

Chem11 Naming Compounds : Notes-10

Naming Ionic compounds - Ionic compounds are those composed of a metallic ion and a non-metallic ion. The metallic ions are always positive (cations). They lose electrons (usually to a non-metal). The most important exceptions are the ammonium ion, NH_4^+ , and the hydrogen ion, H^+ . The non-metallic ions are always negatively charged (anions). These ions include the polyatomic anions.

Example - $\text{Al}^{3+} + \text{O}^{2-} \rightarrow \text{Al}_2\text{O}_3$ aluminum oxide

Here, aluminum combines with oxygen. But aluminum oxide must be neutral so 2(3 plus) Al ions are required for every 3(2 minus) O ions. So we must **switch** the oxidation numbers. The second element ends in "ide".

Example - $\text{Cu}^{2+} + \text{Cl}^- \rightarrow \text{CuCl}_2$ copper (II) chloride

or $\text{Cu}^+ + \text{Cl}^- \rightarrow \text{CuCl}$ copper (I) chloride

Here, there are two copper chloride compounds because Cu has two oxidation numbers. The two compounds are distinguished by the Roman numerals (I) and (II) indicating the oxidation number of Cu.

Example - $\text{Na}^+ + \text{CO}_3^{2-} \rightarrow \text{Na}_2\text{CO}_3$ sodium carbonate

Example - $\text{Fe}^{2+} + \text{PO}_4^{3-} \rightarrow \text{Fe}_3(\text{PO}_4)_2$ iron (II) phosphate

The above method of naming ionic compounds is called the **Stock System**.

Important - Ionic compounds will dissociate in water into positive and negative ions. This means that solutions of ionic compounds form electrolytes and these solutions will conduct electricity.

Naming Covalent compounds - Covalent compounds are those that consist of a non-metal/non-metal combination. There is a different method for naming covalent compounds. This method depends on the Greek prefixes

1 - mono

2 - di

6 - hexa

7 - hepta

3 - tri	8 - octa
4 - tetra	9 - nona
5 - penta	10 - deca

Example - C + O -> CO carbon monoxide

The second element has "ide" at the end. A Greek prefix is put in front of each element. We do not put mono in front of the first element. The more metallic atom comes first.

Example - N + O -> N₂O₅ dinitrogen pentoxide

There are other nitrogen-oxygen compounds because there are several oxidation numbers for nitrogen.

Example - N + O -> NO₂ nitrogen dioxide.