Nomenclature – Names and Formulas

Ionic Naming and Formulas

- Remember – Metals form positive ions called cations and non-metals form negative ions called anions.

- The term monatomic means one atom. Ex. – Ne, He, Li^+, Cl^-.

The term diatomic means two atoms. Ex. – O_2, IBr, ClO^-.

The term polyatomic means many atoms. Ex. – H_3PO_4, NO_3^-, NH_3, NO.

Rules for naming

1.)

2.)

Ex. – AgCl = silver chlorine = silver chloride Ex. 3 –

Ex. 2 – LiF = lithium fluorine = lithium fluoride Ex. 4 –

*** Watch out for metals with more than one combining capacity (charge) Fe^{+2} or Fe^{+3}. For these you must specify which combining capacity (charge) to use through the use of Roman numerals in the name.

Ex. - $FeCl_2$ → iron (II) chloride or $FeCl_3$ → iron (III) chloride

*** Watch out for **polyatomic ions**.***

Suffixes

- These species end in "ate" or "ite". The suffix "ate" tells you the chemical is oxygen mixed with the element that the first part of the name refers to. DO NOT CHANGE THE ENDING OF POLYATOMIC IONS TO "ide".

- The suffix "ite" tells you the chemical is again oxygen mixed with the element that the first part of the name refers to, however this species will contain LESS OXYGEN then the "ate" form.

Prefixes

- Some polyatomics start with "per". This prefix means "more" and tells you this polyatomic has more oxygen then the polyatomic with the same name but no "per" in front.

Ex. – Chlorate → ClO_3^- more oxygen = Perchlorate → ClO_4^-

Rules for Formulas

1.)

2.)

3.)

Ex. 1 – sodium chloride →

Ex. 2 - calcium oxide →

Ex. 3 - lithium hydroxide →

Ex. 4 - ammonium phosphide →

Ex. 5 - iron (II) iodide →

Ex. 6 - manganese (IV) oxide →

- Hydrates are an ionic crystal grown by evaporation from water, such that the crystal structure includes water molecules. Ex. – copper (II) sulphate pentahydrate → $CuSO_4 \cdot 5H_2O$

The prefixes needed to tell the reader how **MANY** water molecules are attached.

Table 1 – List of approved chemical prefixes.

	Prefix		**Prefix**
1	mono	6	hexa
2	di	7	hepta
3	tri	8	octa
4	tetra	9	nona
5	penta	10	deca

Ex. 2 – zinc acetate dehydrate → $Zn(CH_3COO)_2 \cdot 2H_2O$

Ex. 3 - calcium nitrate tetrahydrate →

Covalent Naming and Formulas

Rules for naming

1.)

2.)

Ex. 1 – PS = phosphorus sulphide

Ex. 2 – P_2S_3 = diphosphorus trisulphide

Ex. 3 – CO =

Ex. 4 – CO_2 =

Ex. 5 – Si_2I_6 =

Ex. 6 – N_2O_4 =

Acids Naming and Formulas

- The name of the acid is determined based on the name of the anion, specifically, based on the ending of the anion name. The three possibilities are listed here:

ANION NAME	ACID NAME
-ide	hydro- -ic acid
-ite	-ous acid
-ate	-ic acid

- You must know the following acids:

Formula	Name	Formula	Name	Formula	Name
HF	Hydrofluoric	H_2SO_4	Sulphuric	HNO_3	Nitric
HCl	Hydrochloric	H_2SO_3		HNO_2	
HBr		H_3PO_4		CH_3COOH	
HI		H_2CO_3			