Naming

Charges or Oxidation Numbers

- Group 1A → +1
- Group 2A → +2
- Group 3A → +3
- Group 4A → +4 / -4
- Group 5A → -3
- Group 6A → -2
- Group 7A → -1
- Group 8A → STABLE

- The charges of **monatomic ions**, or ions containing only one atom, can often be determined by referring to the periodic table

Ions

- _____ - atom or group of combined atoms that has a charge because of the loss or gain of electrons.
- _____ compounds usually start with a metal or ammonium
- In ionic compounds, you will _____ valence electrons

Ions

- _____ **-** positive ion
  - formed when an atom loses one or more electrons.
- _____ - negative ion
  - formed when an atom gains one or more electrons.
- _____ ion - one element with a charge
- _____ ion - more that one element with a charge

Formation of Ionic Compounds

- The strong attractive force between ions of opposite charge is called an _____
- The overall charge of the compound will be … _____

Examples of Formula Writing

- Write the formula for the compound formed between sodium and chloride
- Write the formula between Mg and Br
- Write the formula for the compound formed between Ca and S
- Write the formula for the compound formed between sodium and nitrate
- Write the formula between ammonium and sulfate

More examples

- Copper (II) and chlorine
- Silver and Nitrate
- Magnesium and sulfite
- Calcium and sulfur
- Potassium and oxygen
- Ammonium and phosphate
- Ammonium and chlorine

Don't Forget!

- You have to remember the elements that form multiple charges (the ones with the roman numerals)
- That roman numeral will tell you the charge!
- For example: Copper (II) → Cu^{+2}

Naming ionic compounds

- In naming ionic compounds, name the _____ first, then the _____ .
- _____ cations use the element name.
- Monatomic anions use the root of the element name plus _____ .
- If an element can have more than one oxidation number, use a _____
- For polyatomic ions, use the name of the ion.

Oxyanions

- Certain polyatomic ions, called _____ , contain oxygen and another element.
- If **two** different oxyanions can be formed by an element, the suffix -*ate* is used for the oxyanion containing more oxygen atoms, and the suffix -*ite* for the oxyanion containing fewer oxygens.

Oxyanions

- Four oxyanions can be formed by the halogens
- In this case:
- Most – Per (root) – ate
- 1 less – (root) – ate
- 1 less – root – ite
- 1 less – hypo (root) - ite

Examples

- NaCl
- $MgSO_4$
- K_3PO_4
- $Ca(ClO_3)_2$
- NH_4NO_2
- $Al(ClO)_3$
- $CuSO_3$
- $Fe(NO_3)_2$

More examples

- Lead (IV) Oxide
- Ammonium Permanganate
- Cobalt (II) chloride
- Calcium sulfide
- Lithium nitrate
- Sodium acetate
- Tin (II) chloride

Molecules

- _____ – two or more atoms covalently bound together
- _____– two of the same atom bound together

Diatomic Molecules

- Br I N Cl H O F or the Magnificent 7 (Super 7)
- These atoms never exist alone.
- They always come in pairs
- For example:
  - Br → Br_2
  - I → I_2
  - N → N_2
  - Cl → Cl_2
  - H → H_2
  - O → O_2
  - F → F_2

Binary Molecular Compounds

- Binary covalent compounds can be recognized by containing 2 _____

Prefixes

• Mono	• 1
• Di	• 2
• Tri	• 3
• Tetra	• 4
• Penta	• 5
• Hexa	• 6
• Hepta	• 7
• Octa	• 8
• Nona	• 9
• Deca	• 10

Rules for naming Binary Covalent Compounds

- Name the _____ for the number of atoms of the first element
- Then name the first element
- Name the _____ for the number of atoms of the second element
- Than name the root of the second element with the ending - _____

Note…

- No charges are used in Binary Covalent Compounds
- If the 1st prefix is mono….DROP IT!
- When the prefix ends in an o or a, and the name of the element begins with a vowel, the o or a is often dropped

Examples

- What is the name of N_2O_4?
- Name SO_2
- Write the formula for dichlorine monoxide
- Write the formula for disulfur dichloride

Acids

- Acids can be recognized because the start with H
- Examples
  - HCl
  - H_2SO_4
  - HI

Acids

- Acids are in aqueous solution (aq)
- For the purposes of this class, we will assume that if it begins with H, we will name it according to the rules of naming acids
- If the HX were to be in a gas form, it would be named hydrogen x-ide

Rule #1 - naming acids

- If the anion ends in *–ide*, the acid will be named…
- Hydro (root) – ic acid
- This is usually for H plus one element

For example

- HCl
- HI
- H_2S

Rule #2 – naming acids

- If you have an H plus an anion ending in –*ate*, the acid will be named…
- (root) – ic acid

Examples

- H_2SO_4
- HNO_3
- H_3PO_4

Rule # 3 – naming acids

- If you have an H plus an anion ending in –*ite*, the acid will be named…
- (root) – ous acid

Examples

- H_2SO_3
- HNO_2
- H_3PO_3

Writing formulas for acids

- When writing formulas for acids you MUST look at the charges and bring them down!

More examples

- H_2SO_3
- H_2CO_3
- HF
- Nitrous acid
- Perchloric acid
- Iodic acid
- Phosphorous acid

Hydrates

- _____ – a compound with a specific number of water molecules bound to it
- In a hydrate the formula of the compound is written first with a dot and the number of water molecules attached to it

Hydrates

- Examples:
  - $CaCl_2 \cdot 2H_2O$
  - $Na_2CO_3 \cdot 10\ H_2O$

Mixed examples

- $KClO_2$
- CO_2
- H_2SO_4
- NH_4Br
- $CuCO_3$
- Fe_2O_3
- $HClO$
- $CoCl_2 \cdot 6H_2O$

More Mixed Examples

- Carbon tetrachloride
- Phosphorous pentachloride
- Aluminum oxide
- Copper (II) nitrate
- Chlorous acid
- Hydrophosphoric acid
- Iron (III) hydroxide
- Cupric sulfate dihydrate