**3.2 Names and Formulas of Ionic Componds** (p. 84–87)

**COMMON NAMES:** NaCl = table salt **CHEMICAL NAMES:** NaCl = sodium chloride

**Parts of an ionic compound:**

**NAMING IONIC COMPOUNDS WITH TWO ELEMENTS** : **Monovalent** metals that only have one possible
 ion charge combined with ONE non-metal element.

|  |  |
| --- | --- |
| STEPS | EXAMPLE: CaF2 |
| 1. Name the metal ion
 | Ca - calcium |
| 1. Name the non-metal ion, but change the end of the name to “ide”
 | F – fluorine changes to fluoride |
| 1. Put the names together so that the metal name is written first followed by the non-metal name (all lower case letters)
 | calcium fluoride |

**Metal Non-metal{-ide}**

 **1 2**

***See pg. 85 Table 3.1 for non-metal naming***

|  |  |  |  |
| --- | --- | --- | --- |
| **Chemical Formula** | **Elements**  | **Ion Ratio** | **Chemical Name** |
| Ca3N2 | Calcium and nitrogen | 3 Ca2+: 2 N3-  | calcium nitride |
| MgS | Magnesium and sulphur | 1 Mg 2+: 1 S2- | magnesium sulphide |
| AgF | Silver and fluorine | 1 Ag+ : 1 F- | Silver fluoride |

**DO pg. 86 Practice Problems (5 minutes)**

**WRITING FORMULAS FOR IONIC COMPOUNDS WITH TWO ELEMENTS**

We need to figure out the ratio of metal to non-metal ions to determine chemical formulas:

Eg. sodium chloride = **NaCl** (1 Na+ : 1 Cl-)

 calcium fluoride = **CaF2** (1 Ca2+ : 2 F-)

 aluminium oxide = **Al­2O3** (2 Al3+ : 3 O2-)

The **subscripts** indicate the number of ions of each element in the final compound.

|  |  |
| --- | --- |
| **Al­2O3**  | **2 = # of aluminum ions (**Al3+ ) **3 = # of oxygen ions (**O2-) |

Let’s look at the transfer of electrons between the valence shells of atoms to show WHY these ions exist in certain ratios

EX 1: Sodium and Chlorine

For sodium and chlorine to form a compound, the atoms must form ions! Each sodium atom \_\_\_\_\_\_\_\_\_\_\_ and each chlorine atom \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to become an ion. One sodium atom must transfer one electron to one chlorine atom for all the outer shells to be full.

EX 2 Calcium and Fluorine

For calcium and fluorine to form a compound, the atoms must form ions! Each calcium atom \_\_\_\_\_\_\_\_\_\_\_\_\_ and each fluorine atom \_\_\_\_\_\_\_\_\_\_\_\_\_ to become an ion. One calcium atom must transfer two electrons to two fluorine atoms for all the outer shells to be full.

EX 3 Aluminum and Oxygen

For aluminum and oxygen to form a compound, the atoms must form ions! Each aluminum atom \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and each oxygen atom \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to become an ion. Two aluminum atoms must transfer six electrons to three oxygen atoms for all the outer shells to be full.

|  |  |
| --- | --- |
| STEPS | EXAMPLE: zinc nitride |
| 1. Identify each ion and its charge
 | zinc: Zn2+nitride: N3- |
| 1. Determine the total charges needed to balance positive and negative ions
 | Zn2+: +2 +2 +2 = +6N3- : -3 -3 = -6 |
| 1. Note the ratio of positive to negative
 | 3 Zn2+ ions for every 2 N3- ions |
| 1. Use subscripts to write the formula.

A “1” is not shown in the subscript | Zn3N2 |

**CHARGE-BALANCING METHOD:** The total positive charge of the metal ions must be the same as the total negative charge of the non-metal ions. The number of each charge is the ratio of positive to negative ions.

Al3+ O2- 🡪 Al2O3 Zn2+ N3- 🡪 Zn3N2

*+3 +3 -2 -2 -2 🡪 shows # of each ion +2 +2 +2 -3 -3*

*+6 = -6 🡪 total # of + and # of - must be equal +6 = -6*

Al3+ Cl- 🡪 AlCl3 \*Do not write “1” as a subscript! Mg2+ O2- 🡪 MgO

*+3 -1 -1 -1 +2 -2*

*+3 -3*

**CRISS-CROSS METHOD:**

aluminum oxide 🡪Al3+ O2- 🡪

zinc nitride 🡪Zn2+ N3- 🡪

aluminum chloride 🡪Al3+ Cl- 🡪

magnesium oxide🡪 Mg2+ O2- 🡪

**DO pg. 87 Practice Problems**

**Worksheet**