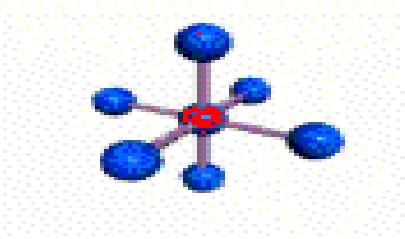
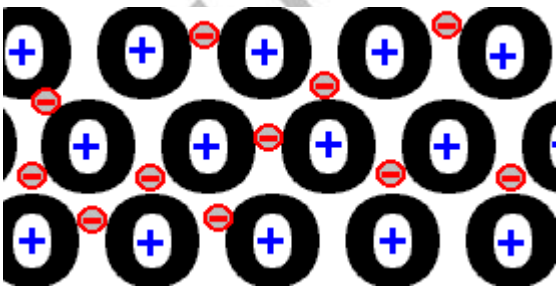
METALLIC BONDING - structure and properties of metals



BONDING IN METALS

- To explain the properties of metals like iron or sodium we need a more sophisticated picture than a simple particle model of atoms all lined up in close packed rows and layers.



- **A giant metallic lattice**.

- The **crystal lattice of metals consists of ions NOT atoms** surrounded by a '**sea of electrons**' forming another type of **giant lattice**.
- The **outer electrons (-)** from the original metal atoms are free to move around between the positive metal ions formed **(+)**.
- These free or '**delocalized**' electrons are the 'electronic glue' holding the particles together.
- There is a **strong electrical force of attraction between** these **free and mobile electrons (-)** and the 'immobile' **positive metal ions (+)** and this is the **metallic bond**.
- Metallic bonding is not directional like covalent bonding, it is like ionic bonding in the sense that the force of attraction between the positive metal ions and the mobile electrons acts in every direction about the fixed (immobile) metal ions.