

***Al-Mustaqbal University College***

***Department of Medical Physics***

***First Class***

***General Chemistry***

***Lec 11***

***Introduction to bonding***

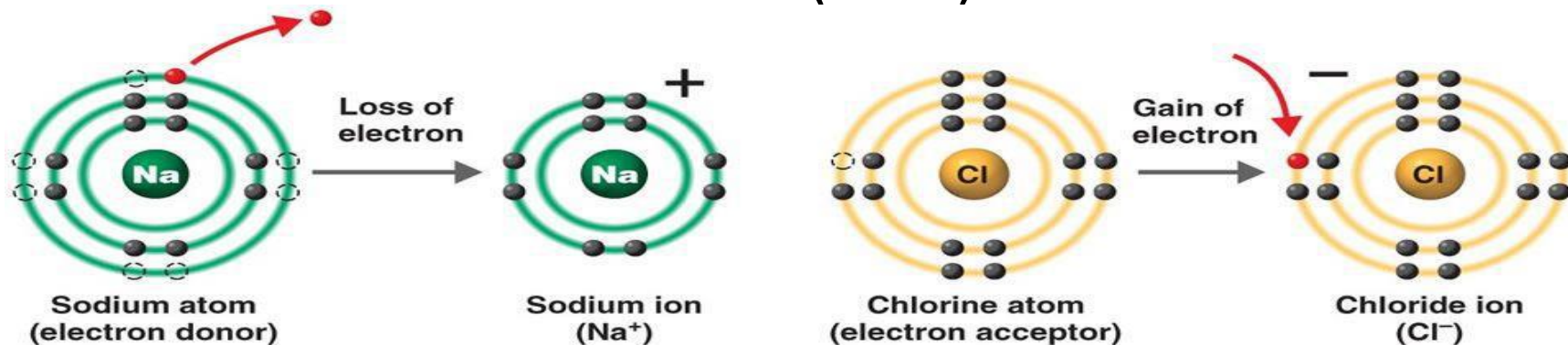
***M.S.C.Doa.Nassr***

- **Introduction to Bonding**
- Type of bonding in solids
  - Ionic bonding
  - Covalent bonding
  - Metallic bonding
  - Hydrogen bonding
  - Van der waals bonding

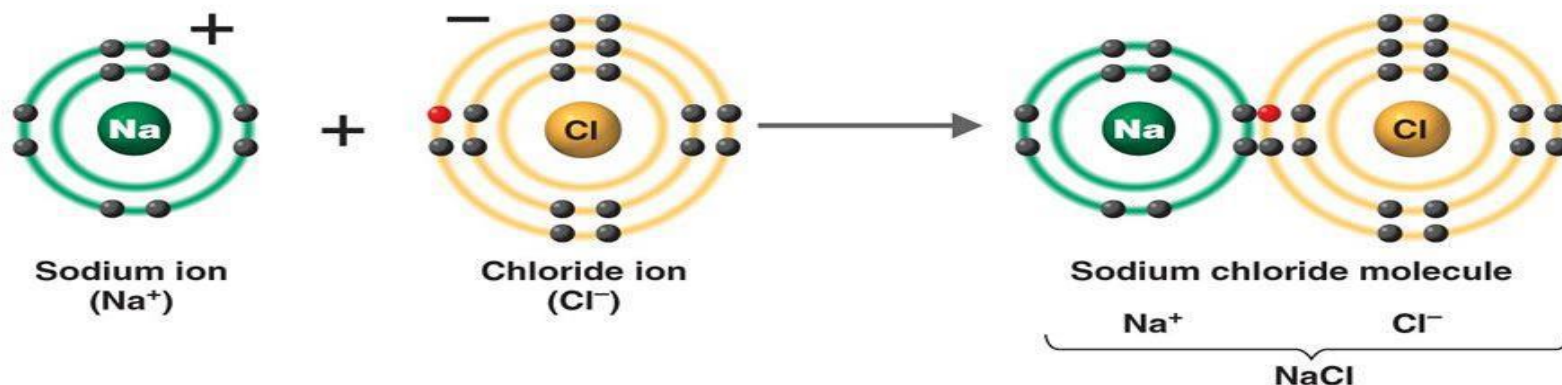
**An ionic bonding** is the attractive force existing between a positive ion and a negative ion when they are brought into close proximity. These ions are formed when the atoms of different elements involved lose or gain electrons in order to stabilize their outer shell electron configuration.

For example, common table salt is sodium chloride. When sodium (Na) and chlorine (Cl) are combined, the sodium atoms each lose an electron, forming cations ( $\text{Na}^+$ ), and the chlorine atoms each gain an electron to form anions ( $\text{Cl}^-$ ).

These ions are then attracted to each other in a 1:1 ratio to form sodium chloride (NaCl).



**(a)** A sodium atom (Na) loses one electron to an electron acceptor and forms a sodium ion (Na<sup>+</sup>). A chlorine atom (Cl) accepts one electron from an electron donor to become a chloride ion (Cl<sup>-</sup>).



**(b)** The sodium and chloride ions are attracted because of their opposite charges and are held together by an ionic bond to form a molecule of sodium chloride.

## **Properties of ionic compounds**

1. Ionic compounds are made up of a positive ion (cation) and a Negative ion (anion)
2. The general formula for an ionic compound is  
Cation Anion
3. Ionic solids are crystalline in nature.
4. They are hard and brittle.
5. They have high melting and boiling points.
6. Ionic solids are good insulators of electricity.
7. Ionic solids are soluble in polar solvents and insoluble in non-polar solvents.

- 8. In an ionic crystal, a cation is surrounded by as many as possible and vice-versa.
- 9. Most ionic compounds are crystalline solids at room temperature.