNOC Recom. R-5.7.1.3.3.

hydroximic acids:*

Compounds derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing =O by =NOH (=NOR), as in carbohydroximic acids, RC(OH)=NOH, (NOC Rule C-451.1) and sulfonohydroximic acids, RS(=O)(=NOH)OH. GNOC Recom. R-5.7.2.1 Table 14.

hydroxylamines:*

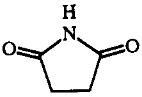
Hydroxylamine, H_2N-OH, and its *hydrocarbyl* derivatives. NOC Rule C-841. See also *hydroxamic acids*, *oximes*.

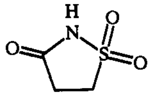
icosanoids:

Unsaturated C_{20} *fatty acids* and skeletally related compounds. *Cf. prostanoids*, *leukotrienes*. The spelling icosanoids is preferred over the spelling eicosanoids for consistency with icosanoic acid. NOC Rule A-1.1, footnote. Specialists working in this field commonly use eicosanoids.

imides:*

1. Diacyl derivatives of ammonia or primary *amines*, especially those cyclic compounds derived from diacids. NOC Rule C-827. *E.g.*





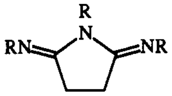
2. In additive nomenclature, in which imide is analogous to oxide, the term is used to name compounds of the type R_3Y^+-N^-R (Y = N, P) and R_2Z^+-N^-R (Z = O, S, Se, Te), which are the products of formal attachment of an RN= group to N, P, O, S, Se, Te. *E.g. amine imides*, *azomethine imides*.
3. Salts having the anion RN^{2-}. RNRI Rule RC-83.1.2.1.

imidic acids:*

Compounds derived from *oxoacids* $R_kE(=O)_l(OH)_m$ ($l \neq 0$) by replacing =O by =NR; thus tautomers of *amides*. In organic chemistry an unspecified imidic acid is generally a carboximidic acid, RC(=NR)OH. NOC Rule C-451.1; GNOC Recom. R-5.7.2. *E.g.* $RS(=NH)_2OH$ a sulfonodiimidic acid. *Cf. imino acids*.

imidines:

Analogues of cyclic *acid anhydrides* in which =O has been replaced by =NR and -O- by -NR-. *Cf. diamidides*.



imidogens:

A non-IUPAC term for *nitrenes* used in the *Chemical Abstracts Service* index nomenclature. RNRI RC-81.1.3.1, footnote.

imidonium ions: A term, which is not recommended, for *nitrenium ions*. GTPOC

imidoyl carbenes:

Carbenes having the structure $RC(=NR)\ddot{C}$-R. Imidoyl is a shortened but imprecise term for carboximidoyl, $RC(=NH)$–.

imidoyl nitrenes:

Nitrenes having the structure $RC(=NR)N\!: \leftrightarrow RC(-N^{-}R)=N^{+}\!:$. See *imidoyl carbenes*.

imines:*

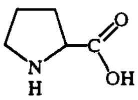
1. Compounds having the structure $RN=CR_2$ (R = H, *hydrocarbyl*). Thus analogues of *aldehydes* or *ketones*, having NR doubly bonded to carbon; *aldimines* have the structure RCH=NR, *ketimines* have the structure $R'_2C=NR$ ($R' \neq H$). Imines include *azomethines* and *Schiff bases*. Imine is used as a suffix in systematic nomenclature to denote the C=NH group excluding the carbon atom. NOC Rule C-815.3. GNOC Recom. R-5.4.3. See also *azomethines, Schiff bases*.
2. An obsolete term for azacycloalkanes.

iminium compounds:*

Salts in which the cation has the structure $R_2C=N^+R_2$. Thus *N*-hydronated *imines* and their *N*-substituted derivatives. RNRI Rule RC-82.1.2.1. The synonymous terms imonium compounds and immonium compounds are irregularly formed and should not be used. *Cf. quaternary ammonium compounds.*

imino acids:

1. An obsolete term, which should not be used, for *imidic acids*.
2. Any *carboxylic acid* having an imino substituent, HN=, replacing two hydrogens. A shortened form of imino carboxylic acid.
3. Obsolescent term for azaalkanoic acids and azacycloalkane-2-carboxylic acids. *E.g.*



proline

imino carbenes:

This term systematically means *carbenes* bearing an imino or *N*-substituted imino group, RN=, somewhere in the molecule. *E.g.* $R\text{-}\ddot{C}\text{-}CH_2C(=NR)R$. It is listed here in order to warn against its misuse for alkylideneamino carbenes. *Cf. carbenes, nitrile ylides.*

iminooxy/iminoxy radicals:

This term has improperly been used for *alkylideneaminoxyl radicals*, also called *iminoxyl radicals*: $R_2C=N\text{-}O^{\bullet}$. Its use is strongly discouraged. *Cf. aminoxyl radicals, iminyl radicals.*

iminoxyl radicals:*

Synonymous with *alkylideneaminoxyl radicals*. The term can be regarded as a contraction of iminyloxyl radicals. RNRI RC-81.2.4.

iminyl carbenes: See under *nitrile ylides*.

iminyl radicals:

Radicals having the structure $R_2C=N^{\bullet}$. A contraction of alkaniminyl radicals. A synonymous term is alkylideneaminyl radicals. RNRI Rule RC-81.2.3.1. *Cf. aminyl radicals. E.g.* $MeCH=N^{\bullet}$ ethaniminyl.

iminylium ions:

Cations having the structure $R_2C{=}N^+$. A contraction of alkaniminylium ions. Alkylideneaminylium ions is a synonymous term. RNRI Rule RC-82.2.3.3. A subclass of *nitrenium ions.*

inclusion compounds:

Compounds in which one kind of molecule (the guest compound) is embedded in the matrix of another (the host compound). See also *clathrates*, *crown compounds*, *cryptands*, *cryptates* and *intercalation compounds.* J. L. Atwood, J. E. D. Davies and D. D. MacNicol, Eds., *Inclusion Compounds*, Academic Press, 1984.

inner salts: See *zwitterionic compounds.*

inositols:*

Cyclohexane-1,2,3,4,5,6-hexols. BNRD Rule I-1.1 (p. 151).

intercalation compounds:

Compounds resulting from reversible inclusion, without covalent bonding, of one kind of molecule in a solid matrix of another compound, which has a laminar structure. The host compound, a solid, may be macromolecular, crystalline, or amorphous. See also *inclusion compounds.* M. S. Whittingham and A. J. Jacobson, Eds., *Intercalation Chemistry*, Academic Press, 1982.

iodohydrins: See *halohydrins.*

iodonium ions:* See under *halonium ions.*

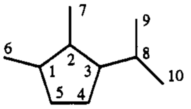
ion pairs:

Pairs of oppositely charged ions held together by coulombic attraction without formation of a covalent bond. Experimentally, an ion pair behaves as one unit in determining conductivity, kinetic behaviour, osmotic properties, *etc.*

ion radicals: See *radical ions.*

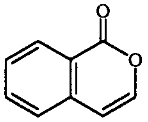
iridoids:

Cyclic *monoterpenoids* having the iridane skeleton (1-isopropyl-2,3-dimethylcyclopentane according to NOC Rule C-15.11), the traditional, but not undisputed, numbering of which is as shown.



isocoumarins:

Isocoumarin (1*H*-isochromen-1-one) and its derivatives formed by substitution. *Cf. coumarins.*



isocyanates:*

The isocyanic acid tautomer, HN=C=O, of cyanic acid, HOC≡N and its *hydrocarbyl* derivatives: RN=C=O. NOC Rule C-833.1.

isocyanides:*

The isomer $HN^+{\equiv}C^-$ of hydrocyanic acid, HC≡N, and its *hydrocarbyl* derivatives: RNC ($RN^+{\equiv}C^-$). NOC Rule C-833.1.

isocyclic compounds: A less preferred synonym for *homocyclic compounds.*

isodiazenes:*

Compounds having the structure $R_2NN{:} \leftrightarrow R_2N^+{=}N^-$. GNOC Recom. R-5.3.5. These compounds can also be called *diazanylidenes* or *hydrazinylidenes*. RNRI Rule RC-81.1.3.2. They have also been called by the trivial name azamines and the incorrectly formed name 1,1-*diazenes*. They should not be called aminonitrenes; see under *carbenes*.

isoflavonoids: See *flavonoids*.

isonitriles: An obsolete term, which should not be used, for *isocyanides*. NOC Rule C-833.1.

isonitroso compounds:

An obsolete term for *oximes*, based on the fact that compounds with a nitroso group, -N=O, bonded to a -CR_2H group readily tautomerise to *oximes*.

isoprenoids:

Compounds formally derived from isoprene (2-methylbuta-1,3-diene), the skeleton of which can generally be discerned in repeated occurrence in the molecule. The skeleton of isoprenoids may differ from strict additivity of isoprene units by loss or shift of a fragment, commonly a methyl group. The class includes both hydrocarbons and oxygenated derivatives. See also *carotenoids*, *steroids*, *terpenes*, *terpenoids*. BNRD, Pr-10 (p. 255).

isoselenocyanates:*

Selenium analogues of *isocyanates*: RN=C=Se. NOC Rule C-833.1.

isothiocyanates:*

Sulfur analogues of *isocyanates*: RN=C=S. NOC Rule C-833.1.

isoureas:*

The imidic acid tautomer of urea, $H_2NC(=NH)OH$, and its hydrocarbyl derivatives. NOC Rule C-972.

kephalins: An alternative spelling of *cephalins*.

ketals:*

Acetals derived from *ketones* by replacement of the oxo group by two hydrocarbyloxy groups: $R_2C(OR)_2$ (R ≠ H). This term, once abandoned (NOC Rule C-333.1), has been reinstated (GNOC Recom. R-5.6.4.1) as a subclass of *acetals*.

ketazines:

Azines of *ketones*: $R_2C{=}NN{=}CR_2$.

ketenes:*

Compounds in which a carbonyl group is connected by a double bond to an *alkylidene group*: $R_2C{=}C{=}O$. NOC Rule C-321.

ketenimines:

Compounds having the structure $R_2C{=}C{=}NR$. Thus imino analogues of *ketenes*.

ketides: See *polyketides*.

ketimines:*

Compounds having the structure $R_2C{=}NR'$ (R ≠ H). GNOC Recom. R-5.4.3. See *imines*.

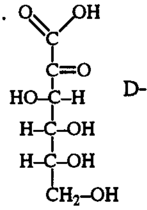
keto: see under *oxo compounds*.

keto carbenes:

The term has imprecisely been used to designate carboxylic *acyl carbenes*. Keto carbenes are *carbenes* bearing an oxo function at an unspecified site.

ketoaldonic acids:*

Monosaccharides in which a structure containing a keto group and a *carboxylic acid* group is in equilibrium with a *hemiacetal* structure. 2-Carb-1.10. Specific compounds are named using the -ulosonic acid suffix. 2-Carb-22.1. See also *oxo compounds. E.g.*



D-*arabino*-hexulosonic acid

ketoaldoses:*

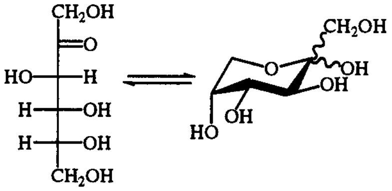
Monosaccharides which contain both an aldehydic and a ketonic carbonyl group in equilibrium with intramolecular hemiacetal forms. 2-Carb-1.5. See also *oxo compounds.*

ketones:*

Compounds in which a carbonyl group is bonded to two carbon atoms: $R_2C=O$ (neither R may be H). NOC Rule C-311.1. Note: Compounds of structure such as $R_3SiC(=O)R$ are not ketones but acyl derivatives of substituted *silanes*.

ketoses:*

Ketonic parent *sugars* (polyhydroxy *ketones* $H-[CHOH]_n-C(=O)[CHOH]_m-H$ with three or more carbon atoms) and their intramolecular *hemiacetals*. 2-Carb-1.2. The oxo group is usually at C-2. See also *monosaccharides. E.g.* D-fructose



ketoximes:*

Oximes of *ketones*, $R_2C=NOH$ ($R \neq H$). GNOC Recom. R-5.6.6.1.

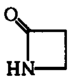
ketyls:*

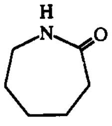
Radical anions (or the corresponding salts) derived from *ketones* by addition of an electron: $R_2C^{\bullet}-O^{-} \leftrightarrow R_2C^{-}-O^{\bullet}$. NOC Rule C-84.4. Note: Ketyls produce two types of conjugate acids: $R_2C^{\bullet}-OH$ and $R_2CH-O^{\bullet}$. The former are α-hydroxyalkyl *radicals* and the latter are alkoxyl radicals, but they have also been called ketyls in photochemistry.

lactams:*

Cyclic *amides* of amino carboxylic acids, having a 1-azacycloalkan-2-one structure, or analogues having unsaturation or heteroatoms replacing one or more carbon atoms of the ring. NOC Rule C-475.1.

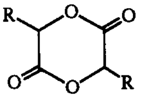
E.g.





lactides:*

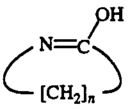
Cyclic *esters* derived by multiple esterification between two (usually) or more molecules of lactic acid or other hydroxy *carboxylic acids*. They are designated as dilactides, trilactides, *etc.*, according to the number of hydroxy acid residues. NOC Rule C-474.1. *E.g.*



a dilactide (a 1,4-dioxane-2,5-dione)

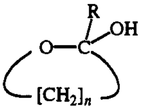
lactims:*

Tautomeric forms of *lactams*, having an endocyclic carbon-nitrogen double bond. Thus, cyclic *carboximidic acids*. NOC Rule C-475.1. *E.g.*



lactols:

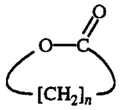
1. Cyclic *hemiacetals* formed by intramolecular addition of a hydroxy group to an aldehydic or ketonic carbonyl group. They are thus 1-oxacycloalkan-2-ols or unsaturated analogues. *E.g.*



2. This term has also been used for hydroxy *lactones*, but such use is not recommended.

lactones:*

Cyclic *esters* of hydroxy *carboxylic acids*, containing a 1-oxacycloalkan-2-one structure, or analogues having unsaturation or heteroatoms replacing one or more carbon atoms of the ring. NOC Rule C-471.1.

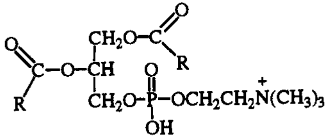


lariat ethers:

Crown *ethers* (see under *crown compounds*) having a side chain that holds one or more additional coordinating sites. G.W. Gokel, K.A. Arnold, M. Delgado, L. Echeverria, V.J. Gatto, D. A. Gustowski, J. Hernandez, A. Kaifer, S.R. Miller and L. Echegoyen, *PAC* **60**, 461-465 (1988).

lecithins:

Choline *esters* of *phosphatidic acids*. Specific compounds should be named systematically. BNRD Rule Lip-2.4 (p. 184).



leuco bases:

Colourless compounds formed by reduction of triphenylmethane dyes. Generally, they are amino or hydroxy derivatives of triphenylmethane. Use of this class name, which is more or less parochial to the technology of dyes, is not endorsed. *E.g.* $(p\text{-}Me_2NC_6H_4)_2CHPh$ the leuco base of Malachite Green.

leuco compounds:

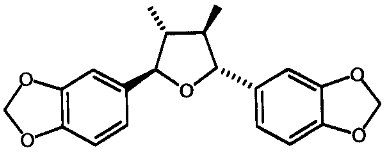
Dihydroxy polycyclic *aromatic compounds* which on oxidation form polycyclic quinone dyes (intermediates in vat dyeing). Use of this class name, which is more or less parochial to the technology of dyes, is not endorsed.

leukotrienes:

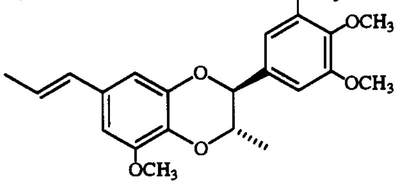
Linear C_{20} endogenous metabolites of arachidonic acid (icosa-5,8,11,14-tetraenoic acid) containing a terminal carboxy function and four or more double bonds (three or more of which are conjugated) as well as other functional groups. A subclass of *icosanoids*.

lignans:

Plant products of low molecular weight formed primarily from oxidative coupling of two *p*-propylphenol moieties at their β carbon atoms; products with units coupled in other ways are neolignans. *E.g.*



galbacin, a lignan



(–)-eusiderin, a neolignan

lignins:

Macromolecular constituents of wood related to *lignans*, composed of phenolic propylbenzene skeletal units, linked at various sites and apparently randomly.

lipids:

A loosely defined term for substances of biological origin that are soluble in nonpolar solvents. They consist of saponifiable lipids, such as *glycerides* (fats and oils) and *phospholipids*, as well as nonsaponifiable lipids, principally *steroids*. BNRD, Nomenclature of Lipids (p. 180).

lipopolysaccharides:

Natural compounds consisting of a trisaccharide repeating unit (two heptose units and octulosonic acid) with oligosaccharide side chains and 3-hydroxytetradecanoic acid units (they are a major constituent of the cell walls of Gram-negative bacteria).

lipoproteins:

Clathrate complexes consisting of a *lipid* enwrapped in a *protein* host without covalent binding in such a way that the complex has a hydrophilic outer surface consisting of all the protein and the polar ends of any *phospholipids*.

macrolides:

Macrocyclic *lactones* with a ring of twelve or more members.

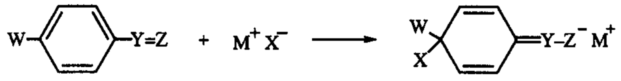
mancude-ring systems:

Rings having (formally) the **ma**ximum number of **n**on**cu**mulative **d**oubl**e** bonds are termed mancude. *E.g.* benzene, indene, indole, 4*H*-1,3-dioxine. Also called mancunide-ring systems.

mancunide-ring systems: see *mancude-ring systems*.

Meisenheimer complexes/compounds/adducts:

Originally, this term was applied to the somewhat stable, detectable delocalized cyclohexadienyl anions (or salts) formed by addition of *alkoxide* ions to the *ortho* or *para* positions of an *ortho*- or *para*-substituted nitrobenzene, particularly in the case of nitroaryl *ethers*. It has since been generalized to include other anionic addends (and even uncharged nucleophiles), other activating groups besides nitro (or even none at all), any substituent (or none) at the site of addition, and heterocyclic analogues. GTPOC (Meisenheimer adduct).



mercaptals:

A term once used for dithioacetals derived from *aldehydes*; its use is discouraged. NOC Rule C-533.1, footnote. See *thioacetals*.

mercaptans:

A traditional term abandoned by IUPAC, synonymous with *thiols*. NOC Rule C-511, footnote. This term is still widely used.

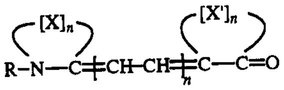
mercaptides: An obsolescent synonym for *thiolates*.

mercaptoles:

An archaic term for dithioketals. NOC Rule C-533.1, footnote. See *thioacetals*.

mero:

A prefix meaning part, partial, or fragment, used in formation of compound words. *E.g.* merocyanines are compounds related to *cyanines* but have a nitrogen atom at only one end of the chromogenic system instead of at both ends.

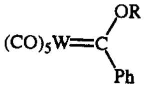


mesoionic compounds:

Dipolar five- (possibly six-) membered *heterocyclic compounds* in which both the negative and the positive charge are delocalized, for which a totally covalent structure cannot be written, and which cannot be represented satisfactorily by any one polar structure. The formal positive charge is associated with the ring atoms, and the formal negative charge is associated with ring atoms or an exocyclic nitrogen or chalcogen atom. Mesoionic compounds are a subclass of *betaines*. See also *munchnones*, *sydnones*. W. D. Ollis, S. P. Stanforth and C. A. Ramsden, *Tetrahedron* **41**, 2239-2329 (1985).

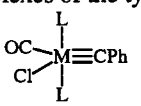
metal-carbene complexes:

Metal complexes of the type R_2CML_n (M = metal, L = ligand) in which formally a *carbene* is coordinated to a metal. *E.g.*



metal-carbyne complexes:

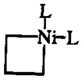
Metal complexes of the type $RCML_n$ (M = metal, L = ligand) in which formally a *carbyne* is coordinated to a metal. *E.g.*



metallacycloalkanes:

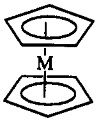
Monocyclic compounds containing a metal atom and saturated carbon atoms as ring members.

E.g. L is a ligand, *e.g.* triphenylphosphane.



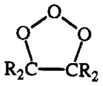
metallocenes:

Organometallic coordination compounds in which one atom of a transition metal such as iron, ruthenium or osmium is bonded to and only to the face of two cyclopentadienyl [η^5-(C_5H_5)] ligands which lie in parallel planes. NOC Rule D-2.55. The term should not be used for analogues having rings other than cyclopentadienyl as ligands.



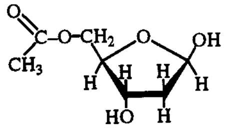
molozonides:

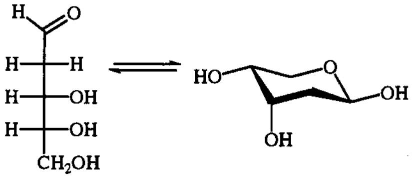
1,2,3-Trioxolanes, the primary products of the reaction of ozone at a carbon-carbon double bond. *Cf. ozonides.*



monosaccharides:*

A term which includes *aldoses*, *ketoses* and a wide variety of derivatives. Derivation includes oxidation, deoxygenation, introduction of other substituents, alkylation and acylation of hydroxy groups, and chain branching. 2-Carb-1.2. *Cf glycosides.* See *saccharides*. *E.g.*





Subgroups of *monosaccharides* mentioned in this glossary are *aldoketoses*, *uronic acids* and *amino sugars*.

monoterpenes: See *terpenes*.

monoterpenoids: *Terpenoids* having a C_{10} skeleton.

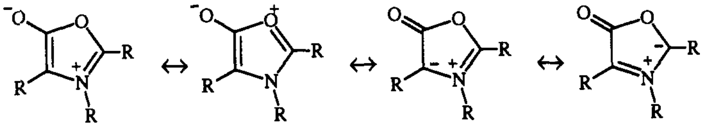
monothioacetals:* See *thioacetals*.

mucopolysaccharides:

Polysaccharides composed of alternating units from *uronic acids* and glycosamines, and commonly partially esterified with sulfuric acid. BNRD Nomenclature of glycoproteins, glycopeptides and peptidoglycans (p.86).

munchnones:

Mesoionic compounds having a 1,3-oxazole skeleton bearing an oxygen atom attached to the 5-position with the following delocalised structure:



mustards:

Compounds having two β-haloalkyl groups bound to a sulfur atom, as in $(XCH_2CH_2)_2S$, and their analogues, the nitrogen (and phosphorus) mustards, $(XCH_2CH_2)_2NR$. Compounds having one β-haloalkyl group and one β-hydroxyalkyl group on S are termed hemi- or semi-mustards by some chemists.

mustard oils: An archaic term for *isothiocyanates*, RN=C=S.

naphthenes:

Cycloalkanes especially cyclopentane, cyclohexane and their alkyl derivatives. The term seems to be obsolescent, except in the petrochemical industry.

naphthenic acids:

Acids, chiefly monocarboxylic, derived from *naphthenes*. The term seems to be obsolescent, except in the petrochemical industry.

neoflavonoids: See *flavonoids*.

neolignans: See *lignans*.

nitramines:

Amines substituted at N with a nitro group (a contracted form of *N*-nitroamines); they are thus amides of nitric acid, and the class is composed of nitramide, O_2NNH_2, and its derivatives formed by substitution.

nitrenes:*

1. The neutral compound HN: having univalent nitrogen, and its derivatives RN:. Aminylenes is a recognised but less widely used synonym. RNRI Rule RC-81.1.3.1. NOC Rule C-81.2. Other names that have been used include aminediyls, *imidogens*, azenes. They may exist in either a singlet or a triplet electronic state (four spin-paired electrons, or two spin-paired and two with parallel spins, respectively). *Cf. carbenes. E.g.* CH_3N: methylnitrene.
2. Until the 1960s, nitrenes had a totally different meaning: analogues of nitrones in which the double-bonded oxygen is replaced by double-bonded carbon, thus *azomethine ylides*.

nitrenium ions:*

The cation $H_2N{:}^+$ and its N-*hydrocarbyl* derivatives $R_2N{:}^+$, in which the nitrogen has a positive charge, and two unshared electrons. A synonymous but less widely used term is aminylium ions. RNRI Rule RC-82.2.2.2. The alkylidene derivatives of $H_2N{:}^+$, $R_2C{=}N{:}^+$, still belong to the class nitrenium ions, but are more precisely designated by the term *iminylium ions*.

nitriles:*

Compounds having the structure RC≡N; thus *C*-substituted derivatives of hydrocyanic acid, HC≡N. NOC Rule C-831. In systematic nomenclature, the suffix nitrile denôtes the triply bound ≡N atom, not the carbon atom attached to it. NOC Rule C-832.1. GNOC Recom. R-5.7.9.1. See also *cyanides*, *isocyanides*, *carbonitriles*.

nitrile imides:

Ylides having the structure $RC{\equiv}N^+\text{-}N^-\text{-}R \leftrightarrow RC^+{=}NN^-\text{-}R \leftrightarrow RC^-{=}N^+{=}NR$. Also known as nitrile imines or nitrilimines, especially in the German literature. R. Huisgen, in *1,3-Dipolar Cycloaddition Chemistry*, A. Padwa, Ed. John Wiley and Sons, 1984, p. 3. See also *dipolar compounds*, *ylides*.

nitrile imines: See *nitrile imides*, *imides* (2).

nitrile oxides:*

Ylides having the structure $RC{\equiv}N^+\text{-}O^- \leftrightarrow RC^-{=}N^+{=}O$. NOC Rule C-834.1. See also *dipolar compounds.*

nitrile sulfides:

Sulfur analogues of *nitrile oxides*: $RC{\equiv}N^+\text{-}S^- \leftrightarrow RC^-{=}N^+{=}S$. See also *dipolar compounds.*

nitrile ylides:

1,3-*Dipolar compounds* having the structure $RC{\equiv}N^+\text{-}C^-R_2 \leftrightarrow RC^-{=}N^+{=}CR_2 \leftrightarrow RC^+{=}NC^-R_2 \leftrightarrow R\ddot{C}\text{-}N{=}CR_2$. The uncharged canonical form $R\ddot{C}\text{-}N{=}CR_2$ is called an alkylidene- (or hydrocarbylidene-) amino carbene; the name iminyl carbene is incorrect because iminyl is not a recognised prefix for $\text{-}N{=}CR_2$. See also *carbenes*, *dipolar componds.*

nitrilimines: See *nitrile imides.*

nitrilium betaines:

Derivatives of *nitriles* having the general structure $R\text{-}C{\equiv}N^+\text{-}Y^-$. A subclass of 1,3-*dipolar compounds* including *nitrile imides*, *nitrile oxides*, *nitrile sulfides* and *nitrile ylides.*

nitrilium ions:*

Cations derived formally by attachment of one hydron to the nitrogen atom of a nitrile and hydrocarbyl derivatives thereof. *E.g.* $PhC{\equiv}N^+H \leftrightarrow PhC^+{=}NH$ benzonitrilium. RNRI Rule RC-82.1.2.1.

nitrimines:

Compounds having the structure $O_2NN{=}CR_2$ (also called *N*-nitroimines).

nitro compounds:*

Compounds having the nitro group, $\text{-}NO_2$ (free valence on nitrogen), which may be attached to carbon, nitrogen (as in *nitramines*), or oxygen (as in nitrates), among other elements (in the absence of specification, *C*-nitro compounds are usually implied). NOC Rule C-852.1. See also *dipolar compounds.*

***aci*-nitro compounds**:

A class name for hydrocarbylideneazinic acids, $R_2C{=}N^+(\text{-}O^-)OH$. The use of *aci*-nitro as a prefix in systematic nomenclature to name specific compounds (NOC Rule C-852.2) is abandoned. GNOC Recom. R-5.3.2, footnote. See also *azinic acids.*

nitrogen mustards: See *mustards.*

nitrogen ylides: See *ylides.*

nitrolic acids:

Compounds having the structure $RC({=}NOH)NO_2$.

nitrones:*

The *N*-oxides of *imines*, that have the structure $R_2C{=}N^+(O^-)R'$ ($R' \neq H$). NOC Rule C-842.3. Synonymous with *azomethine oxides*. *N*-Oxides $R_2C{=}N^+(O^-)H$ may be included. See also *dipolar compounds.*

nitronic acids: See *azinic acids.*

nitrosamides:

Although this term has, regrettably, been used to mean the *N*-nitroso derivatives of *amides*, logically it refers to amides of nitrous acid; the unstable parent compound H_2NNO is, in fact, named nitrosamide, but its derivatives formed by substitution with *hydrocarbyl groups* are by long custom called *nitrosamines*. See also *nitramines*.

nitrosamines:

N-Nitroso *amines*: compounds of the structure R_2NNO. Compounds RNHNO are not ordinarily isolable, but they, too, are nitrosamines. The name is a contraction of *N*-nitrosoamine and, as such, does not require the *N* locant. See also *nitrosamides*.

nitrosimines:

N-Nitroso *imines*: $O{=}NN{=}CR_2$.

nitroso compounds:*

Compounds having the nitroso group, -NO, attached to carbon, or to another element, most commonly nitrogen or oxygen. See *nitrosamines*. NOC Rule C-851.

nitrosolic acids:

Compounds having the structure RC(=NOH)NO.

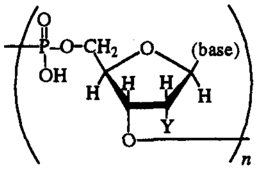
nitroxides:

Nitroxide is the parent name used by *Chemical Abstracts Service* for $H_2N\text{-}O^\bullet$. *E.g.* $(ClCH_2)_2N\text{-}O^\bullet$ bis(chloromethyl) nitroxide. The IUPAC name is bis(chloromethyl)aminoxyl. Nitroxides should not be used as a class name for *aminoxyl radicals*. See *aminoxyl radicals*.

nitroxyl radicals: See *aminoxyl radicals*.

nucleic acids:*

Macromolecules, the major organic matter of the nuclei of biological cells, made up of *nucleotide* units, and hydrolysable into certain *pyrimidine* or *purine bases* (usually adenine, cytosine, guanine, thymine, uracil), D-ribose or 2-deoxy-D-ribose, and phosphoric acid. See *nucleotides*, *ribonucleic acids*. BNRD, Rule N-1.3 (p. 110).



Y = H or OH

nucleoproteins:

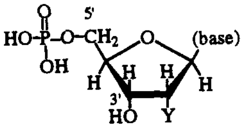
Proteins having *nucleic acids* as prosthetic groups, and thus yielding *nucleic acids* (or their cleavage products) as well as amino acids on hydrolytic cleavage.

nucleosides:*

Ribosyl or deoxyribosyl derivatives (rarely, other glycosyl derivatives) of certain *pyrimidine* or *purine bases*. They are thus *glycosylamines* or N-*glycosides* related to *nucleotides* by the lack of phosphorylation. It has also become customary to include among nucleosides analogous substances in which the *glycosyl group* is attached to carbon rather than nitrogen ('*C*-nucleosides'). See also *nucleic acids*. BNRD Rule N-2.3 (p.110).

nucleotides:*

Compounds formally obtained by esterification of the 3' or 5' hydroxy group of *nucleosides* with phosphoric acid. They are the monomers of *nucleic acids* and are formed from them by hydrolytic cleavage. BNRD Rules N-1.1, N-2.4 (p. 109, 111).



Y = H, a deoxyribonucleotide
Y = OH, a ribonucleotide

olefins:

Acyclic and cyclic *hydrocarbons* having one or more carbon-carbon double bonds, apart from the formal ones in *aromatic compounds*. The class olefins subsumes *alkenes* and cycloalkenes and the corresponding polyenes. See also *cycloalkanes*.

oligo:

A prefix meaning 'a few', and used for compounds with a number of repeating units intermediate between those in monomers and those in high polymers. The limits are not precisely defined, and in practice vary with the type of structure being considered, but are generally from 3 to 10. *E.g. oligopeptides, oligosaccharides.*

oligonucleotides:* See *oligo* and *nucleotides*. BNRD Rule N-3.3 (p. 111).

oligopeptides:* See *oligo* and *peptides*. BNRD, Rule 3AA-11 (p.48).

oligosaccharides:* See *oligo* and *saccharides*. 2-Carb-1.14.

onium compounds:*

1. Cations (with their counterions) derived by addition of a hydron to a mononuclear parent hydride of the nitrogen, chalcogen and halogen families. NOC Rules C-82.1, D-5.33.

H_4N^+	ammonium	H_3O^+	oxonium	H_2F^+	fluoronium
H_4P^+	phosphonium	H_3S^+	sulfonium	H_2Cl^+	chloronium
H_4As^+	arsonium	H_3Se^+	selenonium	H_2Br^+	bromonium
H_4Sb^+	stibonium	H_3Te^+	telluronium	H_2I^+	iodonium
H_4Bi^+	bismuthonium				

2. Derivatives formed by substitution of the above parent ions by univalent groups. The number of substituted hydrogen atoms is, especially in the case of *hydrocarbyl* substituents, indicated by the adjectives primary, secondary, tertiary or quaternary. RNRI Rule RC-82.1.1.1. *E.g.* Cl_2F^+ dichlorofluoronium, $(CH_3)_2S^+H$ dimethylsulfonium (a secondary sulfonium ion), $ClCH_3)_3P^+$ chlorotrimethylphosphonium, $(CH_3CH_2)_4N^+$ tetraethylammonium (a quaternary ammonium ion). See also *quaternary ammonium compounds*, *phosphonium compounds*, *arsonium compounds*, *stibonium compounds*, *oxonium ions*, *sulfonium compounds*, *halonium ions*.

3. Derivatives formed by substitution of the above parent ions by groups having two or three free valencies on the same atom. Such derivatives are, where possible, designated by a specific class name. *E.g.* $RC{\equiv}O^+$ hydrocarbylidyne oxonium ions, $R_2C{=}N^+H_2\ X^-$ *iminium compounds*, $RC{\equiv}NH^+$ *nitrilium ions*.

organo-: See *organometallic compounds*.

organoheteryl groups:

Univalent groups containing carbon, which are thus organic, but which have their free valence at an atom other than carbon. This collective term is seldom used; specific subclasses are more frequently encountered (organothio- or organylthio, organogermanium- or organylgermanium groups). The synonymous term organoelement groups is occasionally encountered. *E.g.* phenoxy, acetamido, pyridinio ($C_5H_5N^+$-), thiocyanato ($N{\equiv}C$-S-), trimethylsilyl; but not hydroxyphenyl, aminoacetyl. *Cf. organyl.*

organometallic compounds:

Classically compounds having bonds between one or more metal atoms and one or more carbon atoms of an organyl group. Organometallic compounds are classified by prefixing the metal with organo-, *e.g.* organopalladium compounds. In addition to the traditional metals and semimetals, elements such as boron, silicon, arsenic and selenium are considered to form organometallic compounds. *E.g.* organomagnesium compounds: MeMgI iodo(methyl)magnesium, Et_2Mg diethylmagnesium; an organolithium compound: BuLi butyllithium; an organozinc compound: $ClZnCH_2C(=O)OEt$ chloro(ethoxycarbonylmethyl)zinc; an organocuprate: $Li^+[CuMe_2]^-$ lithium dimethylcuprate; an organoborane: Et_3B triethylborane. The status of compounds in which the canonical anion has a delocalized structure in which the negative charge is shared with an atom more electronegative than carbon, as in *enolates*, may vary with the nature of the anionic moiety, the metal ion, and possibly the medium; in the absence of direct structural evidence for a carbon-metal bond, such compounds are not considered to be organometallic. See *acetylides*, *ferrocenophanes*, *Grignard reagents*, *metallocenes*.

organyl groups:

Any organic substituent group, regardless of functional type, having one free valence at a carbon atom. See *heterocyclyl groups*, *hydrocarbyl*, *organoheteryl*. *E.g.* CH_3CH_2- , $ClCH_2$- , $CH_3C(=O)$-, 4-pyridylmethyl. Note: organyl is also used in conjunction with other terms, as in organylthio- (*e.g.* MeS-) and organyloxy.

ortho acids:*

Hypothetical compounds having the structure $RC(OH)_3$. Thus hydrated forms of *carboxylic acids*. Orthocarbonic acid, $C(OH)_4$, is generically included. NOC Rule C-464. See also *ortho amides*, *ortho esters*.

ortho amides:

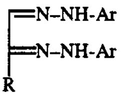
Hypothetical compounds having the structure $RC(NH_2)_3$, and *N*-substituted derivatives thereof. $(R_2N)_4C$ are generically included, but such use is obsolescent.

ortho esters:*

Compounds having the structure $RC(OR')_3$ ($R' \neq H$), or the structure $C(OR')_4$ ($R' \neq H$). NOC Rule C-464.1. E.g. $HC(OCH_3)_3$ trimethyl orthoformate, $C(OCH_3)_4$ tetramethyl orthocarbonate.

osazones:

1,2-Bis(arylhydrazones) of *ketoaldoses* (aldoketoses) formed from *aldoses* and 2-*ketoses* by reaction with excess arylhydrazine. 2-Carb-16.5.



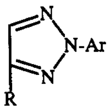
R = rest of monosaccharide chain

osides: See *glycosides*.

osones: An obsolescent and non-recommended term for 1,2-*ketoaldoses*, usually derived by hydrolysis of *osazones*. BNRD Rule Carb-12 (p. 132).

osotriazoles:

The 1,2,3-triazoles formed on oxidising *osazones*.



R = rest of monosaccharide chain

oxenium ions:

An unnecessary and erroneous term for oxylium ions, RO^+ ($:\ddot{O}:$ is monooxygen, not "oxene").

oxime *O*-ethers:*

O-*Hydrocarbyl oximes* $R_2C{=}NOR'$ ($R' \neq H$). NOC Rule C-842.2.

oximes:*

Compounds of structure $R_2C{=}NOH$ derived from condensation of *aldehydes* or *ketones* with hydroxylamine. NOC Rule C-842.1. GNOC Recom. R-5.6.6.1. Oximes from aldehydes may be called *aldoximes*; those from ketones may be called *ketoximes*.

oxo acids: See *oxo carboxylic acids*.

α-oxo carbenes: Synonymous with *acyl carbenes*. See also *keto carbenes*.

oxo carboxylic acids:

Compounds having a carboxy group as well as an aldehydic or ketonic group in the same molecule. NOC Rule C-415. *E.g.* $HC(=O)CH_2CH_2CH_2C(=O)OH$ 5-oxopentanoic acid. In an organic context the term is generally shortened to oxo acids. The full name should be used if confusion with *oxoacids* seems possible.

oxo compounds:

Compounds containing an oxygen atom, =O, doubly bonded to carbon or another element. The term thus embraces *aldehydes*, *carboxylic acids*, *ketones*, *sulfonic acids*, *amides* and *esters*. Oxo used as an adjective (and thus separated by a space) modifying another class of compound, as in *oxo carboxylic acids*, indicates the presence of an oxo substituent at any position. To indicate a double-bonded oxygen that is part of a ketonic structure, the term keto is sometimes used as a prefix, but such use has been abandoned by IUPAC for naming specific compounds. A traditional use of keto is for indicating oxidation of CHOH to C=O in a parent compound that contains OH groups, such as *carbohydrates*. *E.g.* 3-ketoglucose. *Cf. ketoaldonic acids*, *ketoaldoses*.

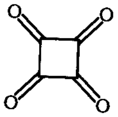
oxoacids:

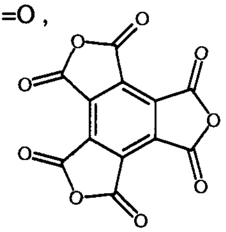
Oxoacids (and its variants oxyacids, oxo acids, oxy-acids, oxiacids, oxacids) is a traditional name for any acid having oxygen in the acidic group. The term stands in contradistinction to 'hydracids' (*e.g.* HCl) lacking oxygen.

The term oxoacid now refers to a compound which contains oxygen, at least one other element, and at least one hydrogen bound to oxygen, and which produces a conjugate base by loss of positive hydrogen ion(s) (hydrons). CNIC, *Nomenclature of Inorganic Chemistry, Recommendations 1990*, Blackwell Scientific Publications, Rule I-9.2. *E.g.* $P(OH)_3$, RC(=O)OH, HOSOH, HOCl, HON=O, $(HO)_2SO_2$, $RP(=O)(OH)_2$. See also *oxo carboxylic acids*.

oxocarbons:

Compounds consisting wholly of carbon and oxygen. *E.g.* CO, O=C=O , O=C=C=C=O ,





oxonium ions:

The parent ion H_3O^+ and substitution derivatives thereof. See under *onium compounds*.

oxonium ylides:

1. Compounds having the structure $R_2O^+\text{-}C^-R_2$. See *ylides*.
2. A class of 1,3-*dipolar compounds* of general structure $R_2C{=}O^+\text{-}Y^-$, comprising *carbonyl imides*, *carbonyl oxides* and *carbonyl ylides*.

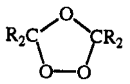
oxyacid/oxy-acid: See *oxoacid*.

oxylium ions:

Species of the form RO^+. RNRI Rule RC-82.2.3.4. *E.g.* CH_3O^+ methoxylium, HO^+ hydroxylium.

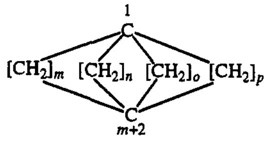
ozonides:

The 1,2,4-trioxolanes formed by the reaction of ozone at a carbon-carbon double bond, or the analogous compounds derived from acetylenic compounds. *Cf. molozonides*.



paddlanes:

Tricyclic saturated *hydrocarbons* having two bridgehead carbon atoms joined through four bridges, systematically named tricyclo[*m.n.o.p*$^{1,(m+2)}$]alkanes, have been referred to as [*m.n.o.p*]paddlanes (when *p* = 0, the compounds are *propellanes*).



paraffins:

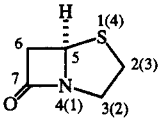
Obsolescent term for saturated *hydrocarbons*, commonly but not necessarily acyclic. Still widely used in the petrochemical industry, where the term designates acyclic saturated hydrocarbons, and stands in contradistinction to *naphthenes.*

pectins:

Polyuronic acids mostly derived from D-galacturonic acid (abundant in some fruits). See also *uronic acids.*

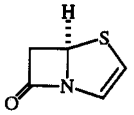
penams:

Natural and synthetic antibiotics containing the 4-thia-1-azabicyclo[3.2.0]heptan-7-one structure, generally assumed to have the 5*R* configuration unless otherwise specified. The numbering of the penam skeleton differs from that of the von Baeyer named bicyclic system. Where they differ the von Baeyer numbering is shown in parenthesis in the example. *Cf. penems.*



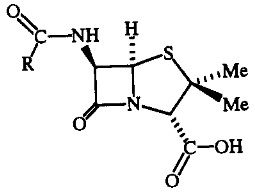
penems:

2,3-Didehydropenams. *Cf. penams.*



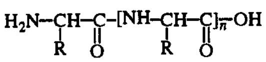
penicillins:

Substituted *penams* having the basic structure shown, including the natural penicillins and synthetic analogues.



peptides:*

Amides derived from two or more amino carboxylic acid molecules (the same or different) by formation of a covalent bond from the carbonyl carbon of one to the nitrogen atom of another with formal loss of water. The term is usually applied to structures formed from α-amino acids, but it includes those derived from any amino carboxylic acid. BNRD, Rule 3AA-11 (p. 48). See also *proteins, retro. Cf. carboxylic acids.*



$$\mathrm{H_2N{-}\underset{R}{\underset{|}{CH}}{-}\underset{O}{\underset{\|}{C}}{-}[NH{-}\underset{R}{\underset{|}{CH}}{-}\underset{O}{\underset{\|}{C}}]_{n}{-}OH}$$

(R may be any *organyl group*, commonly but not necessarily one found in natural amino acids)

per acids:

An ambiguous term, which may imply either a higher oxidation state of a central atom, as in perchloric acid, or a derivative of hydrogen peroxide, as in $CH_3C(=O)OOH$. Accordingly, it is not recommended as a class name. See *peroxy acids.*

peroxides:*

Compounds of structure ROOR in which R may be any *organyl group*. (The term is, of course, also used in an inorganic sense to denote salts of the anion O_2^{2-}). See also *hydroperoxides*. NOC Rule C-218.2.

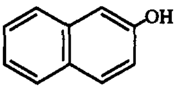
peroxo compounds: See *carbonyl oxides.*

peroxy acids:*

Acids in which an acidic -OH group has been replaced by an -OOH group. NOC Rule C-441.1. *E.g.* $CH_3C(=O)OOH$ peroxyacetic acid, $PhS(=O)_2OOH$ benzeneperoxysulfonic acid.

phenols:*

Compounds having one or more hydroxy groups attached to a benzene or other arene ring. NOC Rule C-202. *E.g.*



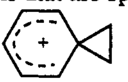
2-naphthol

phenolates:*

Synonymous with *phenoxides*. NOC Rule C-206.1. The term phenolate should not be used for solvates derived from a *phenol*, for the ending -ate often occurs in names for anions. See *phenoxides*.

phenonium ions:

The traditional generic name for those cyclohexadienyl cations that are spiro-annulated with a cyclopropane unit. Phenonium ions constitute a subclass of *arenium ions*. GTPOC (bridged carbocations).



phenoxides:*

Salts or analogous metal derivatives of *phenols*; synonymous with *phenolates*. NOC Rule C-206. A preferable general term, however, is aryloxides.

phosphanes:*

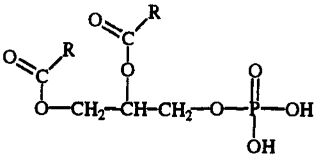
The saturated hydrides of tervalent phosphorus having the general formula P_nH_{n+2}. Individual members having an unbranched phosphorus chain are named phosphane, diphosphane, triphosphane, *etc*. The name of a saturated hydride of phosphorus wherein one or more phosphorus atoms have a bonding number of 5 is formed by prefixing locants and λ^5 symbols to the name of the corresponding phosphane. CNOC, Treatment of variable valence in organic nomenclature (lambda convention), *PAC* **56**, 769-778 (1984) Rule Lm-1. GNOC Recom. R-2.1, R-2.2. *Hydrocarbyl* derivatives of PH_3 belong to the class *phosphines*.

phosphanylidenes:*

Recommended name for *carbene analogues* having the structure RP: (former IUPAC name is phosphinediyls). A common non-IUPAC synonym is phosphinidenes. RNRI Rule RC-81.1.3.2.

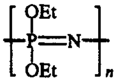
phosphatidic acids:*

Derivatives of glycerol in which one hydroxy group, commonly but not necessarily primary, is esterified with phosphoric acid and the other two are esterified with *fatty acids*. See *lecithins*, *phosphoglycerides*, *phospholipids*. BNRD Rule Lip-2.3 (p. 184).

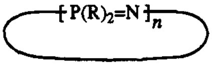


phosphazenes:

Compounds containing a phosphorus-nitrogen double bond, *i.e.* derivatives of $H_3P{=}NH$ and $HP{=}NH$. A multiplicity of such bonds is present in various well-established chain, ring and cage compounds. NOC D-4.4. *E.g.*



poly(diethoxyphosphazene),



phosphines:*

PH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by *hydrocarbyl groups*: R_3P. RPH_2, R_2PH and R_3P ($R \neq H$) are called primary, secondary and tertiary phosphines, respectively. NOC Rule D-5.11. A specific phosphine is preferably named as a substituted phosphane. GNOC Recom. R-5.1.3.2. *E.g.* CH_3PH_2 methylphosphane. *Cf. phosphanes*.

phosphine oxides:*

Compounds having the structure $R_3P{=}O \leftrightarrow R_3P^+\text{-}O^-$ (analogously, phosphine *imides* and phosphine *sulfides*). NOC Rule D-5.4. See under *imides* (2).

phosphinic acids:*

$H_2P({=}O)OH$ (phosphinic acid) and its P-*hydrocarbyl* derivatives. NOC Rule D-5.51.

phosphinidenes: See *phosphanylidenes.*

phosphinous acids:*

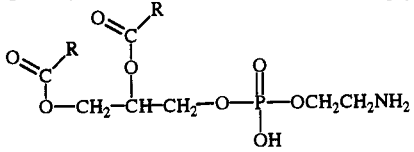
H_2POH (phosphinous acid) and its P-*hydrocarbyl* derivatives. NOC Rule D-5.21.

phospho:

1. A prefix used in biochemical nomenclature in place of *phosphono* to denote the $-P(=O)(OH)_2$ group linked to a heteroatom. BNRD Nomenclature of Phosphorus-Containing Compounds of Biochemical Importance, Rule 1 (p. 256). *E.g.* $Me_3N^+-CH_2CH_2OP(=O)(OH)O^-$ phosphocholine.
2. An infix used in biochemical nomenclature to name phosphoric diesters. BNRD Nomenclature of Phosphorus-Containing Compounds of Biochemical Importance, Rule 4 (p. 256). *Cf. phosphoglycerides. E.g.* glycerophosphocholine.

phosphoglycerides:

Phosphoric diesters, *esters* of *phosphatidic acids*, generally having a polar head group (OH or NH_2) on the esterified *alcohol* which typically is 2-aminoethanol, choline, glycerol, inositol, serine. The term includes *lecithins, cephalins. E.g.*



2-aminoethyl phosphatidates.

phospholipids:*

Lipids containing phosphoric acid as mono- or di-esters, including *phosphatidic acids* and *phosphoglycerides.* BNRD Rule Lip-2.1 (p. 184).

phosphonic acids:*

$HP(=O)(OH)_2$ (phosphonic acid) and its P-*hydrocarbyl* derivatives. NOC Rule D-5.51.

phosphonitriles:*

Compounds of stoichiometric composition $[X_2PN]_n$, in which X is alkoxy, halogen, or other electronegative group, and n is a variable integer, the value of which may not be known. NOC Rule D-5.65. See *phosphazenes.*

phosphonium compounds:*

Salts (and hydroxides) $[R_4P]^+X^-$ containing tetracoordinate phosphonium ion and the associated anion. NOC Rule D-5.31. See under *onium compounds.*

phosphonium ylides:

Compounds having the structure $R_3P^+-C^-R_2 \leftrightarrow R_3P=CR_2$. Also known as Wittig reagents. See under *ylides.*

phosphono:*

A prefix indicating the presence of the group $-P(=O)(OH)_2$. *Cf. phospho.* NOC Rule D-5.52.

phosphonous acids:*

$HP(OH)_2$ (phosphonous acid) and its P-*hydrocarbyl* derivatives. NOC Rule D-5.21.

phosphoramides:*

Compounds in which one or more of the OH groups of phosphoric acid have been replaced with an amino or substituted amino group; commonly confined to the phosphoric triamides, $P(=O)(NR_2)_3$, since replacement of one or two OH groups produces phosphoramidic acids: $P(=O)(OH)(NR_2)_2$, $P(=O)(OH)_2(NR_2)$. NOC Rule D-5.62.

phosphoranes:*

The mononuclear hydride PH_5, systematically named λ^5-phosphane, and its *hydrocarbyl* derivatives. NOC Rule D-5.71. By extension, the literature also applies the term to *phosphonium ylides.* See also *phosphanes.*

phosphoranyl radicals:

A tetracoordinate phosphorus species which has nine valence-shell electrons: $R_4P^{\bullet}$.

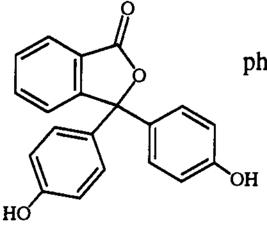
phosphorus ylides: See *phosphonium ylides*.

phosphylenes: An obsolescent synonym for *phosphanylidenes*.

phthaleins:

3,3-Bis(hydroxyaryl)-2-benzofuran-1(3*H*)-ones generally derived from the condensation of phthalic anhydride with *phenols*. *Cf. xanthenes*.

E.g.



phenolphthalein.

phthalides:

3,3-Di(hydrocarbyl) or 3-hydrocarbylidene-2-benzofuran-1(3*H*)-ones. *Cf. phthaleins*.

pi-adducts: See *π-adducts* under '**a**'.

pi-complexes: See *π-adducts* under '**a**'.

picrates:*

Salts or *charge-transfer complexes* of picric acid (2,4,6-trinitrophenol). *Cf. styphnates*.

pinacols:

Tetra(hydrocarbyl)ethane-1,2-diols, $R_2C(OH)C(OH)R_2$, of which the tetramethyl example is the simplest one and is itself commonly known as pinacol (benzpinacol is the tetraphenyl analogue).

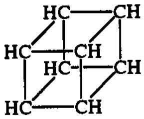
plumbylenes: An older, no longer recommended name for *plumbylidenes*.

plumbylidenes:*

Carbene analogues having the structure R_2Pb: . RNRI Rule RC-81.1.3.2.

polyhedranes:

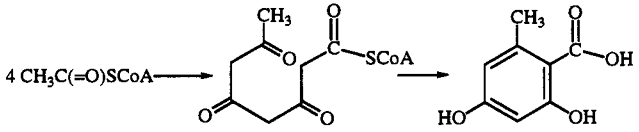
Polycyclic *hydrocarbons* of the $(CH)_n$ series having skeletons corresponding to the regular and semiregular geometrical solids. *E.g.*



cubane.

polyketides:

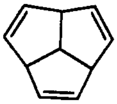
Natural compounds containing alternating carbonyl and methylene groups ("β-polyketones"), biogenetically derived from repeated condensation of acetyl coenzyme A (via malonyl coenzyme A), and usually the compounds derived from them by further condensations. Considered by many to be synonymous with the less frequently used terms acetogenins and ketides.



polypeptides:*

Peptides containing ten or more amino acid residues. BNRD, Rule 3AA-11 (p. 48). See also under *peptides*.

polyquinanes/polyquinenes:

Saturated or unsaturated, respectively, polycyclic *hydrocarbons* consisting of fused five-membered rings, commonly but not necessarily incorporating the skeleton of quinacene (tricyclo[5.2.1.$0^{4,10}$]deca-2,5,8-triene):  *E.g.* bicyclo[3.3.0]octane, dodecahedrane.

polysaccharides:*

Compounds consisting of a large number of *monosaccharides* linked glycosidically. This term is commonly used only for those containing more than ten monosaccharide residues. Also called *glycans*. See also 2-Carb-1.15.

polysulfanes:*

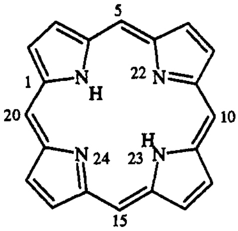
Compounds having an unbranched chain of sulfur atoms (S_2 or higher) terminating in H: HS_nH. NOC Rule C-515.2. GNOC Recom. R-5.5.6. Some chemists exclude disulfane, HS_2H, from the class polysulfanes.

polysulfides:*

Compounds R-$[S]_n$-R, with a chain of sulfur atoms ($n \geq 2$) and R $\neq$ H. NOC Rule C-515. GNOC Recom. R-5.5.6. Some chemists exclude disulfides, RS_2R, from the class polysulfides.

porphyrins:

Natural pigments containing a fundamental skeleton of four pyrrole nuclei united through the α-positions by four methine groups to form a macrocyclic structure (porphyrin is designated porphine in *Chemical Abstracts* indexes). See also *corrinoids*. BNRD, The Nomenclature of Tetrapyrroles, Rule TP-1.1 (p. 281).



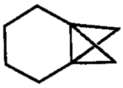
porphyrin

prenols:*

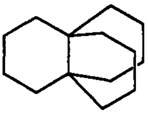
Alcohols of general formula H-$[CH_2C(Me){=}CHCH_2]_n$OH in which the carbon skeleton is composed of one or more isoprene units (biogenetic precursors of the *isoprenoids*). BNRD, Prenol Nomenclature, Rule Pr-1 (p. 252).

propellanes:

Tricyclic saturated *hydrocarbons*, systematically named tricyclo[*a*.*b*.*c*.$0^{1,(a+2)}$]alkanes; have been referred to as [*a*.*b*.*c*]propellanes. *Cf. paddlanes.*



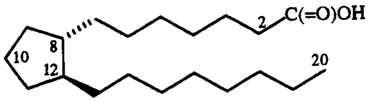
[4.1.1]propellane



[4.4.4]propellane

prostaglandins:

Naturally occurring compounds derived from the parent C_{20} acid, prostanoic acid. *Cf. icosanoids*, prostanoids. R. G. Salomon, *Acc. Chem. Res.* **18**, 294-301 (1985). *E.g.*



prostanoic acid

prostanoids:

The family of natural *prostaglandins* and prostaglandin-like compounds. E. J. Corey, T. Ravindranathan and S. Terashima, *J. Am. Chem. Soc.* **93**, 4326-4329 (1971).

proteins:

Naturally occurring and synthetic *polypeptides* having molecular weights greater than about 10 000 (the limit is not precise). See also *peptides*. BNRD, Rule 3AA-11 (p. 48).

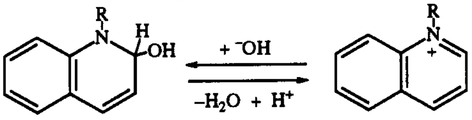
pseudo acids:

Potentially acidic compounds that require some structural reorganization, such as keto-enol tautomerization, having a non-negligible activation energy, in order to show normal acidic properties. *E.g.* nitroalkanes:

$$RCH_2NO_2 \xrightarrow{(slow)} RCH{=}NO_2H \xrightarrow{(fast)} RCHNO_2^- + H^+$$

pseudo bases:

Hydroxy compounds that give salts with acids by formation of water accompanied by a change of constitution. *Cf. anhydro bases.*



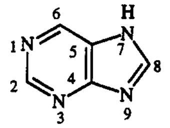
pseudohalogens:

Compounds that resemble the halogen elements, X_2, in their chemistry. *E.g.* $(CN)_2$ cyanogen, $(SCN)_2$ thiocyanogen, ICN iodine cyanide. Certain ions that have sufficient resemblance to halide ions are sometimes referred to as pseudohalide ions. *E.g.* N_3^-, SCN^-, CN^-.

pseudoureas: An obsolescent synonym for *isoureas*.

purine bases:

Purine and its substitution derivatives, especially naturally occurring examples. The customary numbering shown below is not systematic. NOC Rule B-2.11.



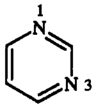
purine

pyranoses:*

Cyclic *hemiacetal* forms of *monosaccharides* in which the ring is six-membered (a tetrahydropyran). *Cf. furanoses.* 2-Carb-5.1.

pyrimidine bases:

Pyrimidine and its substitution derivatives, especially naturally occurring examples.



pyrimidine

pyro:

A prefix designating compounds formed by heating a compound, usually with the elimination of water, carbon dioxide, or other simple molecule. *E.g.* pyroglutamic acid from glutamic acid.

pyrromethenes:

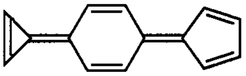
A less preferred term for *dipyrrins*. (The term 'pyrromethane' has been used for the system with a $-CH_2-$ linkage.) See *dipyrrins*.

quaternary ammonium compounds:*

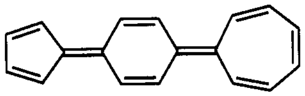
Derivatives of ammonium compounds, NH_4^+ Y^-, in which all four of the hydrogens bonded to nitrogen have been replaced with *hydrocarbyl groups*. Compounds having a carbon-nitrogen double bond (*i.e.* $R_2C{=}N^+R_2$ Y^-) are more accurately called *iminium compounds*. See under *onium compounds*. *E.g.* $[(CH_3)_4N]^+$ OH^- tetramethylammonium hydroxide.

quinarenes:

Mancude assemblies of three carbocyclic rings, a six-membered quinonoid ring bonded at the 1,4-positions to odd-membered rings which differ in ring size by two. *E.g.*



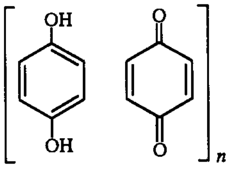
[3.6.5]quinarene



[5.6.7]quinarene

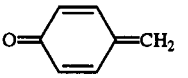
quinhydrones:

Molecular complexes of one equivalent amount of a *quinone* with one equivalent amount of the corresponding hydroquinone.



quinomethanes:

Methylidenecyclohexadienones and dimethylidenecyclohexadienes, formally derived from *quinones* by replacement of one or both of the quinone oxygens by methylidene groups. (The diradical, triplet state of quinodimethanes can also be called *o*- or *p*-xylylenes).



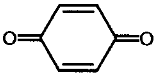
p-quinomethane

p-quinodimethane

quinomethides/quinone methides: Undesirable names for *quinomethanes.*

quinones:*

Compounds having a fully conjugated cyclic dione structure, such as that of benzoquinones, derived from *aromatic compounds* by conversion of an even number of -CH= groups into -C(=O)- groups with any necessary rearrangement of double bonds (polycyclic and heterocyclic analogues are included). NOC Rule C-317.



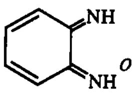
p-benzoquinone

quinone diazides:

A potentially confusing term for *diazooxides*; the presence of an azido group, -N_3, is falsely suggested.

quinonimines/quinone imines:*

Imines derived from *quinones* by replacement of one or both oxygens by =NR. The term may include both types unless the infix mono or di is included. NOC Rule C-815.3 *E.g.*



o-benzoquinone diimine

quinonoximes:

Mono- or dioximes of *quinones*; quinone monooximes are tautomeric with nitrosophenols. *Cf. oximes.*

radicals:

1. Molecular entities possessing an unpaired electron, such as $^{\bullet}CH_3$, $^{\bullet}SnH_3$, $^{\bullet}Cl$. (In these formulae the dot, symbolizing the unpaired electron, should be placed so as to indicate the atom of highest spin density, if this is possible). Paramagnetic metal ions are not normally regarded as radicals. Depending on the nature of the core atom that possesses an unpaired electron, the radicals can be described as carbon-, oxygen-, nitrogen-, metal-centered radicals. Subclasses are *e.g. acyl, acyloxyl, alkyl, alkylsulfanyl radicals, aminyl, aminoxyl, aryl, diazenyl, iminoxyl, iminyl, silyl.* See also *diradicals.*
2. In the past, the term 'radical' was used to designate a substituent group bound to a molecular entity, as opposed to 'free radical,' which nowadays is called simply 'radical'. The bound entities may be called groups or substituents, but should no longer be called radicals.

radical anions: See *radical ions.*

radical cations: See *radical ions.*

radical ions:

Species with an odd number of valence electrons and a positive or negative charge, called, respectively, radical cations, $R^{\bullet+}$, and radical anions, $R^{\bullet-}$. Commonly, but not necessarily, the odd electron and the charge are associated with the same atom. See also *ketyls.*

E.g. $R_2\ddot{O}^{\bullet+}$ $R_3N^{\bullet+}$ $[CH_4]^{\bullet+}$; $RN^{\bullet}\text{-}O^{-} \leftrightarrow RN^{-}\text{-}O^{\bullet}$ $RN(O^{\bullet})(O^{-})$
radical cations radical anions

Note: In mass spectroscopic usage the symbol for the charge precedes the dot representing the unpaired electron. GTPOC (radical ion). In the electrochemical tradition dot and sign are arranged vertically *e.g.* $\overset{\bullet}{R}^{+}$ or $\overset{+}{R}^{\bullet}$.

radical pairs:

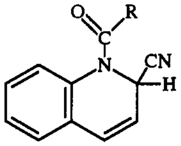
Two radicals in close proximity in the solid or gas phase or, when in solution, within a common solvent cage.

reductones:

Compounds containing an enediol structure stabilized by conjugation and hydrogen bonding with an adjacent carbonyl group, RC(OH)=C(OH)C(=O)R. They are strong reducing agents, fairly strong acids and commonly derived from *saccharides* by oxidation at the carbon atom alpha to the carbonyl function. *E.g.* ascorbic acid.

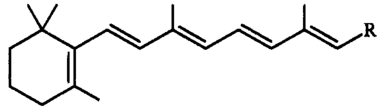
Reissert compounds:

Compounds formed by formal addition of an acyl group and a cyano group to a nitrogen atom and carbon atom, respectively, of a nitrogen-carbon bond in quinolines, isoquinolines, and related nitrogen heterocycles. *E.g.*



retinoids:*

Oxygenated derivatives of 3,7-dimethyl-1-(2,6,6-trimethylcyclohex-1-enyl)nona-1,3,5,7-tetraene as shown and derivatives thereof. BNRD, Nomenclature of Retinoids, Rule Ret-1 (p. 247). See also *carotenoids*, *retro.*



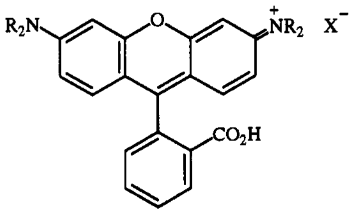
R = $-CH_2OR'$, $-C(=O)H$, $-CH_2OH$, $-C(=O)OH$

retro:*

1. A prefix which indicates a shift by one position of all single and double bonds in a conjugated polyene system. GNOC Recom. R-1.2.7.2. It has been applied only to *carotenoids* (BNRD Rule Carotenoid-9, p. 229) and *retinoids* (BNRD, Rule Ret. 4.7, p.249). *E.g. retro*-carotenoids, *retro*-retinoids.
2. A prefix which indicates the reverse sequence of a *peptide*. BNRD, Nomenclature and symbolism for amino acids and peptides. Rule 3AA-22.7 (p. 64).

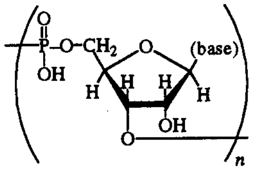
rhodamine dyes:

Dyes derived from condensation of phthalic anhydride with *m*-dialkylaminophenols. *Cf. xanthenes.*



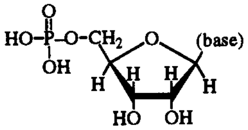
ribonucleic acids (RNA):

Naturally occurring polyribonucleotides. See also *nucleic acids, nucleosides, nucleotides, ribonucleotides.* BNRD Rule N-1.3 (p. 110).



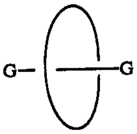
ribonucleotides:*

Nucleotides in which the *glycosyl group* is a ribosyl group. BNRD Rule N-1.1 (p. 109). See also *nucleotides.*



rotaxanes:

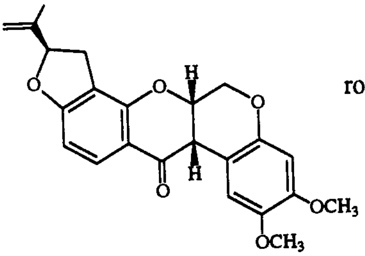
Molecules in which a ring encloses another, rod-like molecule having end groups too large to pass through the ring opening, and thus holds the rod-like molecule in position without covalent bonding. *Cf. catenanes.*



G = end groups

rotenoids:

Naturally occurring substances containing a *cis*-fused tetrahydrochromeno[3,4-*b*]chromene nucleus. Many rotenoids contain an additional ring. *E.g.*



rotenone

saccharides:

The *monosaccharides* and di-, *oligo-*, and *polysaccharides*, which are made up of *n* monosaccharide units linked to each other by a glycosidic bond. Considered by some to be synonymous with *carbohydrates.*

sandwich compounds:

Compounds in which a metal atom is located between the faces of two parallel and planar (or nearly so) ring structures. See also *metallocenes. E.g.* bis(η^5-cyclopentadienyl)iron (ferrocene), dibenzenechromium.

Schiff bases, Schiff's bases:*

Imines bearing a *hydrocarbyl* group on the nitrogen atom: $R_2C{=}NR'$ ($R' \neq H$). NOC Rule C-815.3. Considered by many to be synonymous with azomethines. See also *azomethines.*

selenenic acids:*

Compounds having the structure RSeOH ($R \neq H$). NOC Rule C-701. *E.g.* ArSeOH, areneselenenic acids.

selenides:*

1. Compounds having the structure RSeR ($R \neq H$). They are thus selenium analogues of *ethers.* NOC Rule C-701.1.
2. Metal salts of selane, H_2Se.

seleninic acids:*

Compounds having the structure RSe(=O)OH. NOC Rule C-701.

selenocyanates:*

Salts and *esters* of selenocyanic acid, HSeCN. NOC Rule C-833.1. *E.g.* CH_3CH_2SeCN ethyl selenocyanate.

selenols:*

Compounds having the structure RSeH ($R \neq H$). NOC Rule C-701.

selenones:*

Compounds having the structure $R_2Se(=O)_2$. NOC Rule C-701.

selenonic acids:*

Compounds having the structure $RSe(=O)_2OH$. NOC Rule C-701.

selenoxides:*

Compounds having the structure $R_2Se=O$ ($R \neq H$). NOC Rule C-701.

selones:*

Compounds having the structure $R_2C=Se$ ($R \neq H$). They are thus selenium analogues of *ketones*. NOC Rule C-701.

semicarbazones:*

Compounds having the structure $R_2C=NNHC(=O)NH_2$, formally derived by condensation of *aldehydes* or *ketones* with semicarbazide $[NH_2NHC(=O)NH_2]$. NOC Rule C-982.

semioxamazones:

Compounds having the structure $R_2C=NNHC(=O)C(=O)NH_2$, formally derived from the condensation of *aldehydes* or *ketones* with semioxamazide (the *hydrazide* of oxamic acid), $H_2NNHC(=O)C(=O)NH_2$.

semiquinones:

Radical anions having the structure $^-O\text{-}Z\text{-}O^\bullet$ where Z is an ortho- or para-*arylene group* or analogous heteroarylene group; they are formally generated by the addition of an electron to a *quinone*.

sesquiterpenoids:

Terpenoids having a C_{15} skeleton.

sesterterpenoids:

Terpenoids having a C_{25} skeleton. Sometimes erroneously referred to as sesterpenoids.

silanes:*

Saturated silicon hydrides, analogues of the *alkanes*; *i.e.* compounds of the general formula Si_nH_{2n+2}. NOC Rule D-6.11. Silanes may be subdivided into silane, oligosilanes and polysilanes. Note: *hydrocarbyl* derivatives and other derivatives are often referred to loosely as silanes.

silanols:

1. In a strict sense, hydroxy derivatives of *silanes*: $Si_nH_{2n+1}OH$.
2. A name commonly applied to Si-*hydrocarbyl* derivatives, R_3SiOH, of silanol, H_3SiOH.

silasesquiazanes:*

Compounds in which every silicon atom is linked to three nitrogen atoms and every nitrogen atom is linked to two silicon atoms, thus consisting of SiH and NH units, and having the general formula $(SiH)_{2n}(NH)_{3n}$. NOC Rule D-6.61. By extension *hydrocarbyl* derivatives are commonly included.

silasesquioxanes:*

Compounds in which every silicon atom is linked to three oxygen atoms and every oxygen atom is linked to two silicon atoms, and having the general formula $(SiH)_{2n}O_{3n}$. NOC Rule D-6.61. By extension *hydrocarbyl* derivatives are commonly included.

silasesquithianes:*

Compounds in which every silicon atom is linked to three sulfur atoms and every sulfur atom is linked to two silicon atoms, and having the general formula $(SiH)_{2n}S_{3n}$. NOC Rule D-6.61. By extension *hydrocarbyl* derivatives are commonly included.

silathianes:*

Compounds having the structure $H_3Si[SSiH_2]_nSSiH_3$ and branched-chain analogues. They are analogous in structure to *siloxanes* with -S- replacing -O-. NOC Rule D-6.31. By extension *hydrocarbyl* derivatives are commonly included.

silazanes:*

Saturated silicon-nitrogen hydrides, having straight or branched chains. They are analogous in structure to *siloxanes* with -NH- replacing -O-. NOC Rule D-6.41. *E.g.* $H_3SiNHSiH_2NHSiH_3$ trisilazane. By extension *hydrocarbyl* derivatives are commonly included.

silicones:

Polymeric or oligomeric *siloxanes*, usually considered unbranched, of general formula $[\text{-OSiR}_2\text{-}]_n$ ($R \neq H$).

siloxanes:*

Saturated silicon-oxygen hydrides with unbranched or branched chains of alternating silicon and oxygen atoms (each silicon atom is separated from its nearest silicon neighbours by single oxygen atoms). The general structure of unbranched siloxanes is $H_3Si[OSiH_2]_n\,OSiH_3$. See also *silicones*. NOC Rule D-6.21. $H_3Si[OSiH_2]_n\,OSiH[OSiH_2OSiH_3]_2$ is an example of a branched siloxane. By extension *hydrocarbyl* derivatives are commonly included.

silyl groups:

1. In a strict sense, the silyl group is H_3Si- . NOC Rule D-6.12.
2. A name commonly applied to *hydrocarbyl* derivatives of the silyl group: R_3Si-.

silyl radicals:

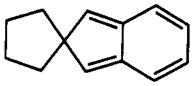
1. In a strict sense, the silyl radical is $H_3Si^{\bullet}$. NOC Rule D-5.81.
2. A name commonly applied to the silicon-centered *radicals*: $R_3Si^{\bullet}$.

silylenes:*

Carbene analogues having the structure R_2Si:. RNRI Rule RC-81.1.3.1.

spiro compounds:

Compounds having one atom (usually a quaternary carbon) as the only common member of two rings. NOC Rule A-41. *E.g.*



spiro[cyclopentane-1,2'-indene],

spiro[4.4]nonane

stannoxanes:

Compounds having the structure $H_3Sn[OSnH_2]_n\,OSnH_3$. Thus tin analogues of *siloxanes*.

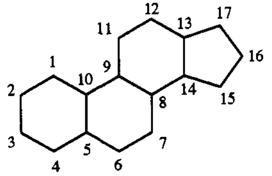
stannylenes: See *stannylidenes*.

stannylidenes:*

Carbene analogues having the structure R_2Sn: . The older synonymous term stannylenes is no longer recommended. RNRI Rule RC-81.1.3.2.

steroids:*

Naturally occurring compounds and synthetic analogues, based on the cyclopenta[*a*]phenanthrene carbon skeleton, partially or completely hydrogenated; there are usually methyl groups at C-10 and C-13, and often an *alkyl group* at C-17. By extension, one or more bond scissions, ring expansions and/or ring contractions of the skeleton may have occurred. BNRD, Rule 3S-1.0 (p. 193). Natural steroids are derived biogenetically from *triterpenoids.*



sterols:*

Natural products derived from the *steroid* skeleton and containing a hydroxy group in the 3 position, closely related to cholestan-3-ol. BNRD, Rule 3S-1.0 (p. 193).

stibanes:*

The saturated hydrides of tervalent antimony, having the general formula Sb_nH_{n+2}. GNOC Recom. R-2.1, R-2.2. *Hydrocarbyl* derivatives of SbH_3 belong to the class *stibines.*

stibanylidenes:*

Recommended name for *carbene analogues* having the structure RSb: (former IUPAC name is stibinediyls). A common non-IUPAC synonym is stibinidenes. RNRI Rule RC–81.1.3.2.

stibines:*

SbH_3 and compounds derived from it by substituting one, two or three hydrogen atoms by *hydrocarbyl groups*: R_3Sb. $RSbH_2$, R_2SbH and R_3Sb ($R \neq H$) are called primary, secondary and tertiary stibines, respectively. NOC Rule D-5.11. A specific stibine is preferably named as a substituted stibane. GNOC Recom. R-5.1.3.2. *E.g.* $(CH_2{=}CH)_3Sb$ trivinylstibane. *Cf. stibanes.*

stibinidenes: See *stibanylidenes.*

stibonium compounds:*

Salts (including hydroxides) containing an atom of tetracoordinate antimony, of the form $[R_4Sb]^+X^-$. NOC Rule D-5.31. See under *onium compounds.*

styphnates:*

Salts or *charge-transfer complexes* of styphnic acid (2,4,6-trinitrobenzene-1,3-diol). NOC Rule C-816.5. *Cf. picrates.*

sugars:

A loose term applied to *monosaccharides* and lower *oligosaccharides.* 2-Carb-1.1.

sulfamic acids:*

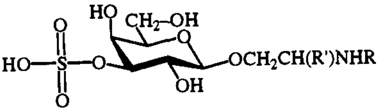
$H_2NS({=}O)_2OH$ (sulfamic acid) and its N-*hydrocarbyl* derivatives. NOC Rule C-661.2. Sulfamic acid is called sulfamidic acid in inorganic chemistry.

sulfanes:

A term including *hydropolysulfides, polysulfanes, polysulfides.* Use is discouraged because of confusion with the newer systematic name sulfane, H_2S, and the numerous names derived therefrom.

sulfatides:

Hydrogen sulfate *esters* of glycosphingolipids. Specific compounds should be named as glycerosphingolipid derivatives. BNRD Rule Lip-3.3 and Lip-3.11 (p. 187). *E.g.*



R = fatty acid acyl group or H
$R' = CH_3[CH_2]_{14}CH(OH)$-

sulfenamides:*

Compounds derived from *sulfenic acids*, RSOH (R $\neq$ H), by replacement of -OH by -NR_2. NOC Rule C-641.8. May alternatively be considered as alkylsulfanylamines. *E.g.* $C_2H_5SNH_2$ ethanesulfenamide or ethylsulfanylamine.

sulfenes:

S,S-Dioxides of *thioaldehydes* and *thioketones*, $R_2C{=}SO_2$.

sulfenic acids:*

Compounds having the structure RSOH (R $\neq$ H). NOC Rule C-521.1. *E.g.* PhSOH benzenesulfenic acid.

sulfenium ions:

A term sometimes erroneously used for *sulfenylium ions.*

sulfenyl groups:*

Groups having the structure RS- (R $\neq$ H). This term is derived from *sulfenic acids*. NOC Rule C-641.7.The synonymous term hydrocarbylsulfanyl groups is derived from sulfane, H_2S. GNOC Recom. R-5.5.2. *E.g.* CH_3-S- methanesulfenyl, methylthio or methylsulfanyl. NOC Rule C-641.6.

sulfenyl nitrenes: See *hydrocarbylsulfanyl nitrenes.*

sulfenyl radicals:*

Sulfur-centered radicals having the structure $RS^{\bullet}$ (R $\neq$ H). This term is derived from *sulfenic acids*. The synonymous term hydrocarbylsulfanyl radicals is derived from sulfane, H_2S. NOC Rule C-81.1. GNOC Recom. R-5.8.1.3. RNRI Rule RC-81.2.5. E.g. $CH_3S^{\bullet}$ methylsulfanyl or methanesulfenyl radical. An older name is alkylthio radical. NOC Rule C-81.1.

sulfenylium ions:*

Cations having the structure RS^+ (R $\neq$ H). This term is derived from *sulfenic acids*. The synonymous term hydrocarbylsulfanylium ions is derived from sulfane, H_2S. NOC Rule C-83.1. GNOC Recom. R-5.8.2. RNRI Rule RC-82.2.3.4. *E.g.* CH_3S^+ methylsulfanylium or methanesulfenylium ion.

sulfides:*

1. Compounds having the structure RSR (R $\neq$ H). Such compounds were once called thioethers. NOC Rule C-514.1. See also *thioacetals*.
2. In an inorganic sense, salts or other derivatives of hydrogen sulfide.
3. A term used in additive nomenclature, see *imides* (2).

sulfilimines: See *sulfimides* (1).

sulfimides:*

1. $H_2S{=}NH$, sulfimide, and its *hydrocarbyl* derivatives. NOC Rule C-633.1. (Indexed by *Chemical Abstracts Service* under the heading sulfilimine.) They are thus related to *sulfoxides* in the same way that imines are related to *aldehydes* or *ketones*. *E.g.* $(C_2H_5)_2S{=}NPh$ *S,S*-diethyl-*N*-phenylsulfimide.
2. A term used in *Chemical Abstracts Service* Index Nomenclature for *sulfonylamines*, $RN{=}S({=}O)_2$.

sulfimines: A non-recommended synonym for *sulfimides* (1).

sulfinamides:*

Amides of *sulfinic acids*, RS(=O)OH; thus $RS({=}O)NR_2$. NOC Rule C-641.8. See also *amides*. *E.g.* $PhS({=}O)NHCH_3$ *N*-methylbenzenesulfinamide.

sulfinamidines:*

Amidines of *sulfinic acids*, RS(=O)OH; thus $RS({=}NR)NR_2$. NOC Rule C-641.9. *E.g.* $PhS({=}NH)NH_2$ benzenesulfinamidine.

sulfines:

S-Oxides of *thioaldehydes* and *thioketones*. Not recommended because in English the -ine termination should be reserved for *amines*, *imines*, *etc*. *E.g.* PhC(=S=O)H thiobenzaldehyde *S*-oxide.

sulfinic acids:*

HS(=O)OH, sulfinic acid, and its *S*-hydrocarbyl derivatives. NOC Rule C-641. *E.g.* $(CH_3)_2CHS(=O)OH$ propane-2-sulfinic acid.

sulfinic anhydrides:*

Compounds having the structure RS(=O)OS(=O)R. See also *acid anhydrides*. NOC Rule C-643.1.

sulfinimines: An obsolescent term for *sulfimides* (1).

sulfinylamines:*

Compounds having the structure RN=S=O. NOC Rule C-661.5. Formerly called thionylamines.

sulfolipids:

Sulfate esters of *glycolipids*. See also *sulfatides*.

sulfonamides:*

Amides of *sulfonic acids*: $RS(=O)_2NR'_2$. NOC Rule C-821.1. *E.g.* $PhS(=O)_2NHCH_3$ *N*-methylbenzenesulfonamide.

sulfonamidines:

A term abandoned because of its ambiguous use to mean either $RS(=O)(=NH)NH_2$ (sulfonimidamide) or $RS(=NH)_2NH_2$ (sulfonodiimidamide). NOC Rule C-641.9 note.

sulfones:*

Compounds having the structure, $RS(=O)_2R$ ($R \neq H$). NOC Rule C-631.1. GNOC Recom. R-5.5.7. *E.g.* $C_2H_5S(=O)_2CH_3$ ethyl methyl sulfone.

sulfonediimines:

Compounds having the structure, $RS(=NR)_2R$, formally derived from *sulfones* by replacing $(=O)_2$ by $(=NR)_2$. S. Oae and N. Furukawa, *Sulfilimines and Related Derivatives*, American Chemical Society, 1983, pp. 1-4. *E.g.* $Ph_2S(=NH)_2$ diphenyl sulfonediimine.

sulfonic acids:*

$HS(=O)_2OH$, sulfonic acid, and its *S-hydrocarbyl* derivatives. NOC Rule C-641.

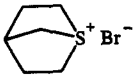
sulfonic anhydrides:*

Compounds having the structure $RS(=O)_2OS(=O)_2R'$. See also *acid anhydrides*. NOC rule C-643.1. *E.g.* $PhS(=O)_2OS(=O)_2Ph$ benzenesulfonic anhydride.

sulfonimides: A seldom used synonym of *sulfoximides*; its use is discouraged.

sulfonium compounds:*

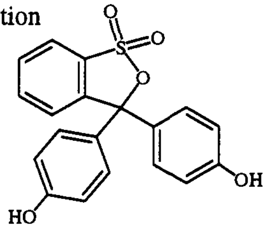
Compounds having the structure R_3S^+ and associated anion (generally, but not necessarily, all three R groups are *hydrocarbyl*). NOC Rule C-551.1. See under *onium compounds*. *E.g.* $[(CH_3)_3S]^+Cl^-$ trimethylsulfonium chloride,



1-thioniabicyclo[2.2.1]heptane bromide.

sulfonphthaleins:

3,3-Bis(hydroxyaryl)-3*H*-2,1-benzoxathiole *S*,*S*-dioxides, formed by condensation of o-sulfobenzoic acid with *phenols* or related compounds. *Cf. phthaleins*. *E.g.*



sulfonylamines:*

Compounds having the structure $RN{=}S({=}O)_2$. NOC Rule C-661.5. (Indexed by *Chemical Abstracts Service* at the heading *sulfimide*.) *E.g.* $CH_3N{=}S({=}O)_2$ *N*-sulfonylmethylamine.

sulfoxides:*

Compounds having the structure $R_2S{=}O$ ($R \neq H$). NOC Rule C-631.1. GNOC Recom. R-5.5.7. *E.g.* $Ph_2S{=}O$ diphenyl sulfoxide.

sulfoximides:*

Compounds having the structure $R_2S({=}O){=}NR$. NOC Rule C-633.1. (Indexed by *Chemical Abstracts Service* at the heading sulfoximines). *E.g.* $(CH_3)_2S({=}O){=}NPh$ *S*,*S*-dimethyl-*N*-phenylsulfoximide.

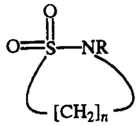
sulfoximines: See *sulfoximides*.

sulfur diimides:

The parent compound HN=S=NH and *hydrocarbyl* derivatives.

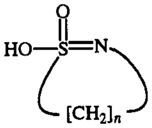
sultams:*

Sulfonamides in which the S-N bond is part of a ring. NOC Rule C-671.2.



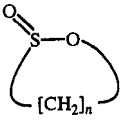
sultims:

Tautomeric forms of *sultams*, having a sulfur-nitrogen double bond as part of a ring.



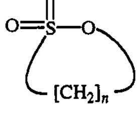
sultines:

Intramolecular cyclic esters of hydroxy sulfinic acids. (Named by supposed analogy with *lactones* and *sultones*; but the -ine ending is unfortunate.) *Cf. sulfinic acids*.



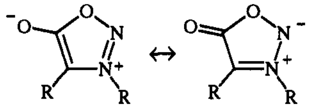
sultones:*

Intramolecular cyclic esters of hydroxy sulfonic acids, analogous to *lactones*. NOC Rule C-671.1. *Cf. sulfonic acids*.



sydnones:

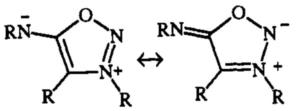
Mesoionic compounds having the 1,2,3-oxadiazole skeleton bearing an oxygen atom attached to the 5 position:



(These structures represent only two canonical forms.)

sydnone imines:

Imines of *sydnones* (i.e. having an imino group in place of the exocyclic oxygen atom).



(These structures represent only two canonical forms.)

tellurides:*

1. Compounds having the structure RTeR (R ≠ H). Thus tellurium analogues of *ethers*. NOC Rule C-701.2.
2. Metal salts of tellurane, H_2Te.

tellurones:

Compounds having the structure $R_2Te(=O)_2$. Thus tellurium analogues of *sulfones*. NOC Rule C-701.2.

terpenes:

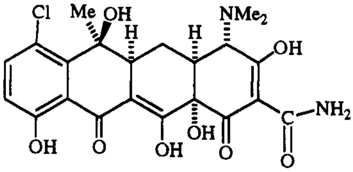
Hydrocarbons of biological origin having carbon skeletons formally derived from isoprene $[CH_2=C(CH_3)CH=CH_2]$. This class is subdivided into the C_5 hemiterpenes, C_{10} monoterpenes, C_{15} sesquiterpenes, C_{20} diterpenes, C_{25} sesterterpenes, C_{30} triterpenes, C_{40} tetraterpenes (carotenoids), and C_{5n} polyterpenes. See also *carotenes, carotenoids, isoprenoids, prenols, retinoids, steroids, terpenoids.*

terpenoids:

Natural products and related compounds formally derived from isoprene units (see *isoprenoids*). They contain oxygen in various functional groups. This class is subdivided according to the number of carbon atoms in the same manner as are terpenes. The skeleton of terpenoids may differ from strict additivity of isoprene units by the loss or shift of a fragment, generally a methyl group. BNRD, Prenol Nomenclature, Rule Pr-10 (p. 255)

tetracyclines:

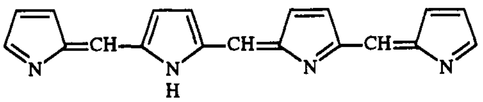
A subclass of *polyketides* having an octahydrotetracene-2-carboxamide skeleton, substituted with many hydroxy and other groups. *E.g.*



chlortetracycline

tetrapyrroles:

Natural pigments containing four pyrrole rings joined by one-carbon units linking position 2 of one pyrrole ring to position 5 of the next. *Porphyrins* are macrocyclic tetrapyrroles. BNRD, Nomenclature of tetrapyrroles, introduction (p. 279). *E.g.*



bilin (a linear tetrapyrrole)

tetraterpenoids:

Terpenoids having a C_{40} skeleton. See also *carotenes, carotenoids, xanthophylls.*

thiazynes: See *alkylsulfanyl nitrenes.*

thio:

This prefix properly denotes replacement of an oxygen by a sulfur. NOC Rule C-502. *E.g.* $PhC(=S)NH_2$, thiobenzamide. *Cf.* entries *thioacetals* to *thioketones.*

thioacetals:*

A term including monothioacetals having the structure $R_2C(OR')(SR')$ (subclass monothioketals, R ≠ H); and dithioacetals having the structure $R_2C(SR')_2$ (subclass dithioketals, R ≠ H, R' ≠ H). NOC Rule C-533.1. GNOC Recom. R-5.6.4.1. See also *thiohemiacetals.*

thioaldehydes:*

Compounds in which the oxygen of an *aldehyde* has been replaced by divalent sulfur, RC(=S)H. NOC Rule C-531. *E.g.* $CH_3CH_2C(=S)H$ propanethial.

thioaldehyde *S*-oxides:

Compounds having the structure RC(=S=O)H. NOC Rule C-633.2. (Also known by the disapproved term *sulfines* which includes thioaldehyde *S*-oxides and thioketone *S*-oxides).

thioanhydrides:*

Compounds having the structure acyl-S-acyl. NOC Rules C-543.5, C-643.2. Also called diacylsulfanes. GNOC Recom. R-5.7.7.3. *E.g.* $CH_3C(=O)SC(=S)CH_2CH_3$ acetic thiopropanoic thioanhydride. See *acyl groups.*

thiocarboxylic acids:*

Compounds in which one or both oxygens of a carboxy group have been replaced by divalent sulfur: RC(=O)SH or RC(=S)OH monothiocarboxylic acids, RC(=S)SH dithiocarboxylic acids. NOC Rule C-541.1.

thiocyanates:*

Salts and esters of thiocyanic acid HSC≡N. See *isothiocyanates.* NOC Rule C-833.1. *E.g.* $CH_3SC{\equiv}N$ methyl thiocyanate.

thioethers: Former name for *sulfides* RSR ($R \neq H$). NOC Rule C-514.1, footnote.

thiohemiacetals:*

Compounds of structure $R_2C(SR')OH$ or $R_2C(OR')SH$ (monothiohemiacetals), or $R_2C(SR')SH$ (dithiohemiacetals), $R' \neq H$. NOC Rule C-533.2.

thioketones:*

Compounds in which the oxygen of a *ketone* has been replaced by divalent sulfur: $R_2C{=}S$ ($R \neq H$). NOC Rule C-532.2. *E.g.* $CH_3C(=S)CH_2CH_3$ butane-2-thione.

thioketone *S*-oxides:

Compounds having the structure $R_2C{=}S{=}O$ ($R \neq H$). NOC Rule C-633.2. (Also known by the disapproved term *sulfines* which comprises thioaldehyde *S*-oxides and thioketone *S*-oxides.)

thiols:*

Compounds having the structure RSH ($R \neq H$). Also known by the term *mercaptans* (abandoned by IUPAC). NOC Rule C-511.2. *E.g.* $MeCH_2SH$ ethanethiol.

thiolates:*

Derivatives of *thiols*, in which a metal (or other cation) replaces the hydrogen attached to sulfur. NOC Rules C-511.3, C-511.4. *E.g.* $CH_3S^- Na^+$ sodium methanethiolate.

thionylamines: See *sulfinylamines.*

thiyl radicals:

Synonymous with *sulfenyl radicals.* Due to inconsistencies in use the term is not recommended. RNRI Rule RC-81.2.5.

triazanes:*

Triazane, NH_2NHNH_2, and its *hydrocarbyl* derivatives. NOC Rule C-942.

triazenes:*

Triazene, $NH_2N{=}NH$, and its *hydrocarbyl* derivatives. See also *diazoamino compounds.* NOC Rule C-942.1.

trimethylenemethanes:

The *diradical* $CH_2{=}C(\dot{C}H_2)_2$, 2-methylenepropane-1,3-diyl, for which no Kekulé structure can be written, and its *hydrocarbyl* derivatives. J. A. Berson, *Acc. Chem. Res.* **11**, 446-453 (1978).

trioxides:

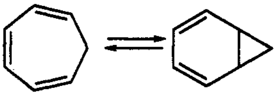
Organic derivatives of trioxidane, HOOOH, *e.g.* ROOOR'. When R' = H, the compound is a hydrotrioxide.

triterpenoids:

Terpenoids having a C_{30} skeleton.

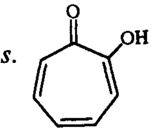
tropilidenes:

This term has inconsistently been used to mean cyclohepta-1,3,5-trienes or to mean cyclohepta-1,3,5-trienes in dynamic equilibrium with bicyclo[4.1.0]hepta-2,4-dienes, so that the structure of the bulk substance is indeterminate in the time scale of the method of observation. Use of this term is therefore discouraged.



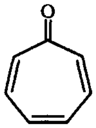
tropolones:

2-Hydroxycyclohepta-2,4,6-trienones and derivatives formed by substitution. *Cf. tropones.*



tropones:

Compounds that contain the cyclohepta-2,4,6-trienone ring system.



tropyl radicals:

The delocalized radicals derived formally by abstraction of one hydrogen from the CH_2 group of cyclohepta-1,3,5-triene and substitution derivatives thereof.

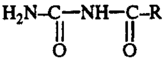
tropylium ions:

The delocalized *carbenium ion*, cycloheptatrienylium, $C_7H_7^+$, derived formally by detachment of one hydride ion from the CH_2 group of cyclohepta-1,3,5-triene and substitution derivatives thereof.

ulosonic acids: See *ketoaldonic acids.*

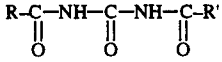
ureides:*

N-Acyl or *N,N'*-diacyl ureas. NOC Rule C-971.2.



$H_2N{-}\underset{\underset{O}{\|}}{C}{-}NH{-}\underset{\underset{O}{\|}}{C}{-}R$

or



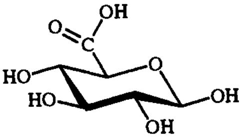
$R{-}\underset{\underset{O}{\|}}{C}{-}NH{-}\underset{\underset{O}{\|}}{C}{-}NH{-}\underset{\underset{O}{\|}}{C}{-}R'$

urethanes (urethans):

An alternative term for the compounds $R_2NC(=O)OR'$ ($R' \neq H$), *esters* of carbamic acids, $R_2NC(=O)OH$, in strict use limited to the ethyl esters, but widely used in the general sense. *E.g.* 'polyurethane resins'. *Cf. carbamates*.

uronic acids:*

Monocarboxylic acids formally derived by oxidation to a carboxy group of the terminal $-CH_2OH$ group of *aldoses*. 2-Carb-1.11 (p. 188). *E.g.*



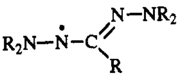
D-glucuronic acid

uronium salts:*

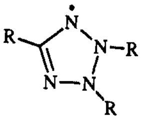
Salts of *O*-hydronated urea, having the structure $[HOC(=NH_2)NH_2]^+ X^-$ (and *O*- and *N*-hydrocarbyl derivatives). NOC Rule C-973.1.

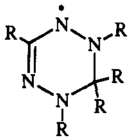
verdazyl radicals:

Relatively stable delocalized *radicals*, derived from hydrazyl, $H_2NN^{\bullet}H$, of the types shown, in particular the six-membered ring:



(R most commonly *aryl groups*.)





vinyl carbenes:

Carbenes having a *vinylic group* on a carbenic carbon atom: $R_2C{=}CR\ddot{C}R \leftrightarrow R_2C^+\text{-}CR{=}C^-R$. See under 1,3-*dipolar compounds*. *E.g.* $H_2C{=}CH\ddot{C}H$ prop-2-en-1-ylidene.

vinylic cations:

Carbocations having the structure $R_2C{=}C^+\text{-}R$.

vinylic groups:

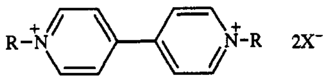
The vinyl group ($CH_2{=}CH$-) and derivatives formed by substitution. Informally, a group, such as -OH, attached to the free valence of a (substituted) vinyl group is sometimes referred to as 'vinylic'.

vinylidenes:

Carbenes in which the carbenic carbon atom has a double bond to another carbon atom: $R_2C{=}C{:}$. *E.g.* $H_2C{=}C{:}$ ethenylidene.

viologens:

1,1'-Di(hydrocarbyl)-4,4'-bipyridinium salts.



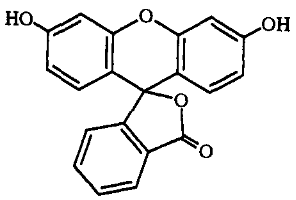
Wheland intermediates: See under *arenium ions*.

Wittig reagents: See *phosphonium ylides*.

xanthates: See *xanthic acids*.

xanthene dyes:

Dyes derived by condensation of phthalic anhydride with resorcinol (and derivatives) or *m*-aminophenol (and derivatives), of which fluorescein is the prototype (all such dyes have the xanthene nucleus). See also *phthaleins*, *rhodamine dyes*.



fluorescein

xanthic acids:

Compounds having the structure ROC(=S)SH. Thus *O*-esters of dithiocarbonic acid. Salts and *esters* of xanthic acid are xanthates. Use of this term is not recommended. NOC Rule C-544.1 footnote.

xanthophylls:

A subclass of *carotenoids* consisting of the oxygenated *carotenes*. BNRD Rule Carotenoid 1 (p. 226).

xylylenes: See under *quinomethanes*.

ylides:

Compounds in which an anionic site Y^- (originally on carbon, but now including other atoms) is attached directly to a heteroatom X^+ (usually nitrogen, phosphorus or sulfur) carrying a formal positive charge. NOC Rule D-5.42. They are thus 1,2-dipolar species of the type $R_mX^+\text{-}Y^-R_n$. If X is a saturated atom of an element from the first row of the periodic system, the ylide is commonly represented by a charge-separated form; if X is a second, third, *etc.* row element uncharged canonical forms are available: $R_mX{=}YR_n$. If X is an unsaturated atom, doubly bonded to another first row element Z, the negative charge on Y may be stabilised by π-conjugation, $Z{=}X^+\text{-}Y^-R_n \leftrightarrow Z^-\text{-}X^+{=}YR_n$. Such ylides belong to the class 1,3-*dipolar compounds*. However, 1,3-dipolar compounds with only sextet-containing canonical forms (*e.g. vinylcarbenes*) are not ylides. See also *betaines*, *dipolar compounds*. *E.g.* $Ph_3P^+\text{-}C^-H_2 \leftrightarrow Ph_3P{=}CH_2$ (often called a Wittig reagent), $(CH_3)_3N^+\text{-}C^-H_2$, $RC{\equiv}N^+N^-\text{-}R$, $(CH_3)_2S{=}CHPh \leftrightarrow (CH_3)_2S^+\text{-}C^-HPh$.

Note that ylide is a complete word, not to be confused with the suffix -ylide, used for some radical anions.

Subclasses of ylides. Ylides $R_mX^+\text{-}C^-R_2$ having the negative charge on carbon are classified by citing the name of the element X before the word ylide. *E.g. nitrogen ylide*, *phosphorus ylide*, *oxygen ylide*, *sulfur ylide*. A further specification may be achieved by citing the class name of R_mX before the word ylide. Thus nitrogen ylides include *amine ylides*, $R_3N^+\text{-}C^-R_2$, *azomethine ylides*, $R_2C{=}N^+R\text{–}C^-R_2$, *nitrile ylides*, $RC{\equiv}N^+\text{-}C^-R_2$. Some authors, who wish to express the positive charge on X, prefer *e.g. ammonium ylides* over amine ylides; such usage varies according to the heteroatom X and to national custom. The ylides $R_mX^+\text{-}Y^- \leftrightarrow R_mX{=}Y$ (Y = O, S, Se, Te, NR) are usually named by citing the name of R_mX followed by the additive nomenclature term for Y (oxide, sulfide, selenide, telluride, imide, respectively). NOC Rules C-0.3, D-5.41. *E.g. amine imides*; use of the less systematic synonyms amine imines and aminimines is discouraged. Some classes of ylides are known by trivial names *e.g. nitrones*, Wittig reagents (synonymous with *phosphonium ylides*)

ynamines:

N,N-Disubstituted alk-1-yn-1-amines, $RC{\equiv}CNR_2$. By usage, restricted to this type of acetylenic amine. *Cf. enamines*.

ynols:

Alk-1-yn-1-ols, $RC{\equiv}COH$; tautomeric with *ketenes*, $RCH{=}C{=}O$.

zwitterionic compounds/zwitterions:

Neutral compounds having formal unit electrical charges of opposite sign. Some chemists restrict the term to compounds with the charges on non-adjacent atoms. Sometimes referred to as inner salts, dipolar ions (a misnomer). See *betaines*, *dipolar compounds*, *ylides*. *E.g.* $H_3N^+CH_2C({=}O)O^-$ ammonioacetate (glycine), $(CH_3)_3N^+\text{-}O^-$ trimethylamine oxide.