

GENERAL CHEMISTRY PRO-KNOWLEDGE

Nomenclature

Common Cations		
Charge	Formula	Name
1+	H ⁺	Hydrogen ion
	H ₃ O ⁺	Hydronium ion
	Alkali metal ⁺	Alkali metal ion
	NH ₄ ⁺	Ammonium ion
	Ag ⁺	Silver ion
	Cu ⁺	Copper(I) or cuprous ion
2+	Alkaline earth metal ²⁺	Alkaline earth metal ion
	Zn ²⁺	Zinc ion
	Co ²⁺	Cobalt(II) or cobaltous ion
	Cu ²⁺	Copper(II) or cupric ion
	Fe ²⁺	Iron(II) or ferrous ion
	Mn ²⁺	Manganese(II) or manganeseous ion
	Hg ₂ ²⁺	Mercury(I) or mercurous ion
	Hg ²⁺	Mercury(II) or mercuric ion
	Ni ²⁺	Nickel (II) or nickelous ion
	Pb ²⁺	Lead (II) or plumbous ion
3+	Sn ²⁺	Tin (II) or stannous ion
	Al ³⁺	Aluminum ion
	Cr ³⁺	Chromium(III) or chromic ion
3+	Fe ³⁺	Iron(III) or ferric ion

Common Anions		
Charge	Formula	Name
-1	H ⁻	Hydride ion
	F ⁻	Fluoride ion
	Cl ⁻	Chloride ion
	Br ⁻	Bromide ion
	I ⁻	Iodide ion
	CN ⁻	Cyanide ion
	OH ⁻	Hydroxide ion
	NO ₃ ⁻	Nitrate
	HCO ₃ ⁻	Hydrogen carbonate or bicarbonate ion
	HSO ₄ ⁻	Hydrogen sulfate ion
	ClO ₄ ⁻	Perchlorate ion
	ClO ₃ ⁻	Chlorate ion
	ClO ₂ ⁻	Chlorite ion
	ClO ⁻	Hypochlorite ion
	H ₂ PO ₄ ⁻	Dihydrogen phosphate ion
	C ₂ H ₃ O ₂ ⁻ (or CH ₃ COO ⁻)	Acetate ion
-2	O ²⁻	Oxide ion
	S ²⁻	Sulfide ion
	SO ₄ ²⁻	Sulfate ion
	CO ₃ ²⁻	Carbonate ion
	HPO ₄ ²⁻	Hydrogen phosphate
-3	PO ₄ ³⁻	Phosphate ion

Other Compounds	
Formula	Name
H ₂ O	Water
NH ₃	Ammonia
CH ₄	Methane (natural gas)
O ₃	Ozone
H ₂ O ₂	Hydrogen peroxide
H ₂ , N ₂ , O ₂ , F ₂ , Cl ₂ , Br ₂ , I ₂ , He, Ne, Ar	Diatomeric molecules
(N ₂ O ₅ , dinitrogen pentoxide)	All simple binary covalent compounds

Acids	
Formula	Name
HNO ₃	Nitric acid (strong)
H ₂ SO ₄	Sulfuric acid (strong)
HCl	Hydrochloric acid (strong)
HBr	Hydrobromic acid (strong)
HI	Hydroiodic acid (strong)
HClO ₄	Perchloric acid (strong)
HClO ₃	Chloric acid (strong)
H ₃ PO ₄	Phosphoric acid
H ₂ CO ₃	Carbonic acid
HC ₂ H ₃ O ₂ (or CH ₃ COOH)	Acetic acid

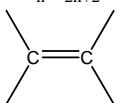
Bases	
Formula	
Group 1A metal hydroxides such as NaOH	Group 1A metal hydroxides (strong)
Group 2A heavy metal hydroxides such as Ca(OH) ₂	Group 2A metal hydroxides (strong)
NH ₃	Ammonia
NR ₃	Other amines
X ⁻	Conjugate bases of weak acids

Alkanes (C _n H _{2n+2})	
Formula	Name
CH ₄	Methane
C ₂ H ₆	Ethane
C ₃ H ₈	Propane
C ₄ H ₁₀	Butane
C ₅ H ₁₂	Pentane
C ₆ H ₁₄	Hexane
C ₇ H ₁₆	Heptane
C ₈ H ₁₈	Octane
C ₉ H ₂₀	Nonane
C ₁₀ H ₂₂	Decane

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Organic Functional Groups

Alkane



Alkene

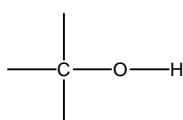
Alkyne



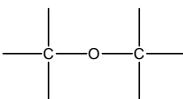
Aromatic



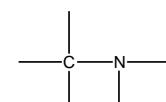
Alcohol



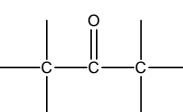
Ether



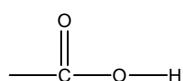
Amine



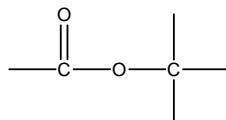
Ketone



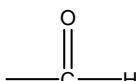
Carboxylic Acid



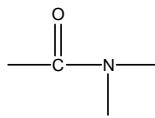
Ester



Aldehyde



Amide



A Few Solubility Rules

Solubility Guidelines for Ionic Compounds in Water

Soluble when containing: Exceptions:

Alkali metal ions (group 1A) None

NH_4^+ None

NO_3^- None

$\text{C}_2\text{H}_3\text{O}_2^-$ (or CH_3COO^-) None

Cl^- , Br^- , I^- Ag^+ , Hg_2^{2+} , Pb^{2+}

Insoluble when containing: Exceptions:

Ions with charges 2+/- or higher* See above

* There are many exceptions.

Activity Series

Activity (oxidation) Series

Al, Mg, Na, Ca, K, Li Most easily oxidized (most active)

Zn

Fe

Sn

$\text{H}_2(g)$

Cu

Au, Ag, Pt Least easily oxidized (least active)

Electrolytes and Dissociation

Electrolytic Behavior

	Strong Electrolyte	Weak Electrolyte	Non-electrolyte
Dissociation	Complete (\rightarrow)	Partial (=)	None
Soluble Ionic Compounds	All	None	None
Molecular Compounds	Strong Acids	Weak acids and bases	All Others