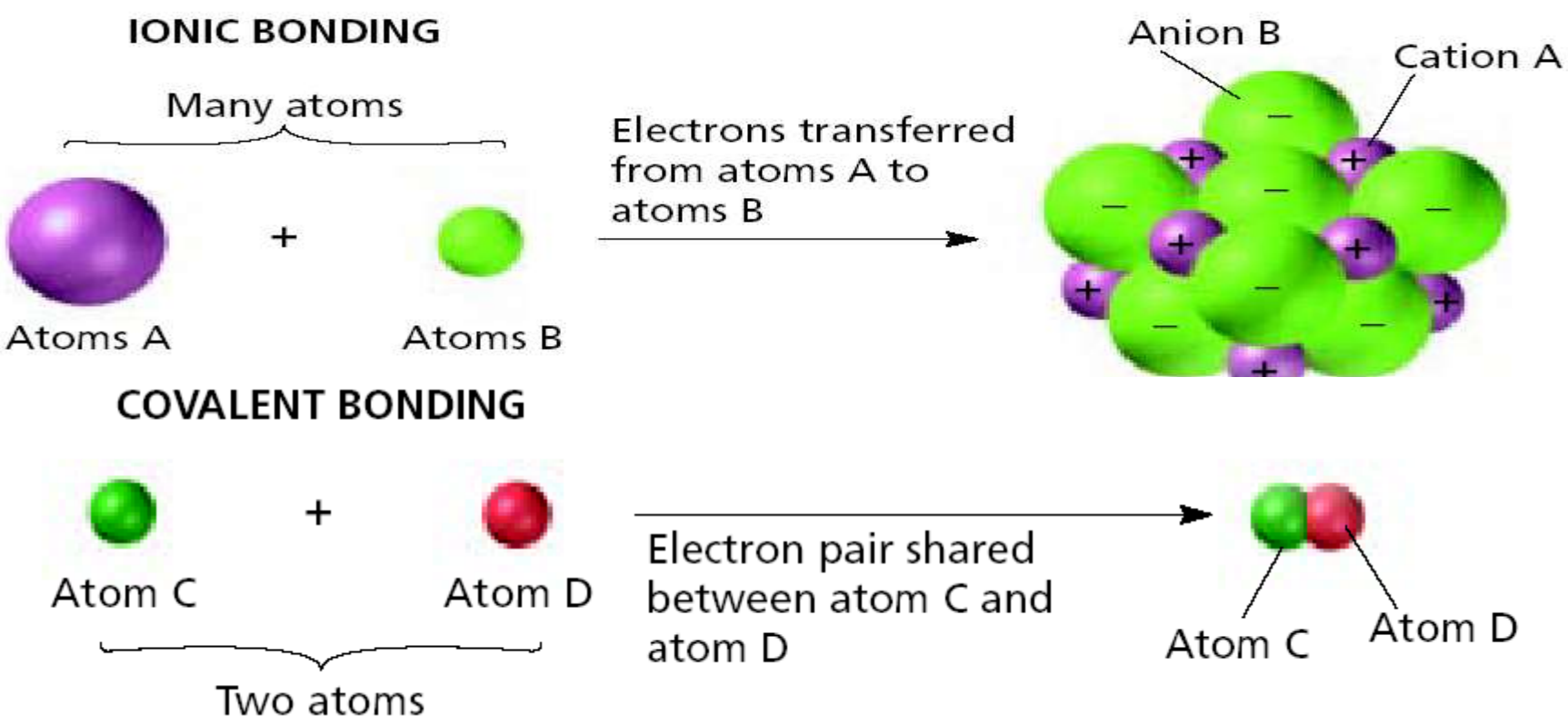
BONDING IN METALS AND NON-METALS

TYPES OF BONDING

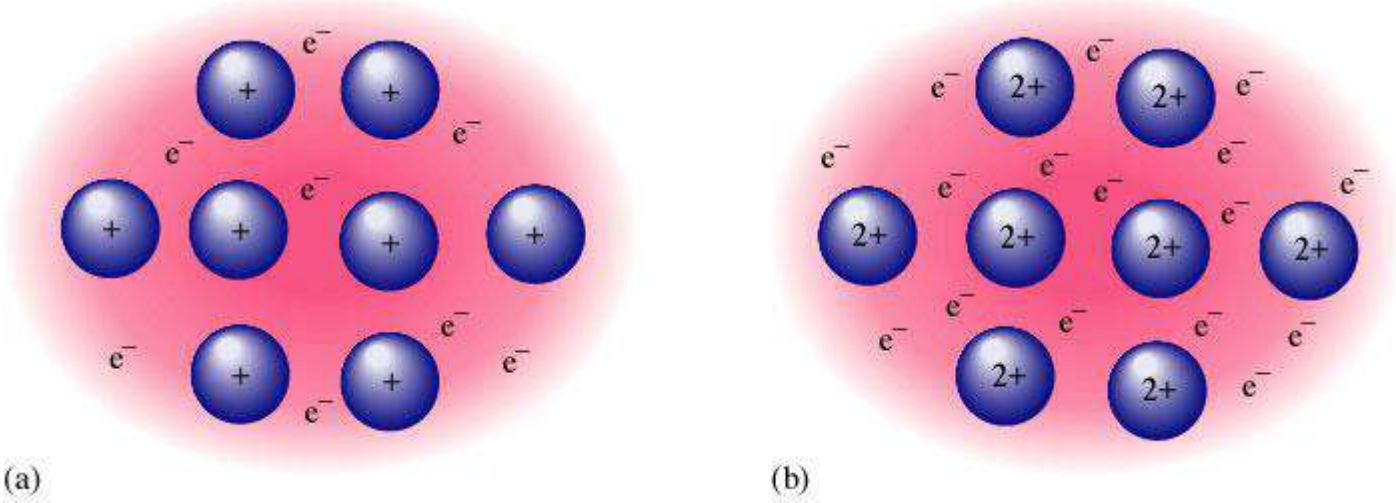
- There are three (3) types of bonding
- Ionic or Electrovalent
- Covalent
- Metallic

	Ionic bond	**covalent**	**Metallic**
Bond formation	Transfer of one or more electrons between atoms	Sharing of electron pairs	Delocalized electron cloud around atoms (of low electro negativity)
Type of element	Metallic and non metallic	Non metallic	Metallic
Melting point	High (usually above 300 degrees Celsius	Low (below 300 degrees celsius)	Very high
Electrical conductivity	Solid is nonconducting; gas and liquids are conductors	Not conductors of electricity in any phase	Electrical conductors in all phases



BONDS

- **IONIC–electrical attraction between large numbers of cations and anions.** Transfer of electrons
- **COVALENT–sharing of electron pairs between two atoms**
- **METALLIC–results from the attraction between metal atoms and the surrounding sea of electrons.** Delocalization of electrons



METALLIC BONDING

- Results from the attraction between metal atoms and the surrounding sea of electrons (delocalized electrons)
- Metal crystals form when atoms crowd together and outer level orbitals overlap
- Electrons are delocalized

Delocalization

- Bonding electrons are not confined to the region between two atoms due to vacant outer level orbitals
- Can move freely around the nuclei within the entire metal so they are spread over several atoms or a whole piece of metal

Properties of compound based on type of bonding

- Ionic Compounds

Held by strong electrostatic force of attraction between + and –ions

High melting and boiling points

- Covalent or Molecular Compounds

Force of attraction between individual molecules much weaker than ionic bond

Molecular compounds boil and melt at low temperatures

Usually gaseous and vaporize at room temperature