

Metallic Bonding



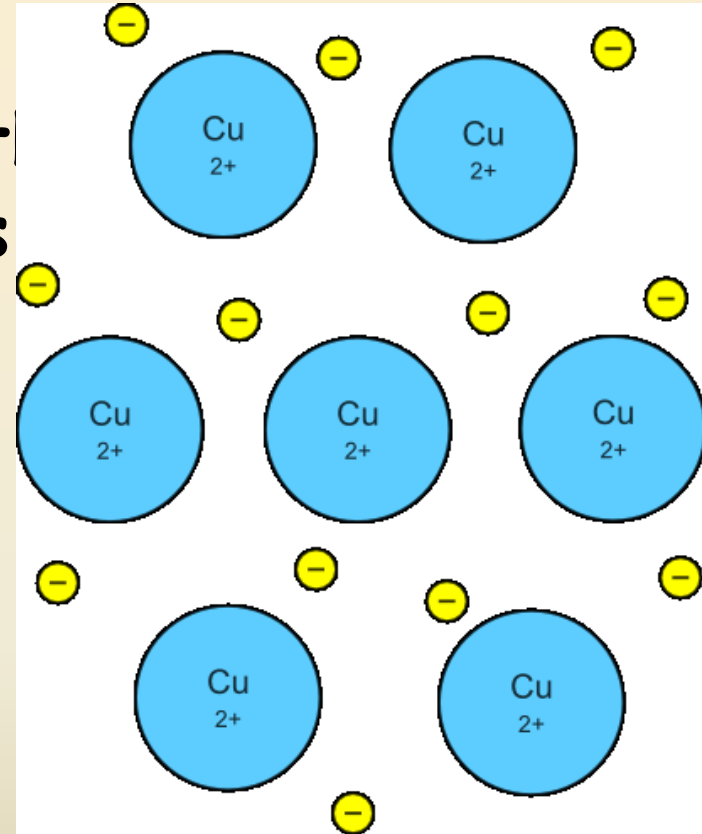
Strong forces of attraction are responsible for the high melting point of most metals.

CA Standards

Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.

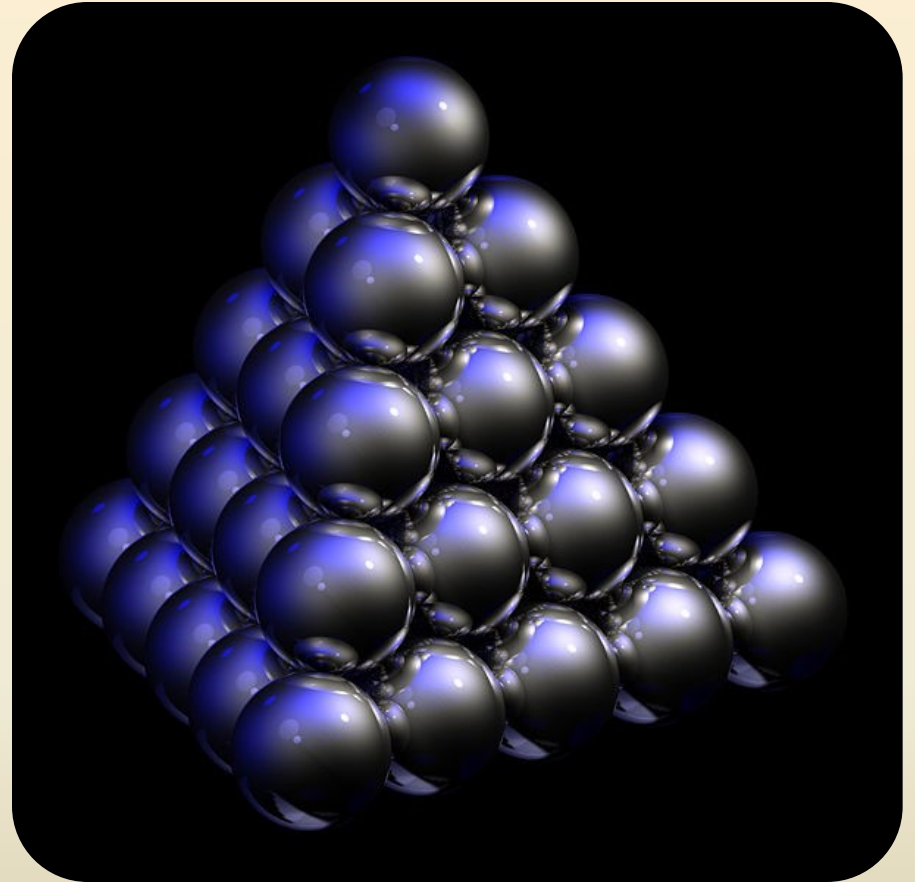
Metallic Bonding

- ❑ The chemical bonding that results from the attraction between metal cations and the surrounding sea of electrons
- ❑ Vacant p and d orbitals in metal's outer energy levels overlap, and allow outer electrons to move freely throughout the metal
- ❑ Valence electrons do not belong to any one atom



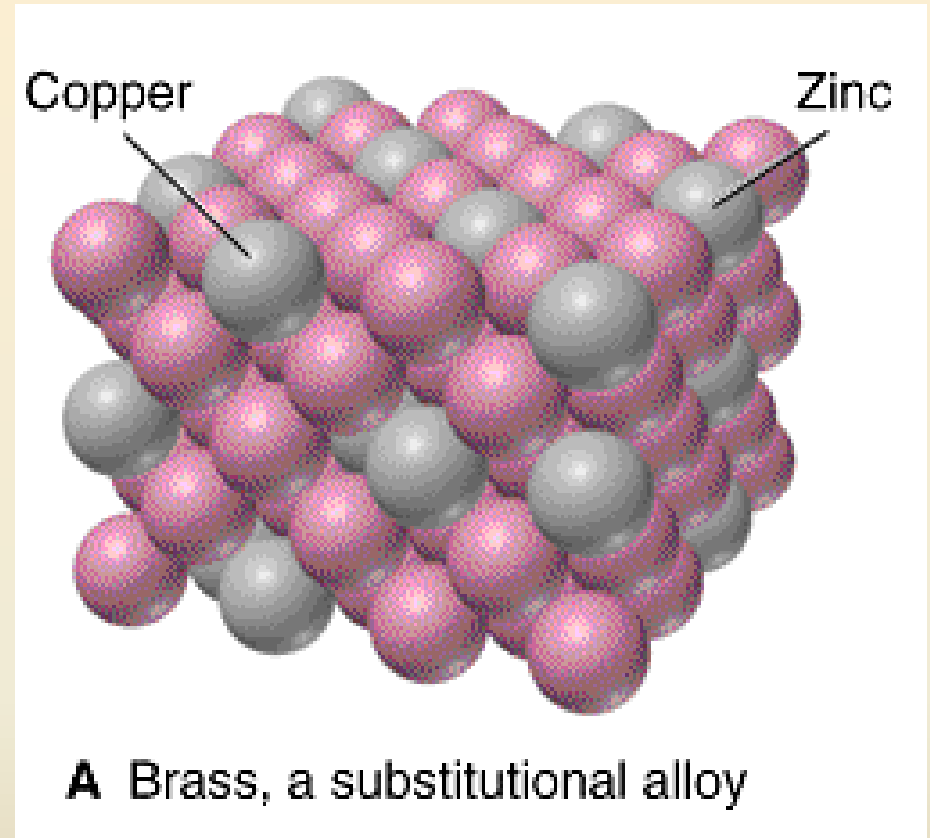
Packing in Metals

Model: Packing uniform, hard spheres to best use available space. This is called *closest packing*. Each atom has 12 nearest neighbors.



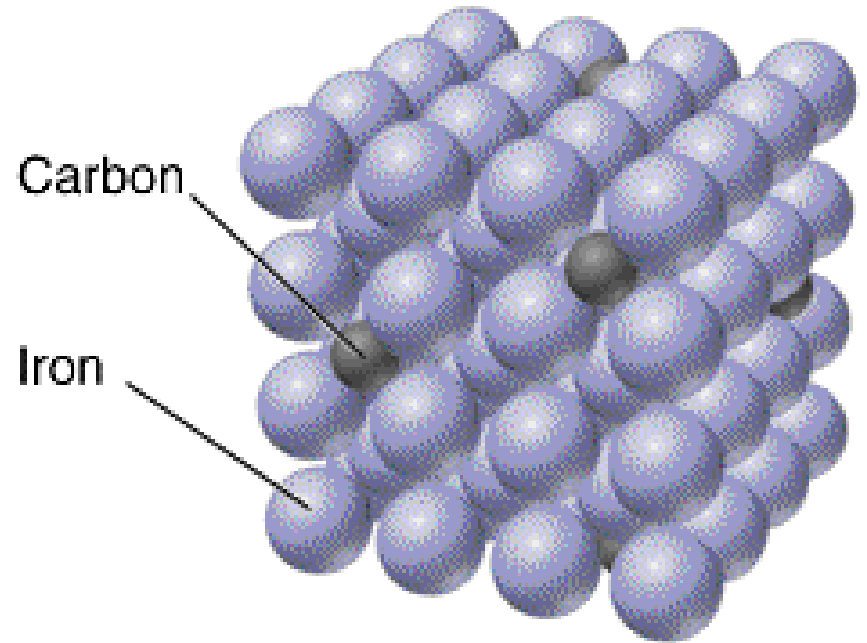
Metal Alloys

❖ **Substitutional Alloy:** some metal atoms replaced by others of similar size.



Metal Alloys

❖ **Interstitial Alloy:**
Interstices (holes) in closest packed metal structure are occupied by small atoms.



B Carbon steel, an interstitial alloy

Properties of Metals

- Metals are good conductors of heat and electricity
- Metals are malleable
- Metals are ductile
- Metals have high tensile strength
- Metals have luster

