Abstraction

Synonymous with removal

Acyl / Acyl group:

Acetyl/Acetyl group:
Acid Specie that can donate a proton (Bronsted-Lowry definition).
Specie that can accept a spare electron (Lewis definition).

Activation Group on ring that makes it easier to introduce a second substituent = activation

Alcohol R-OH

Aldehyde (doubly bonded O in middle of molecule = ketone)

Allyl Group

Aliphatic Definition 1: “Acyclic or cyclic, saturated or unsaturated carbon compounds, excluding aromatic compounds”
(In other words, NOT aromatic).
Definition 2 (not exactly equivalent!): “Organic molecules joined together in straight or branched chains”

Alkane Carbon with tetrahedral bonds (single, covalent) to other carbons, or to hydrogen. C-C bond length ~ 1.54A.
Distance between 2nd nearest C’s (along the spine of the alkane ~2.5A)

Alkene An alkene, olefin, or olefine is an unsaturated chemical compound containing at least one carbon to carbon double bond. C=C bond length ~ 1.33A

Alkyne A hydrocarbon containing at least one carbon to carbon triple bond. C≡C bond length ~ 1.2A

Alkyl group Alkane minus one hydrogen/proton (generally attached to something else)

Amide:
Amine group

Nitrogen with three bonds plus unbonded electron pair

\[
\begin{align*}
\text{Amine group} & \quad \text{Nitrogen with three bonds plus unbonded electron pair} \\
\text{Ammonia} & \quad \text{NH}_3 \\
\text{Ammonium ion} & \quad \text{NH}_4^+ \\
\text{-ane} & \quad \text{(suffix) an organic compound with a single bond between carbon atoms} \\
\text{Anode} & \quad \text{Electrode that attracts negative ions (anions) and/or repels positive ions (cations)} \\
\text{Aniline} & \quad \text{Phenyl ring with one NH}_2 \text{ side group:} \\
\text{Anion} & \quad \text{Negative ion} \\
\text{Anthracene} & \quad \text{“Monocyclic and polycyclic aromatic hydrocarbons” (synonymous with aromatic)} \\
\text{Arene} & \quad \text{“Monocyclic and polycyclic aromatic hydrocarbons” (synonymous with aromatic)} \\
\text{Aromatic} & \quad \text{Containing planar carbon rings with "conjugated" carbon bonds (single bonds alternating with double/triple bonds ("aliphatic" = opposite, no conjugated rings)} \\
\text{Aryl / Aryl Group} & \quad \text{Based on aromatic rings} \\
\text{Azide} & \quad \text{N}_3^- \\
\text{Azo Compound} & \quad \text{Containing N=N}
A solution that has an excess of hydroxide ions (OH-) in aqueous solution, removes hydrogen ions (protons) from an acid and combines with them in a chemical reaction.

Specie that can accept a proton (Bronsted-Lowry definition)

Specie that can donate a pair of electrons (Lewis definition)

Or, a base is a specie that can accept a proton – this requires that it have a lone pair of electrons

Benzene

(benzene minus one hydrogen/proton => "phenyl group")

Butyl

A molecule containing four carbon atoms (butane minus one hydrogen/proton)

C

Carbonyl group

Oxygen doubly bonded to carbon

Carboxyl group

Carbonyl group bonded on one side to hydroxyl group

Carboxylic acid

Cathode

Electrode that attracts positive ions (cations) and/or repels negative ions (anions)

Cation

Positive ion
Chiral molecule = one that cannot be superimposed on its mirror image, (e.g. it may have a left or right “handedness” as screw threads do)

Concerted reaction  Chemical reaction in which all bond breaking and bond making occurs in a single simultaneous step

Conjugation  C chain with alternation of single bonds with multiple bonds which through their ability to rapidly/continuously switch positions (delocalize) can make the carbon chain/ring electrically conductive

Diacyl peroxide  (used as a Si radical initiator in hydrosilylation)

DMSO  (CH₃)₂SO  Dimethylsulfoxide

Enantiomeric excess = (R-S)/(R+S) = excess of one enantiomer divided by concentration of both enantiomers
(In this context S = left handed (from Latin sinister), R = right handed. This R not to be confused with broader use of R in organic chemistry to denote any possible "appended organic molecule segment")

Molecule with carbon chain containing two triple bonds separated by a double bond
Ester

Ether

Ethyl / Ethyl group  A molecule containing two carbon atoms (ethane minus one hydrogen/proton)

eV  1 eV = 23.0627 kcal/mol

Exogenous  “Originating externally. In the context of metalloprotein ligands, exogenous describes ligands added from an external source, such as CO or O2.”

F

Facile substitution  Easy substitution

Ferrocene  or in terms of bonding:

Furan  Five member “unsaturated” ring with oxygen in one position

G

Grignard  Organometallic reagents prepared by deprotonating an organic compound using a strong base Nucleophile or by reaction of organic halides with alkaline metals
H
Hydroxyl group \(-(\text{OH})\)

Homolytic Cleavage
Breaking a bond such that each of the atoms gets one of the electrons

Homolysis
Same as Homolytic Cleavage, above

K
Ketone

\[
\begin{array}{c}
\text{R} \\
\text{O} \\
\text{R'}
\end{array}
\]
That is, molecule with central carbonyl group. (Doubly bonded O at END of molecule = aldehyde)

kilocalorie
1 kilocalorie $= 2.61144768 \times 10^{22}$ electron volts $= 4.184$ joule

kcal/mol
1 kcal/mol $= 0.04336$ eV (thus 1 eV $= 23.0627$ kcal/mol)

L
Labile
As in "kinetically labile": Constantly undergoing change or something that is likely to undergo change

Mercaptin
“A traditional term abandoned by IUPAC, synonymous with thiols.”

Methyl
A molecule containing one carbon atom

N
Napthalene

Nitrile group \(-(\text{C}≡\text{N})\)

Nucleophile
literally nucleus lover = a reagent forms a chemical bond to its reaction partner (the electrophile) by donating both bonding electrons
Nucleophilic: Nucleophile becomes attracted to a full or partial positive charge on an element and displaces the substitution group it is bonded to.

Nucleophilic Attack See Nucleophile

O
Oxidation Loss of electron
OCP Open circuit potential
Olefin An alkene, olefin, or olefine is an unsaturated chemical compound containing at least one carbon to carbon double bond

Oxygenated organics:

<table>
<thead>
<tr>
<th>Acetyl</th>
<th>Alcohol</th>
<th>Aldehyde</th>
<th>Acyl</th>
<th>Amide</th>
<th>Carbonyl</th>
<th>Carboxyl</th>
<th>Carboxylic Acid</th>
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<td>Ether</td>
<td>-(OH)</td>
<td>Ketone</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

PEDOT Polyethylene-dioxy-thiopene
PDMSO  
Polydimethylsulfoxide

Phenyl group  
(with added hydrogen => benzene ring)

Pi bond  
Sigma  
Pi
A valence bond formed by side-by-side overlap of p orbitals on two bonded atoms. In most multiple bonds, the first bond is a sigma bond and all of the others are pi bonds

Porphyrin  
Crazy ring with alternating N's and NH's on inside

Propyl/Propyl group  
A molecule containing three carbon atoms (propane minus one hydrogen/proton)

PSS  
Polystyrene Sulfonic Acid

Purine  
Five member pyrimidine conjugated ring (including two nitrogen’s) attached to four member imidazole conjugated ring (also including two nitrogen's), with different possible side groups. Here: adenine and guanine of DNA fame
Pyridine  Six site conjugated ring, 5 Carbons + 1 Nitrogen

Pyrrole  Five site conjugated ring, 4 Carbons + 1 Nitrogen

Pyrimidine  Five member conjugated ring (including two nitrogen’s) with different possible side groups. Here: cytosine and thymine of DNA fame

R  An appended organic molecule segment (~ “plus something else” or “plus X”)
R-  Opposite of chiral, i.e. containing equal population of alternate enantiomers
Radical  Having an unpaired electron (denoted: C·)
Reduction  Gain of an electron

S  Ionic compounds that can be formed by replacing one or more of the hydrogen ions of an acid with another positive ion.
Salt  Carbon chained together with single bonds (with other carbon bonds being to hydrogen atoms) = carbon chain loaded with maximum number of possible hydrogen atoms (i.e. “saturated”)
Saturated
**Sigma bond**

A sigma bond is a valence bond that is symmetrical around the imaginary line between the bonded atoms. Most single bonds are sigma bonds.

**Steric hindrance**

When a chemical reaction is hindered by unacceptable overlap of atoms, electron orbitals, or the formation of unfavorable bond lengths or angles (i.e. outcome of reaction is at least partially dictated by actual fit of atoms).

**Styrene**

![Styrene structure]

**TEMPO**

2,2,6,6-Tetramethylpiperidine 1-oxyl (organic radical on O site)

**Thiol / Thiol group**

-(S-H)

**Thiophene**

![Thiophene structure]

**Toluene**

![Toluene structure]

**THF**

Tetrahydrofuran – solvent used in rinsing off organic layers (completely hydrogen saturated version of furan)
Unsaturated  Opposite of saturated = carbon compound with less than maximum possible number of hydrogen’s implying some carbon atoms chained together with double or single bonds.

V

“vide infra” Latin for “see below”

“vide supra” Latin for “See earlier” or “look above this page”

Vinyl compound Containing a vinyl group: 

Y

-yne (suffix) an organic compound containing a triple bond between carbon atoms

Z

Zwitterion A chemical compound that is electrically neutral but carries formal positive and negative charges on different (generally separated) atoms

(*i.e. what a physicist would just call a polar molecule!*)