***Ionic Compounds***

**Naming Ions**

Ions can either be a cation – those that have a positive charge or anion – those that have a negative charge.

The name of the positive ion is the same as the element name, for example: sodium forms sodium ions. The name of the negative ion is determined by adding **“ide”** to the stem of the name. For example, oxygen forms ***ox***ide ions and phosphorus forms ***phosph***ide ions.

**Making Ionic Compounds**

Metals tend to lose electrons making their ions positive.

Non-metals tend to gain electrons making their ions negative.

When a metal such as magnesium reacts with a non- metal such as oxygen, both processes occur. The non-metal atoms take electrons from the metal atoms. This happens because the atom has a weak hold on the electrons in the outer most orbit.

The attraction that holds oppositely charged ions together in a compound is called an **IONIC COMPOUND**. The resulting ions all have the same stable, filled outer electron arrangements as the nearest noble gas.

***Ionic Compounds*** – a compound made up of one or more positive metal ions (cations) and one or more negative non-metal ions (anions).

**Properties of Ionic Compounds**

Due to the strength of the ionic bond, ionic compounds are hard, brittle solids, with high melting points. Most ionic compounds are electrolytes, which means they separate into ions when dissolved in water, producing a solution that conducts electricity.

**Naming Ionic Compounds**

Many ionic compounds are made up of 2 elements: a metal and a non-metal.

The first part of the name refers to the metal ion in the compound and the second part to the non-metal ion.

**Examples of Naming Ionic Compounds**

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| --- | --- | --- | --- | --- |
| **Metal** | **Metal ion** | **Non-metal** | **Non-metal ion** | **compound** |
| Magnesium | Magnesium ion | Chlorine | Chloride ion | Magnesium chloride |
| Aluminum | Aluminum ion | Oxygen | Oxide ion | Aluminum oxide |
| Potassium |  | Fluorine |  |  |
| Calcium |  | Bromine |  |  |
| Beryllium |  | nitrogen |  |  |

**Names and Charges of Common Anions**

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| --- | --- | --- | --- |
| **Name of element** | **Name of ion** | **Ionic charge** | **Ion symbol** |
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When charged ions attract other ions of the opposite charge, they do so until the charges balance out. The compound that forms is electrically neutral. In other words, the total number of negative charges equals the total number of positive charges.

This basic idea helps us determine the chemical formulas of ionic compounds.

***Sample Problem 1***

What is the chemical formula of calcium chloride?

Step 1: Write the symbols of the elements, with the metal on the left and the non-metal on the right.

Step 2: Add the ionic charges of each ion above the symbol.

Step 3: Determine how many ions of each are required to bring the total charge to zero.

Step 4: Write the chemical formula using the coefficients in front of each bracket as subscripts.