

You have mastered this topic when you can:

- 1) define the terms **COMPOUND**, **IONIC COMPOUND**, **MOLECULAR COMPOUND**, **ELECTROLYTE**, **NON-ELECTROLYTE**, **SOLUBLE**, **LOW SOLUBILITY**, **DISSOCIATE**, **NON-ELECTROLYTE**, **CHEMICAL BOND** and **INTRAMOLECULAR FORCE**.
 - 2) demonstrate a knowledge that bonding involves valence electrons.
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PHYSICAL CHARACTERISTICS OF IONIC AND MOLECULAR COMPOUNDS

I) IONIC COMPOUNDS

- A) *Ionic compounds* are composed of a metal element bonded to one or more non-metal elements.

II) PHYSICAL CHARACTERISTICS OF IONIC COMPOUNDS ← **MEMORIZE THEM!!**

- A) *Ionic compounds* exist as a _____ *at SATP*.

- B) *Ionic compounds* in their SATP (solid) _____.

- C) *Ionic compounds are* _____. This means that when ionic compounds are dissolved in water a solution is formed that will conduct electricity.

- 1) *Theoretical explanation* outlining why *ionic compounds* are *electrolytes*.

- a) *Ionic compounds* are composed of positive metal ions and negative non-metal ions. *Ionic compounds* are electrolytes because they **DISSOCIATE**, break apart, releasing their positive and negative ions when dissolved in water. When a compound is dissolved in water it is said to be *aqueous = (aq)*.

i.e.

- i) It is the existence of ions in the *solution* that allows the *solution* to conduct electricity. The more ions that exist in the *solution*, the more electricity the *solution* will conduct. The fewer the number of ions that exist in *solution*, the less electricity the *solution* will conduct thus *ionic compounds* are *electrolytes*.

III) MOLECULAR COMPOUNDS

- A) *Molecular compounds* are composed only non-metal elements.

VI) PHYSICAL CHARACTERISTICS OF MOLECULAR COMPOUNDS. **MEMORIZE THEM!!**

- A) *Molecular compounds* exist as a _____ *at SATP*.

- B) *Molecular compounds* in their SATP state _____.

- C) *Soluble molecular compounds are non-electrolytes*. This means that when molecular compounds are dissolved in water a solution is formed that will not conduct electricity.

- 1) *Theoretical explanation* outlining why *molecular compounds* are *non-electrolytes*.

- a) *Molecular compounds* are *non-electrolytes* because they **DISSOCIATE** as whole particles called molecules. *Molecular compounds* are not composed of ions and they do not break apart when they **DISSOCIATE**, which means they do not produce ions when dissolved in water.

i.e.

- i) Since a *solution* containing *molecular compounds* does not contain ions, it does not conduct electricity thus *molecular compounds* are *non-electrolytes*.

- 2) There is an exception to the rule that *molecular compounds* are *non-electrolytes*. *Acids* are *molecular compounds* that create *solutions* that conduct electricity, thus *acids* are *electrolytes*.

- a) **MEMORIZE THIS DEFINITION: ACIDS are composed of non-metal atoms and their formulae begin with hydrogen.**

e.g.

- b) When *acids* are dissolved in water, they **DISSOCIATE**, break apart, to form ions in *solution*. It is the existence of ions in the *solution* that allows it to conduct electricity.

i.e.

- i) It is the existence of ions in the *solution* that allows the *solution* to conduct electricity. The more ions that exist in the *solution*, the more electricity the *solution* will conduct. The fewer the number of ions that exist in *solution*, the less electricity the *solution* will conduct.
- c) *Acids* are **molecular compounds** which means they are not composed of ions, however, when they are dissolved in water, they **DISSOCIATE**, break apart, to form ions in *solution*. This is a special kind of **dissociation** called **IONIZATION**. **IONIZATION means the production of ions where none existed within the compound.**

V) **Required Practice 1:** Answer these questions on your own paper. {Answers are on page 3.}

- Name the type of molecular compound that is an electrolyte. How are they identified from the formulae of their compound?
- Table salt is a combination of mostly sodium chloride and some potassium iodide.
 - Will it conduct electricity?
 - Under what conditions will it conduct electricity?
- Classify these unknown compounds as being ionic, molecular or an acid.
 - Compound W is solid at SATP and is an electrolyte.
 - Compound X is solid at SATP and is a non-electrolyte.
 - Compound Y is liquid at SATP and is an electrolyte.
 - Compound Z is solid at SATP and is a weak electrolyte.
- Design an experiment that will determine if a compound is ionic, molecular or is an acid.
- Describe the characteristic shared by ionic compounds and acids that make them electrolytes.
- Is solubility a reasonable criterion to assist in classifying compounds as ionic or molecular? Explain.

THE INTRAMOLECULAR FORCE

- I) When two atoms or ions react together they form a **CHEMICAL BOND** between them. **A CHEMICAL BOND is the force of attraction holding two atoms together. Chemical bonds** form in order to make unstable atoms stable by filling the valence shells of the atoms reacting together. This means that **valence electrons play an essential role in the creation of chemical bonds** between atoms. An atom's nucleus is positive while valence electrons are negative, thus there is a strong **attraction** between them. It is this **attraction** between positive and negative charges within compound or molecule that creates the **chemical bond**. **The force of attraction within the compound or molecule is called the INTRAMOLECULAR FORCE.** "Intra" means "within" (inside), thus the **intramolecular force** is the force within a compound or molecule that holds the compound together.

ANSWERS TO THE REQUIRED PRACTICE

Required Practice 1 from page 2

1. Acids are molecular electrolytes. Their formulae begin with H, hydrogen. **2a.** Table salt will not conduct electricity. **2b.** Dissolving table salt in water will create a solution that will conduct electricity. **3a.** Ionic **3b.** Molecular **3c.** Acid **3d.** Ionic. **4.** Record the state of the compound, dissolve it in water then test the electrical conductivity of the solution. If the solution conducts electricity and the compound was a solid, the compound is ionic. If the solution does not conduct electricity the compound was a solid, liquid or gas, the compound is molecular. If the solution conducts electricity and the compound was a liquid or a gas, the compound is an acid. **5.** Both ionic compounds and acids dissociate (break apart) to produce ions when dissolved with water. **6.** No because some molecular compounds are soluble.

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