

# Covalent Compounds : Notes/W.S.-90

In an ionic bond, electrons are transferred from one atom to another to form ions. These positive and negative ions attract one another to form the ionic bond. These compounds are called ionic compounds. They are composed of a metal and a non-metal. They will break-apart into ions in water and their solutions will conduct electricity.

A covalent bond consists of a pair of electrons that are shared by two atoms. Compounds that contain covalent bonds are called covalent compounds. In general, two non-metals are connected by a covalent bond. These compounds will not break-apart in water. Their solutions will not conduct electricity.

Hydrogen is considered to be a metal or a non-metal.

Examples of covalent compounds are:  $H_2$ ,  $Cl_2$ ,  $NH_3$ ,  $CCl_4$ ,  $SO_2$ , oil, and wax.

## Naming Covalent Compounds

There is a different way of naming covalent compounds. We need to use the Greek prefixes. Put the suitable prefix before each element and put "ide" on the end.

mono	1	tetra	4
di	2	penta	5
tri	3	hexa	6

Examples:

Name  $CO$ . There is one carbon atom and one oxygen atom in this molecule. The name is:

**monocarbon monoxide**

We leave the mono off of the first atom, so the name is carbon monoxide.

Name  $N_2O_4$ . Since there are two nitrogen atoms and four oxygen atoms, the name is:

**dinitrogen tetraoxide**

Answer the following questions about ionic and covalent compounds.

1) Give two differences between ionic and covalent compounds.

2) Name the following covalent compounds:

a)  $\text{CO}_2$

b)  $\text{SO}_2$

c)  $\text{SO}_3$

d)  $\text{NBr}_3$

e)  $\text{N}_2\text{O}_5$

f)  $\text{P}_2\text{O}_3$

3) Give the symbols for the following covalent compounds:

a) carbon disulfide

b) carbon tetrachloride

c) phosphorus trihydride

d) dihydrogen sulfide

4) Are the following ionic compounds, or covalent compounds?

a) styrofoam

b)  $\text{NaCl}$  (table salt)

c) wood

d)  $\text{MgBr}_2$

e)  $\text{C}_6\text{H}_{12}\text{O}_6$  (glucose)

f)  $\text{Cl}_2\text{O}$

Answers: 1) Ionic; metal + non-metal, breaks apart into ions, solution conducts electricity; Covalent; non-metal + non-metal, doesn't break apart in water, solutions don't conduct electricity, 2)a) carbon dioxide, b) sulfur dioxide, c) sulfur trioxide, d) nitrogen tribromide, e) dinitrogen pentoxide, f) diphosphorus trioxide, 3)a)  $\text{CS}_2$ , b)  $\text{CCl}_4$ , c)  $\text{PH}_3$ , d)  $\text{H}_2\text{S}$ , 4)a) c, b) i, c) c, d) i, e) c, f) c.