

You have mastered this topic when you can:

- 1) define the terms **COMPOUND**, **IONIC COMPOUND**, **MOLECULAR COMPOUND**, **ELECTROLYTE**, **NON-ELECTROLYTE**, **NON-ELECTROLYTE** and **CHEMICAL BOND**.
- 2) demonstrate a knowledge that bonding involves valence electrons.

## INTRODUCTION TO COMPOUNDS

I) **ELEMENTS ARE COMPOSED OF PARTICLES CALLED ATOMS.** The atoms of the elements found in groups 1 through 17 are unstable because their valence shells are not full, therefore, they are reactive. In order to obtain a full valence shell and become stable, they react with each forming chemical bonds to create **MOLECULES** and **COMPOUNDS**.

A) **MOLECULES** \_\_\_\_\_.

B) **COMPOUNDS** \_\_\_\_\_.

C) The atoms within *molecules* and *compounds* are held together by **CHEMICAL BONDS**.

**e.g.**  $\text{H}_{2(g)}$ ,  $\text{N}_{2(g)}$ ,  $\text{O}_{2(g)}$ ,  $\text{S}_{8(s)}$ ,  $\text{H}_2\text{O}_{(l)}$ ,  $\text{CO}_{2(g)}$ ,  $\text{C}_{12}\text{H}_{22}\text{O}_{11(s)}$ ,  $\text{NaCl}_{(s)}$ ,  $\text{CaCO}_{3(s)}$ ,  $(\text{NH}_4)_3\text{PO}_{4(s)}$ .

## II) CLASSIFYING COMPOUNDS

A) There are two main types of compounds: **IONIC** and **MOLECULAR**. Each type of compound has a unique combination of three physical properties that can be used to classify a compound as *ionic* or *molecular*.

**UNDERSTAND AND MEMORIZE THE PROPERTIES AND HOW TO CLASSIFY COMPOUNDS!!**

1) **FIRST:** The type of elements found in the compound.

a) **IONIC COMPOUNDS** \_\_\_\_\_.

**e.g.**  $\text{NaCl}_{(s)}$ ,  $\text{KI}_{(s)}$ ,  $\text{Ba}_3\text{N}_{2(s)}$ ,  $\text{Al}_2\text{O}_{3(s)}$ ,  $\text{Fe}_2\text{O}_{3(s)}$ ,  $\text{AgNO}_{2(s)}$ ,  $\text{NaOH}_{(s)}$ ,  $\text{Ba}_3(\text{PO}_4)_{2(s)}$ , etc.

i) **Ionic compounds** are often referred to as **SALTS**.

b) **MOLECULAR COMPOUNDS** \_\_\_\_\_.

**e.g.**  $\text{H}_2\text{O}_{(l)}$ ,  $\text{CO}_{2(g)}$ ,  $\text{SO}_{2(g)}$ ,  $\text{C}_6\text{H}_{12}\text{O}_{6(s)}$ ,  $\text{C}_{12}\text{H}_{22}\text{O}_{11(s)}$ ,  $\text{C}_2\text{H}_5\text{OH}_{(l)}$ ,  $\text{HCl}_{(g)}$ ,  $\text{NH}_3_{(g)}$ , etc.

2) **SECOND: State at SATP.** The state of a substance is dependent on temperature. In your everyday world, ‘cold’ substances tend to be solids (**i.e.** ice), warm substances tend to be liquid (**i.e.** shower water), while hot substances tend to be gases (**i.e.** steam). The same holds true in the world of chemistry, however, because terms like hot, warm and cold mean different temperatures to different people, when comparing the state of a compound, chemists rely on specific defined conditions such as **SATP**. **SATP** means Standard Ambient Temperature and Pressure, which means the temperature of the room is 25°C and the pressure is 100 kPa. **MEMORIZE SATP CONDITIONS!!**

3) **THIRD: ELECTRICAL CONDUCTIVITY** is the ability of a substance to conduct electricity. **Aqueous solutions are substances created by mixing a substance with water** (**i.e.** mixing sugar in water creates a **solution**). **Solutions** either conduct electricity or do not conduct electricity.

**ELECTROLYTS are** \_\_\_\_\_.

**NON-ELECTROLYTS are** \_\_\_\_\_.

III) **Required Practice 1:** Answer these questions on your own paper. {Answers are on page 2.}

1. Explain how you can classify a compound as ionic or molecular from its name or formula.
  2. Classify these compounds as ionic or molecular. Justify your choice.
    - a.  $\text{NaCl}_{(s)}$
    - b.  $\text{H}_2\text{O}_{(l)}$
    - c.  $\text{Fe}_2\text{O}_3_{(s)}$
    - d.  $\text{C}_6\text{H}_{12}\text{O}_6_{(s)}$
    - e.  $\text{C}_8\text{H}_{18}_{(l)}$
    - f.  $\text{Al}_2(\text{C}_2\text{O}_4)_3_{(s)}$
  3. What is an aqueous solution?
  4. Distinguish between the terms electrolyte and non-electrolyte.
  5. Predict the pairing of ionic compound and molecular compound with the terms electrolyte and non-electrolyte.
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**Required Practice 1 from page 1**

1. Ionic compounds contain metal atoms bonded to non-metal atoms. Molecular compounds are composed of only non-metal atoms. 2a. Ionic because it is composed of both a metal and a non-metal. 2b. Molecular because it is composed of only non-metals. 2c. Ionic because it is composed of both a metal and a non-metal. 2d. Molecular because it is composed of only non-metals. 2e. Molecular because it is composed of only non-metals. 2f. Ionic because it is composed of both a metal and a non-metal. 3. Aqueous solutions are substances created by dissolving a compound in water. 4. An electrolyte is a substance that when dissolved in water creates a solution that conducts electricity. A non-electrolyte is a substance that when dissolved in water creates a solution that does not conduct electricity. 5. Your answer is a prediction that you will test in the next Topic.

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***BE SURE YOU PREPARE FOR MEMORY CHALLENGE-2 ON T8 – T16!!***