Ionic Bonds Notes Outline

--- Fill in the blanks and take notes as we go! ---

The forces that hold matter together are called \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_. There are \_\_\_\_\_\_\_\_ major types of bonds. We need to learn in detail about these bonds and how they influence the properties of matter. The four major types of bonds are:

**I. \_\_\_\_\_\_\_\_\_\_ Bonds**

**II. \_\_\_\_\_\_\_\_\_\_\_\_\_ Bonds**

**III. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bonds**

**IV. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (van der Waals) forces**

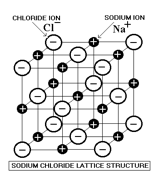
**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Bonds**

**The \_\_\_\_\_\_\_\_\_\_\_bond is formed by the attraction between \_\_\_\_\_\_\_\_\_\_\_ charged ions. Ionic bonds are formed between \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** Remember that metal atoms \_\_\_\_\_\_\_\_\_ one or more valence electrons in order to achieve a stable electron arrangement. When a metal atom \_\_\_\_\_\_\_\_ electrons it forms a positive ion or **\_\_\_\_\_\_\_\_\_\_\_\_**. When nonmetals react they \_\_\_\_\_\_\_\_\_\_\_\_ one or more electrons to reach a stable electron arrangement. When a nonmetal atom \_\_\_\_\_\_\_\_\_\_ one or more electrons it forms a negative ion or **\_\_\_\_\_\_\_\_\_\_\_\_**. The metal \_\_\_\_\_\_\_\_\_ donate electrons to the nonmetal \_\_\_\_\_\_\_\_\_\_\_ so they stick together in an ionic \_\_\_\_\_\_\_\_\_\_\_\_\_. This means that **ionic bonds are formed by the complete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of one or more electrons.**

1. What type of bonding would you expect in a compound that contains a metal and a nonmetal?

A structure with its particles arranged in a regular repeating pattern is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. Because opposite charges \_\_\_\_\_\_\_\_\_\_ and like charges \_\_\_\_\_\_\_\_\_\_\_\_, the ions in an ionic compound stack up in a regular repeating pattern called a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_.

The positive ions are pushed \_\_\_\_\_\_\_ from other positive ions and \_\_\_\_\_\_\_\_\_\_\_\_\_ to negative ions so this produces a regular arrangement of particles where each ion is surrounded by ions of the \_\_\_\_\_\_\_\_\_\_\_ charge. Each ion in the crystal has a strong electrical attraction to its \_\_\_\_\_\_\_\_\_\_\_charged neighbors so the whole crystal holds together as one giant unit. We have no \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules in ionic compounds, just the regular stacking of \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ ions.



1. Define the following terms:

a) ionic bond –

b) cation –

c) anion –

d) crystal –

1. What are the smallest units of an ionic bond?

At room temperature ionic compounds are \_\_\_\_\_\_\_\_\_ melting point solids. They are usually \_\_\_\_\_\_\_\_\_\_ except for compounds of the transition metals that may be \_\_\_\_\_\_\_\_\_\_\_. They are \_\_\_\_\_\_\_\_(break easily). They do NOT conduct \_\_\_\_\_\_\_\_\_\_ as solids, but DO conduct electricity when \_\_\_\_\_\_\_\_\_\_\_or \_\_\_\_\_\_\_\_\_\_\_ in water.

1. List several properties of ionic compounds:

1. When can electricity to be conducted in an ionic bond?

Ionic Bonds Notes Outline- KEY

The forces that hold matter together are called chemical bonds. There are four major types of bonds. We need to learn in detail about these bonds and how they influence the properties of matter. The four major types of bonds are:

**I. Ionic Bonds III. Metallic Bonds**

**II. Covalent Bonds IV. Intermolecular (van der Waals) forces**

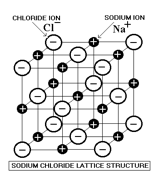
**Ionic Bonds**

**The ionic bond is formed by the attraction between oppositely charged ions. Ionic bonds are formed between metals and nonmetals.** Remember that metal atoms lose one or more valence electrons in order to achieve a stable electron arrangement. When a metal atom loses electrons it forms a positive ion or **cation**. When nonmetals react they gain one or more electrons to reach a stable electron arrangement. When a nonmetal atom gains one or more electrons it forms a negative ion or **anion**. The metal cations donate electrons to the nonmetal anions so they stick together in an ionic compound. This means that **ionic bonds are formed by the complete transfer of one or more electrons.**

1. What type of bonding would you expect in a compound that contains a metal and a nonmetal?

**IONIC**

A structure with its particles arranged in a regular repeating pattern is called a **crystal**. Because opposite charges attract and like charges repel, the ions in an ionic compound stack up in a regular repeating pattern called a crystal lattice. The positive ions are pushed away from other positive ions and attracted to negative ions so this produces a regular arrangement of particles where each ion is surrounded by ions of the opposite charge. Each ion in the crystal has a strong electrical attraction to its oppositely charged neighbors so the whole crystal holds together as one giant unit. We have no individual molecules in ionic compounds, just the regular stacking of positive and negative ions.



1. Define the following terms:

a) ionic bond – **a bond that** **is formed by the attraction between oppositely charged ions**

b) cation **– a positively charged ion**

c) anion – **a negatively charged ion**

d) crystal – **A structure with its particles arranged in a regular repeating pattern**

1. What are the smallest units of an ionic bond?

**Crystal lattice**

At room temperature ionic compounds are high melting point solids. They are usually white except for compounds of the transition metals that may be colored. They are brittle (break easily). They do not conduct electricity as solids, but do conduct electricity when melted or dissolved in water.

4.List several properties of ionic compounds:

* + **high melting points**
  + **usually white (transition metals may be colored)**
  + **brittle**
  + **do NOT conduct electricity as solids**
  + **DO conduct electricity when melted/dissolved**

1. When can electricity to be conducted in an ionic bond?

**When melted or dissolved**