

6-3 Ionic Bonding

Section 6-3 Ionic Bonding

Ionic Compound

Composed of positive and negative ions that are combined so that the numbers of positive and negative charges are equal

Formula Unit

The simplest collection of atoms from which an ionic compound's formula can be established

A formula unit will be based on the charges of the specific ions. To make calcium fluoride, Ca^{2+} with F^- must become CaF_2 .

Crystal Lattice

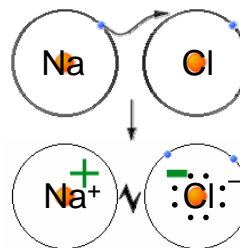
The orderly arrangement of ions in an ionic crystal.

Lattice energy

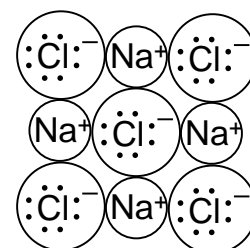
The energy released when one mole of an ionic crystalline compound is formed from gaseous ions

Formation of an Ionic Bond

Electron Transfer



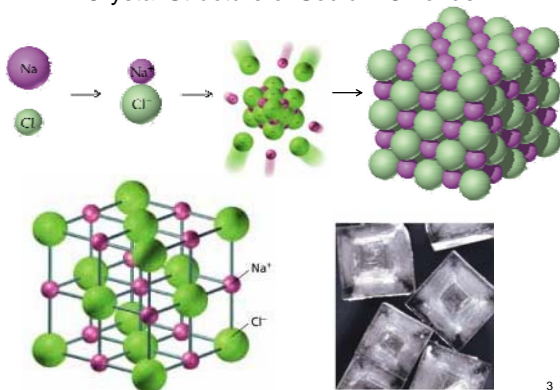
Electrical Attraction



1

2

Crystal Structure of Sodium Chloride



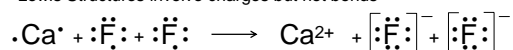
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Ionic Compound Properties

Properties of ionic compounds are based on the strong attractive forces between positive and negative ions. The lattice arrangement and bond strength can depend on ion size and charge difference.

- Ionic compounds tend to have very high melting and boiling points
- Ionic compounds tend to be very hard but brittle
- Many ionic compounds dissolve in water
 - Ions separate and become surrounded by water
 - Attraction of water must overcome attraction between ions
- Molten ionic compounds are electrical conductors because ions moving freely carry an electrical current
- Dissolving ionic compounds in water will make an electrical conductor by allowing ions to move freely

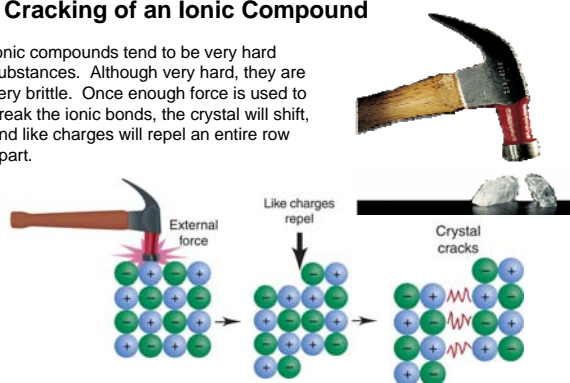
- Lewis Structures involve charges but not bonds



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Cracking of an Ionic Compound

Ionic compounds tend to be very hard substances. Although very hard, they are very brittle. Once enough force is used to break the ionic bonds, the crystal will shift, and like charges will repel an entire row apart.

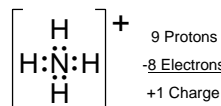


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Polyatomic Ions

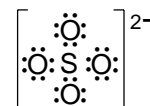
Polyatomic Ion

A charged group of covalently bonded atoms. The charge is due to either an excess or shortage of electrons.



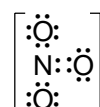
9 Protons
-8 Electrons
+1 Charge

Ammonium ion



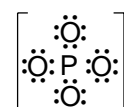
30 Protons
-32 Electrons
-2 Charge

Sulfate ion



23 Protons
-24 Electrons
-1 Charge

Nitrate ion



29 Protons
-32 Electrons
-3 Charge

Phosphate ion

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