**Salt Lake Community College, Chemistry Department**

**Chem 1110 Workshop 5**

**Topic: Ionic compounds/ Acid and Bases Nomenclature**

***Objective:***

* Naming Monoatomic Ions
* Polyatomic Ions
* Naming Ionic Compounds
* H+ and OH– Ions: An Introduction to Acids and Bases

**Naming Monoatomic Ions:**

**Type 1- Positive Ions (cations):**

Cations formed from metal atoms have the same name as the metal: for example,

Na+ - sodium ion.

**Type 2- Positive Ions (transition metals):**

If one metal forms more than one cation, the charge is indicated by a Roman numeral in parentheses: Fe2+ - iron (II) ion

**Type 1- Negative Ions (anions):**

Monoatomic anions: by replacing the ending of the element’s name with the ending –ide. H- (H hydrogen) − hydride ion

Some **polyatomic anions** have names ending – ide:

OH- − hydroxide

CN- − cyanide

O22-− peroxide

**Type 2- Negative Ions (anions)**

Polyatomic anions containing oxygen: names ending in –ate or –ite.

–ate for most common oxyanion of an element

–ite for an oxyanion with the same charge but one O atom fewer

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| --- | --- |
| NO3- | Nitrate ion |
| NO2- | Nitrite ion |
| SO42- | Sulfate ion |
| SO32- | Sulfite ion |

**Negative Ions (anions):**

Polyatomic anions containing oxygen (when more than 2 anions are formed):

In addition to: names ending in –ate or –ite.

Prefixes: per– one more O atom

hypo– one O atom fewer

ClO4− - perchlorate ion (one more O atom than chlorate)

ClO3− - chlorate ion (most common)

ClO2− - chlorite ion (one O atom fewer than chlorate)

ClO− - hypochlorite ion (one O atom fewer than chlorite)

**H+ and OH– Ions: An Introduction to Acids and Bases:**

Acids: substances whose molecule yield hydrogen ions H+ when dissolved in water.

Bases: substances whose molecule yield hydrogen ions OH- when dissolved in water.

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| Acids |

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| **Acids formed from non-oxyanions**  Cl−, S 2− , Br−, I−, CN−); prefix: hydro, ending: −ic  HCl- Hydrochloric acid |  | **Acids formed from oxyanions**  NO3−, NO2−, CO32− , SO42−, SO32−  **Anion ending** **Acid ending**  −ate ending −ic ending:  −ite ending −ous |

**Practice Problems:**

1. Name the following:

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| --- | --- |
| **Ionic Compounds/ Acid/bases** | **Name** |
| Fe2O3 | Iron (III) oxide |
| Ag2S | Silver (I) sulfide |
| BaCl2 | Barium chloride |
| HBr | Hydrobromic acid |
| Mg(OH)2 | Magnesium hydroxide |
| CaCl2 | Calcium chloride |
| HClO | Hypochlorous acid |
| FeOH | Iron (I) hydroxide |
| Co3(PO4)2 | Cobalt (II) phosphate |
| HNO2 | Nitrous acid |
| Pb(NO3)4 | Lead (IV) nitrate |
| BaO | Barium oxide |
| LiBr | Lithium bromide |

1. Give the chemical formula of the following chemical names:

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| **Chemical name** | **Chemical formula** |
| Lead (II) perchlorate | Pb(ClO4)2 |
| Ammonium sulfate | (NH4)2SO4 |
| Perchloric acid | HClO4 |
| Calcium carbonate | CaCO3 |
| Aluminum oxide | Al2O3 |
| Zinc(II) sulfide | ZnS |
| Hydrochloric acid | HCl |
| Barium hydroxide | Ba(OH)2 |
| Sodium oxide | Na2O |
| Strontium hydroxide | Sr(OH)2 |
| Chloric acid | HClO3 |