

Ionic Compounds

Ion = an atom (or group of atoms) that carries an electrical charge.

The *outside* electron shell of an atom is called the **valence shell**.

* Atoms can lose or gain electrons in their outside shell.

Anions: (*Negatively Charged atoms* – atoms that gain 1 or more extra electrons)

Cations: (*Positively Charged atoms* – atoms that lose 1 or more electrons)

Ionic Bonds: Substances that are composed of **anions** and **cations** are called ionic compounds. The bonding is the result of the attraction between the **positive cation** and the **negative anion**.

When an atom from the metal group combines with another atom from the non-metal group, an ionic bond is formed.

Writing the Names of Binary Ionic Compounds:

1. The **cation** (positive ion) is always written before **anion** (negative ion)
2. The first word of the chemical name is the name of the element of which the cation originally came. (Example: Na^+ would be called Sodium)
3. The last word is the name of the element of which the anion originally came with the suffix “**ide**”. (Example: Cl^- would become Chloride {Chlorine with the **-ide** suffix added to the end})
4. Put the two words together and that is the name of the compound. (Example: Na^+ and Cl^- would become Sodium Chloride.)

The symbol used to show an ion is the element name in square brackets followed by the charge of the ion. For example Cl is neutral and $[\text{Cl}^-]$ is an anion.

Properties of Ionic Compounds

Property	Ionic Compounds
General Description	<ul style="list-style-type: none"> ✓ Solid at room temperature ✓ Forms crystal structures ✓ Usually they are hard but very brittle (break vs bend)
Melting Point	✓ Generally quite high (ie: NaCl \rightarrow 801°C)
Solubility	✓ Highly Soluble in water or other polar solvents
Conductivity in Solid State	✓ Very poor conductors in the solid state
Conductivity in Molten State (or dissolved)	<ul style="list-style-type: none"> ✓ Excellent conductors when dissolved (or molten state) ✓ Electrolyte when dissolved
Odour	✓ Usually does not emit an odour in the solid state (or has a very weak odour)

Electrolyte: a substance that dissolves in water producing a solution that is able to conduct electricity (reasonably well).

Ionic compounds are good electrolytes because the ions (when dissolved in water) can easily move electrons.

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