

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 than 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) \rightarrow 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
- MgSO₄
- K₃PO₄
- Ca(ClO₃)₂
- NH₄NO₂
- Al(ClO)₃
- CuSO₃
- Fe(NO₃)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 → Br₂
 - I → I₂
 - N → N₂
 - Cl → Cl₂
 - H → H₂
 - O → O₂
 - F → F₂

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
- Then 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 they start with H
- Examples
 - HCl
 - H₂SO₄
 - 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
- H₂S

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:
 - $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$
 - $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Mixed examples

- KClO_2
- CO_2
- H_2SO_4
- NH_4Br
- CuCO_3
- Fe_2O_3
- HClO
- $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$

More Mixed Examples

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