BONDING

ch 5

BONDING

- Combining Atoms of Elements to make Compounds.
- Compounds: Combinations of elements.
- Molecules: Combinations of atoms.
- All compounds are molecules, but not reverse.

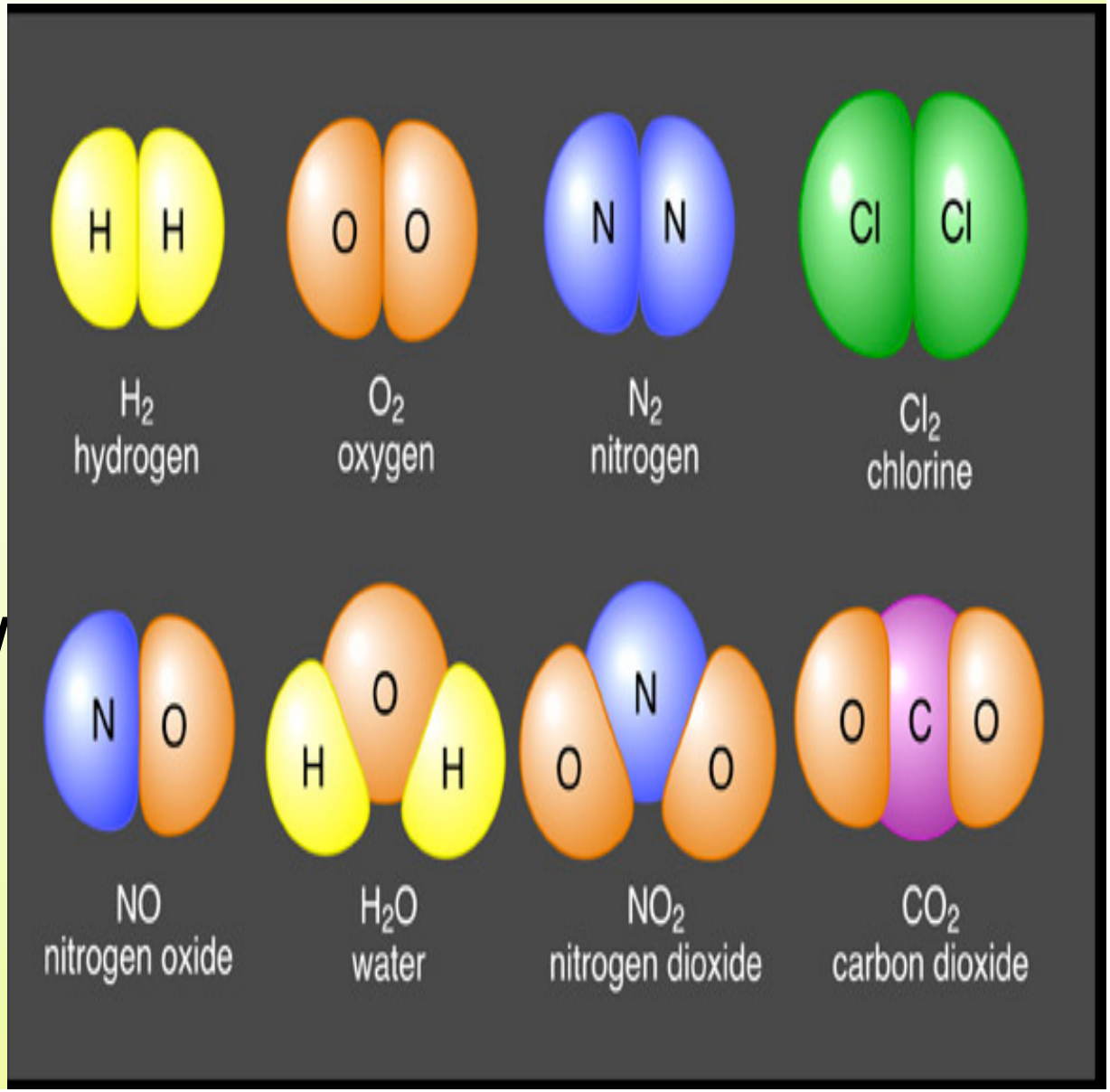
MOLECULE

- Neutral particle formed when electrons are shared.
- Molecular compounds usually have lower melting & boiling points.
- Do not conduct electricity.

BONDING

MOLECULES:

COMPOUNDS/
MOLECULES:

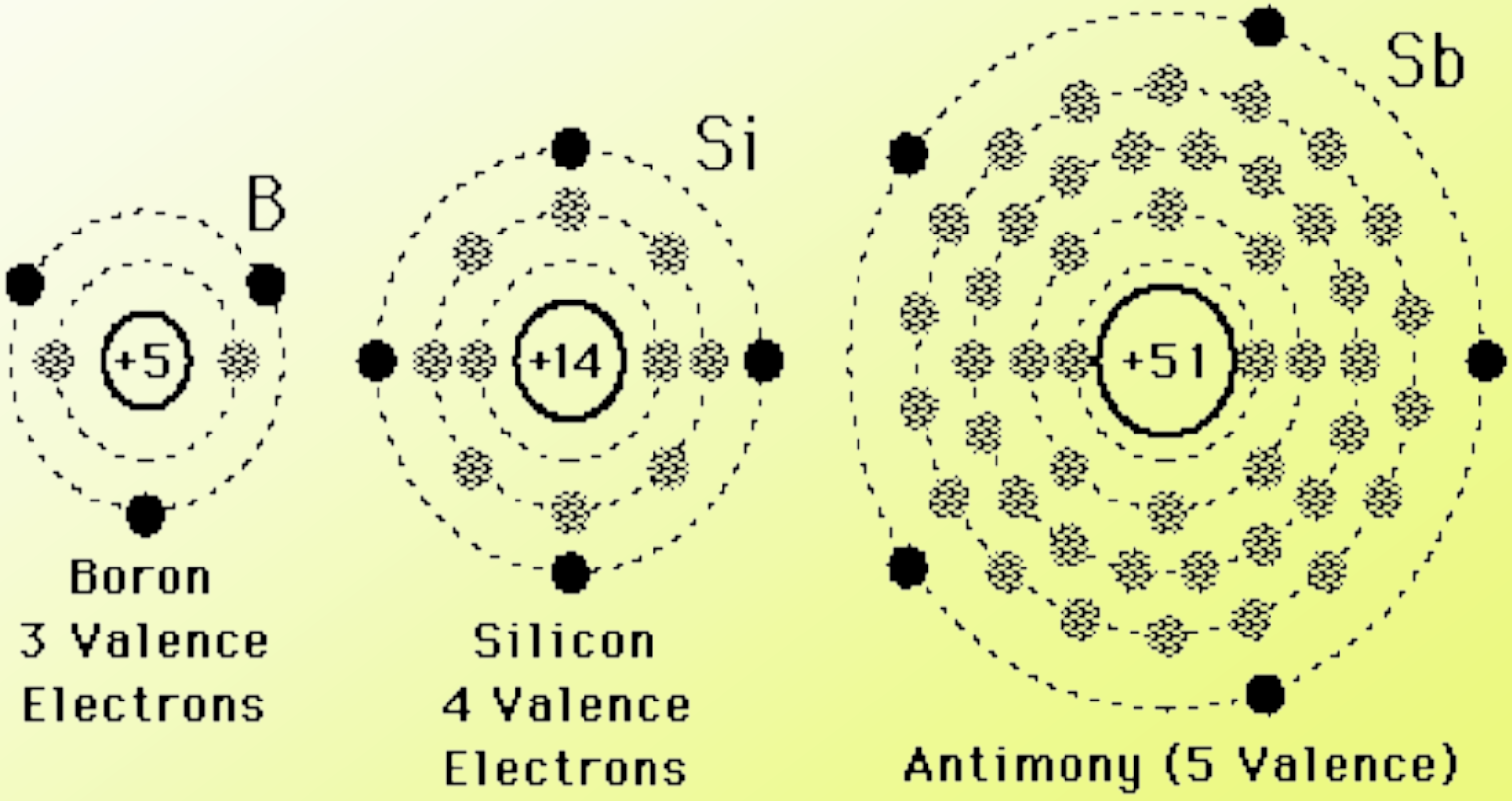


KEY INFO:

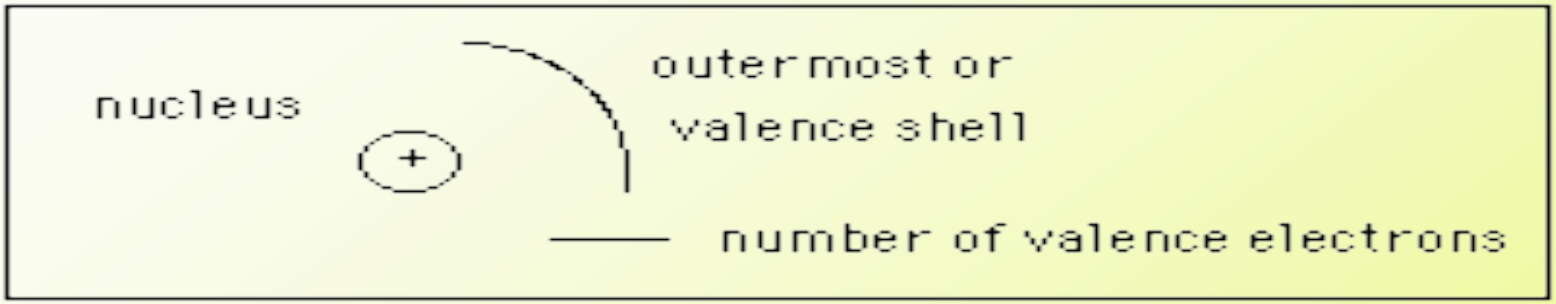
- PERIODS - gives us # energy rings/orbits.
- GROUPS- gives us # valence electrons.

VALENCE ELECTRONS

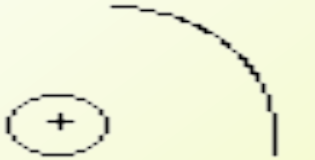
- Electrons on the outer-most energy ring. -Highest energy ring



VALENCE ELECTRONS

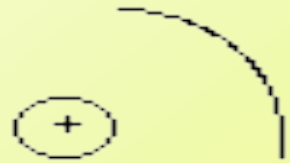


Group I

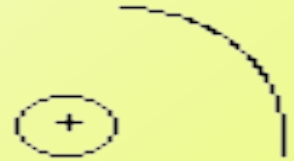


Group II

Group III



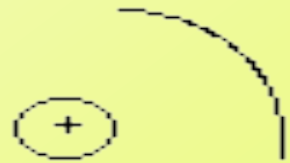
Group IV



Group V

Group VI

Group VII



Group VIII

ELECTRON DOT DIAGRAM:

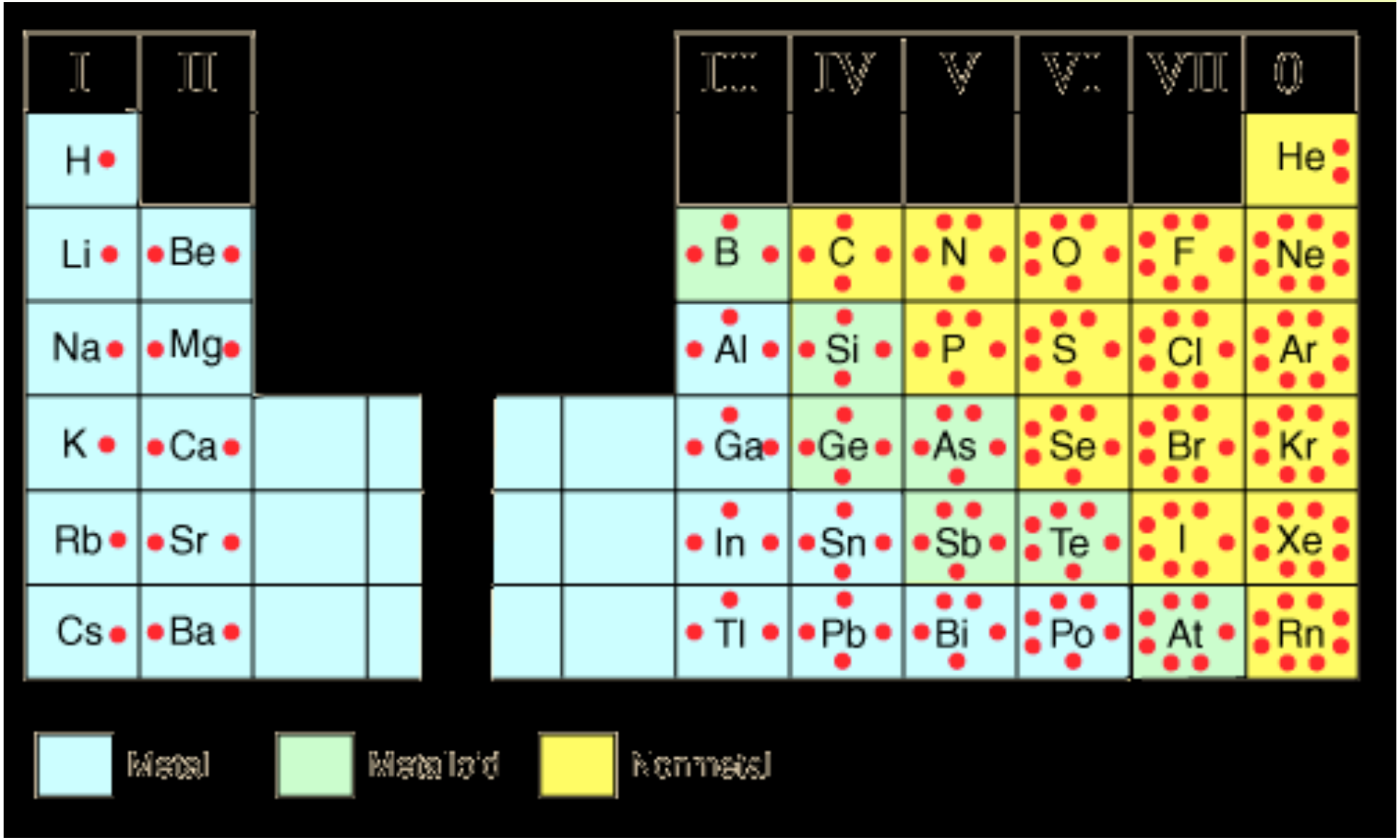
Element symbol and dots to show valence electrons.

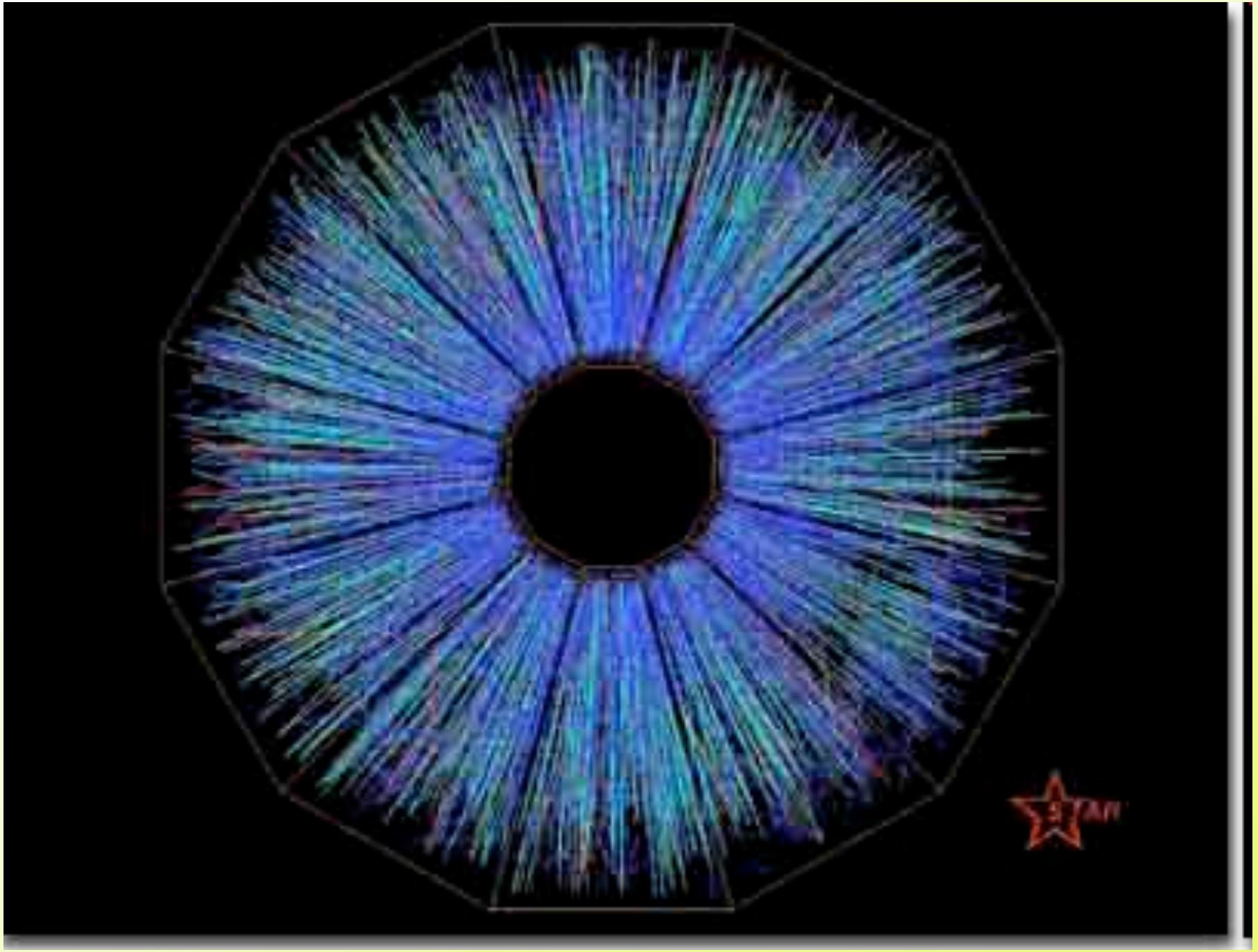
Valence Electrons

IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA
Li·	·Be·	·B·	·C·	:N·	:O:	:F:	:Ne:

In general, the number of valence electrons of a representative element is equal to the group number

VALENCE ELECTRONS

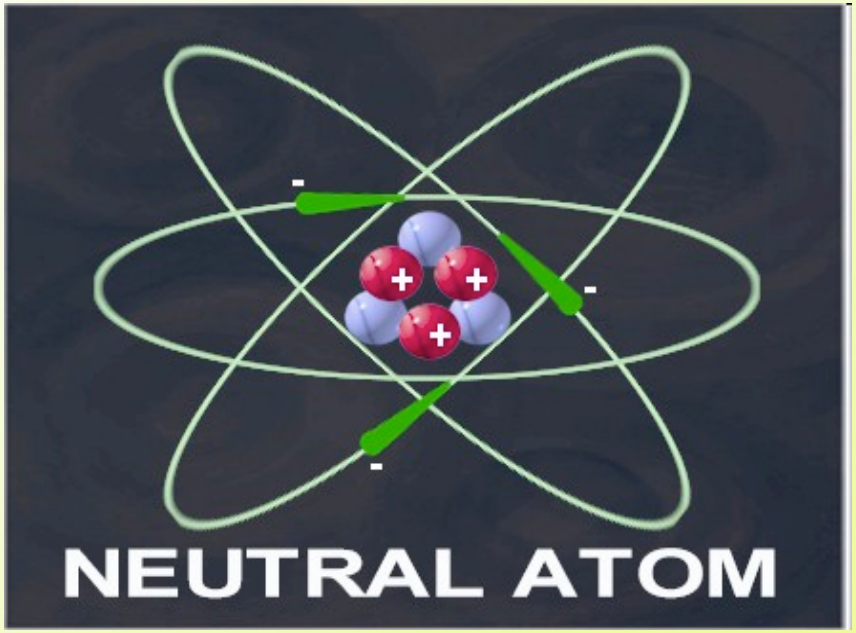




REACTIVITY

Neutral Atom

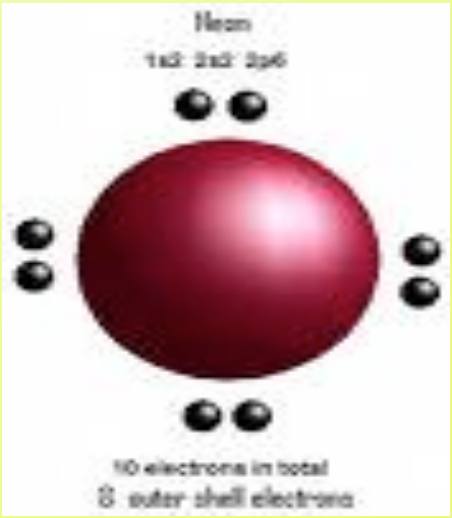
Protons = Electrons



Stable Atom:

full ring=8 electrons

-least reactive.



TYPES OF BONDS:

- METALLIC: metal + metal
- IONIC: metal + nonmetal
- COVALENT: nonmetal + nonmetal

METALLIC BOND

- Metal atoms combine in regular patterns. --+--+--+--+--

  ++++--+++--+++

  ----+----+----+----

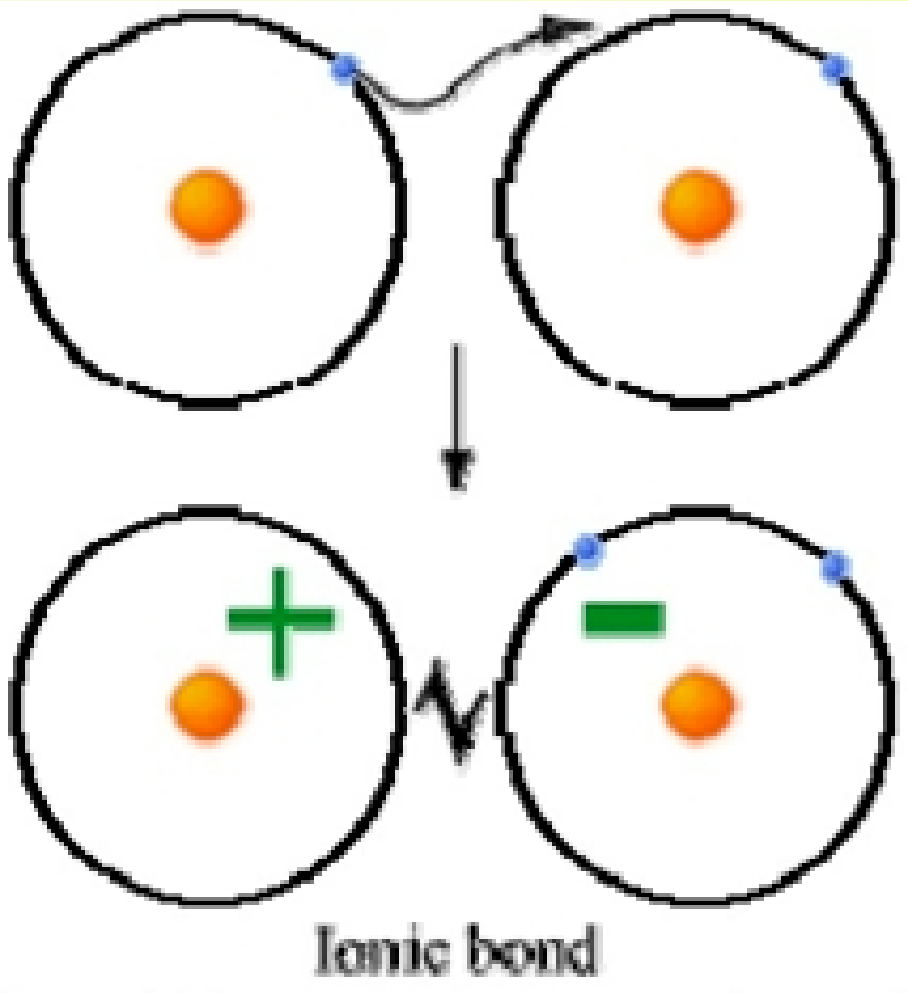
- Valence electrons move freely through metal (from atom to atom).
- Kinetic energy

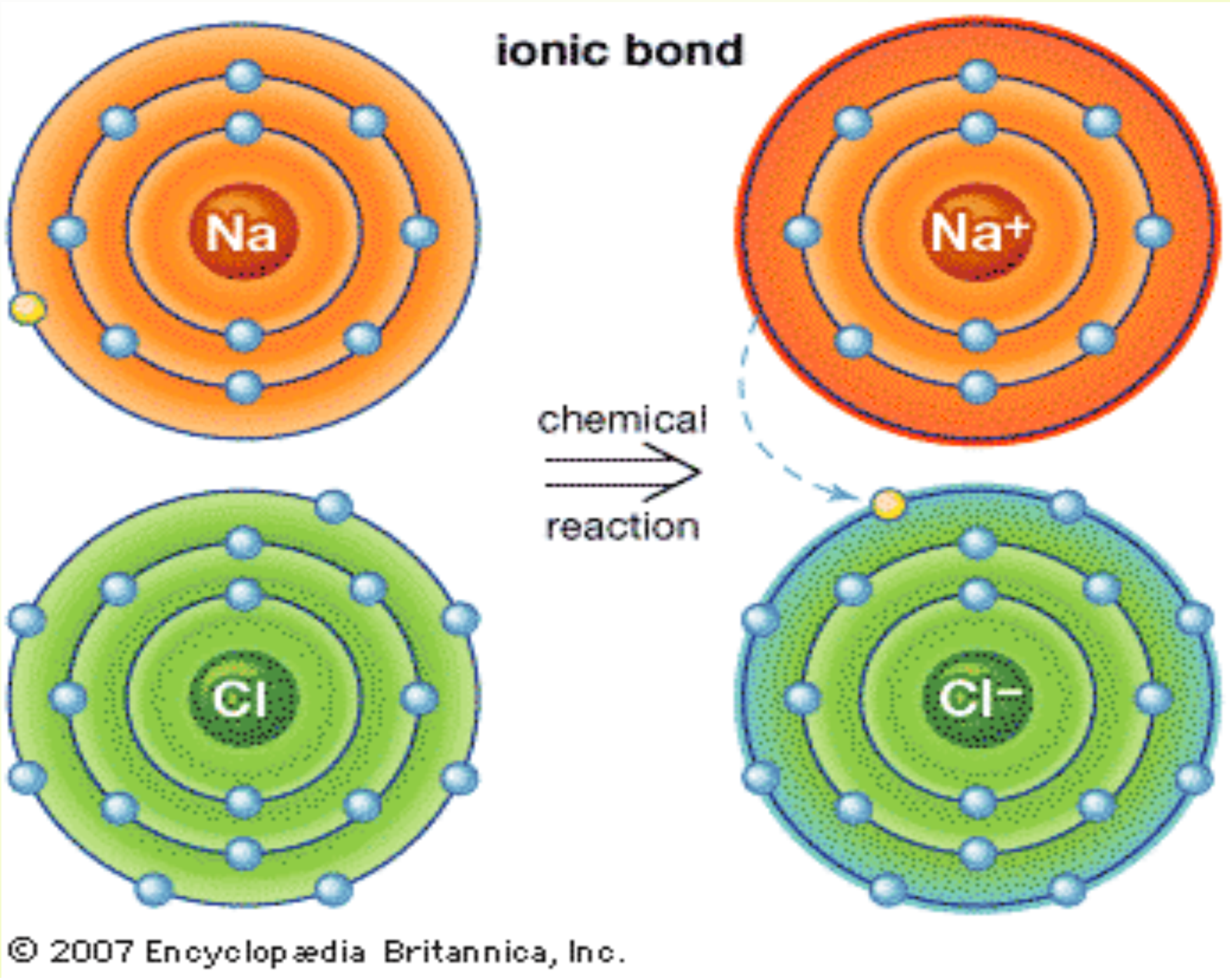
ALLOY

- A mixture of 2 or more elements.
- 1 element is metal.
- Usually stronger and less reactive.

IONIC BONDING

- Combining elements.
- M + NM
- Electrons are gained or lost and ions are formed.




ionic bond
Na
Na+
chemical
reaction
Cl
Cl−
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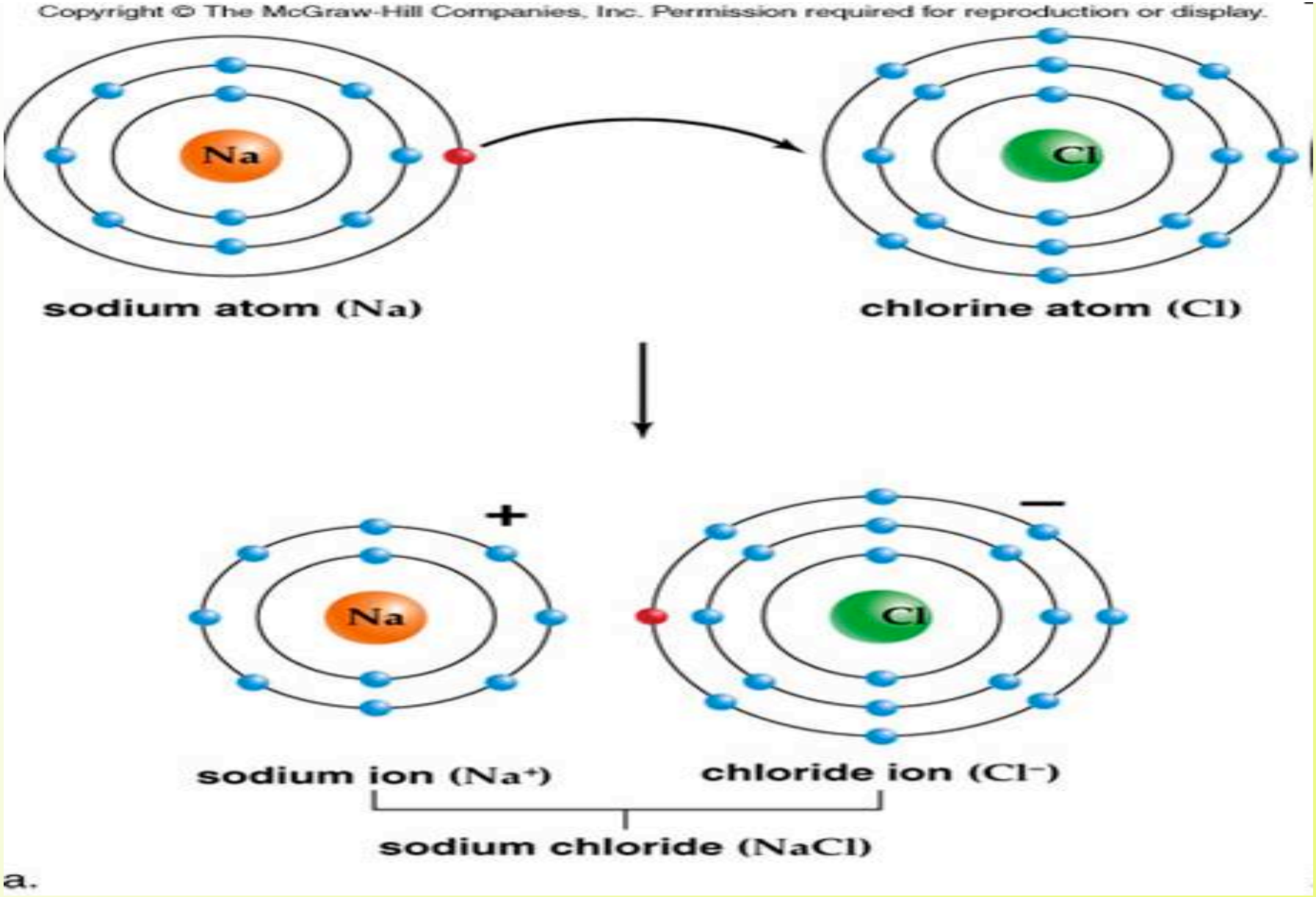
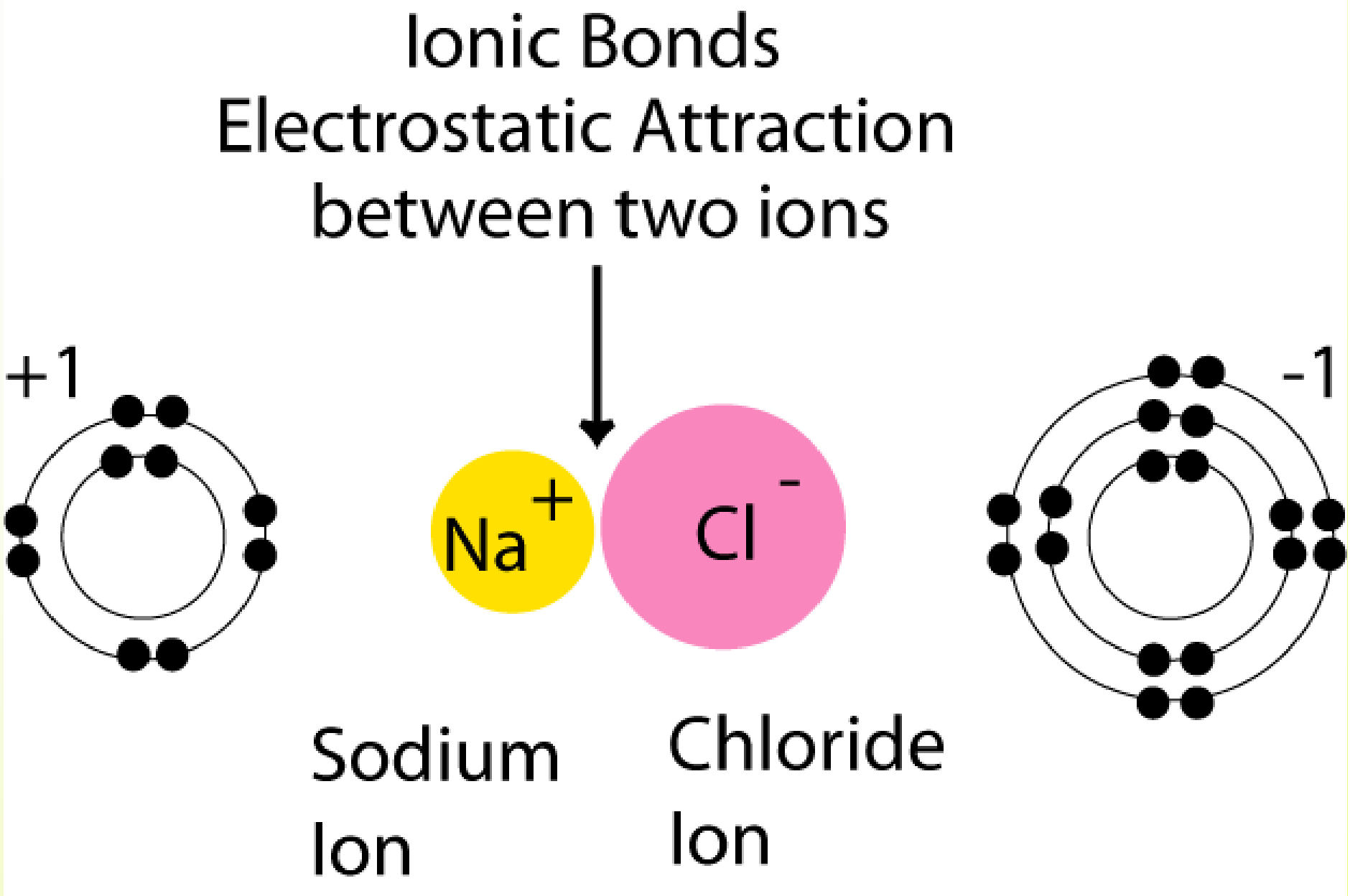
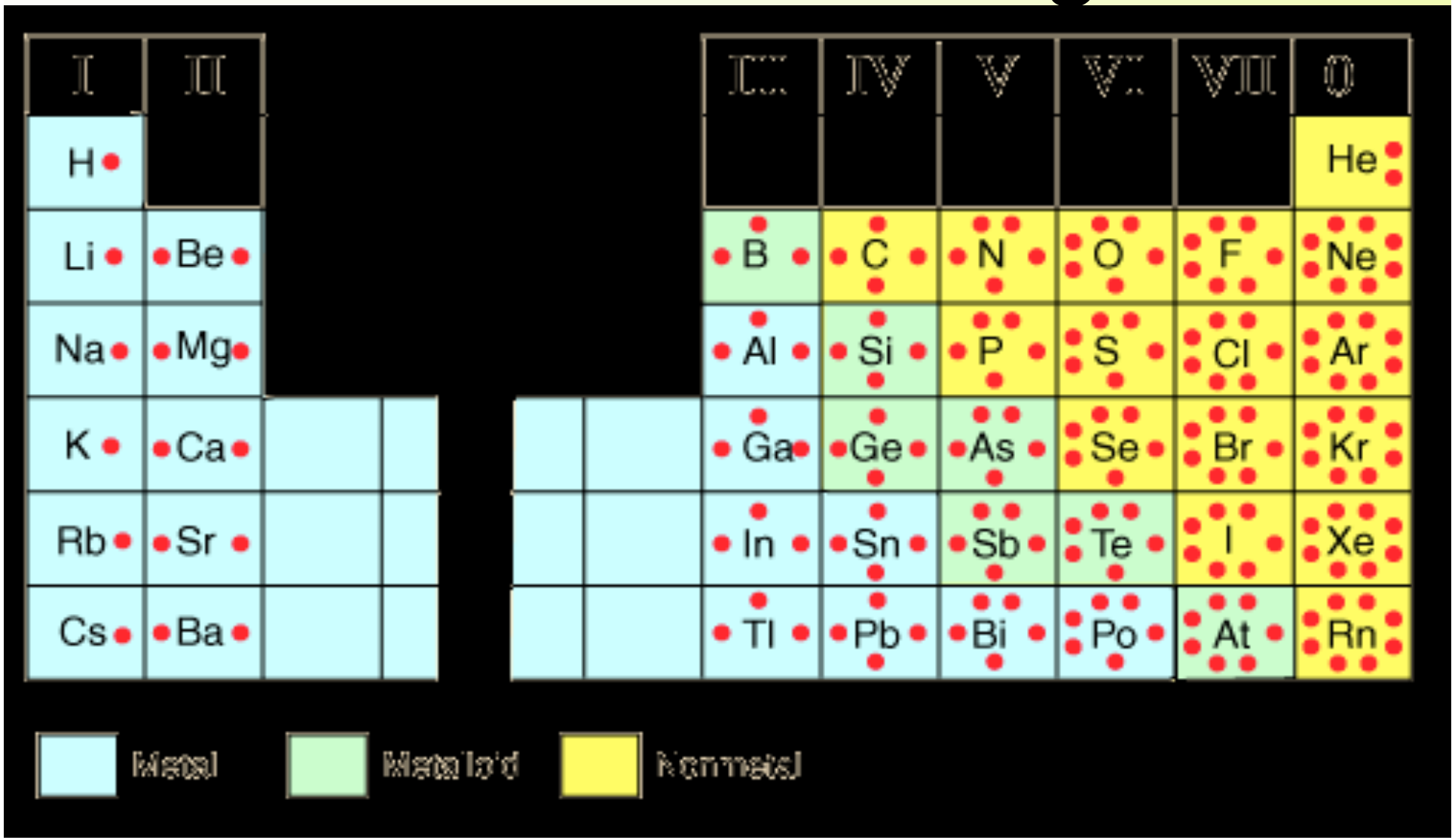


IONIC BONDS: Give or Take


Ionic Bonds
Electrostatic Attraction
between two ions
+1
Na +
Cl -
-1
Sodium
Ion
Chloride
Ion

Which end will lose?
Which end will gain?



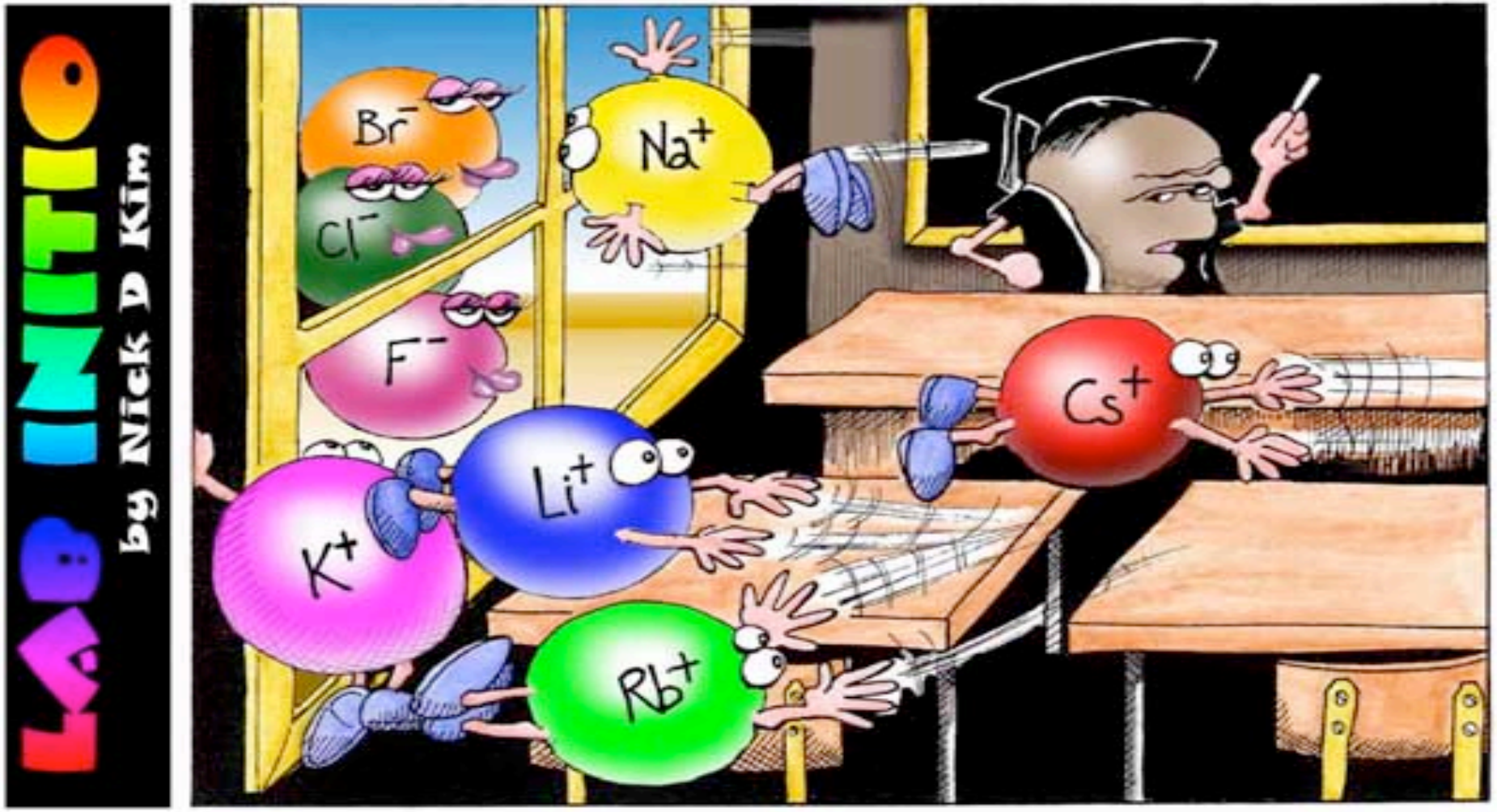
ION

An atom with a + or – charge.

When the number of protons & electrons are not equal. Taken or given during bonding.

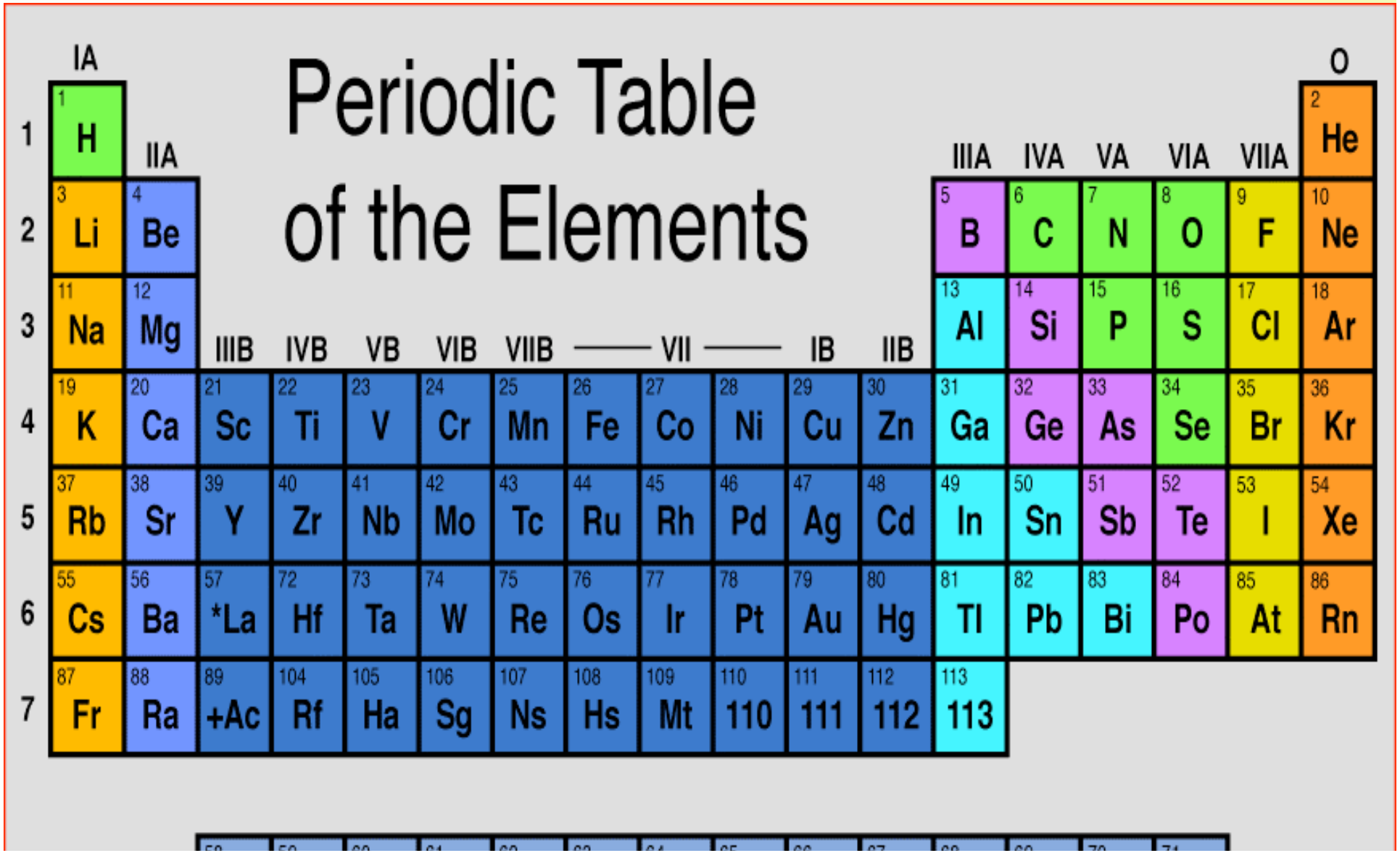
- Description: hard, brittle solids with high melting points. When melted or dissolved in water, they conduct electricity.

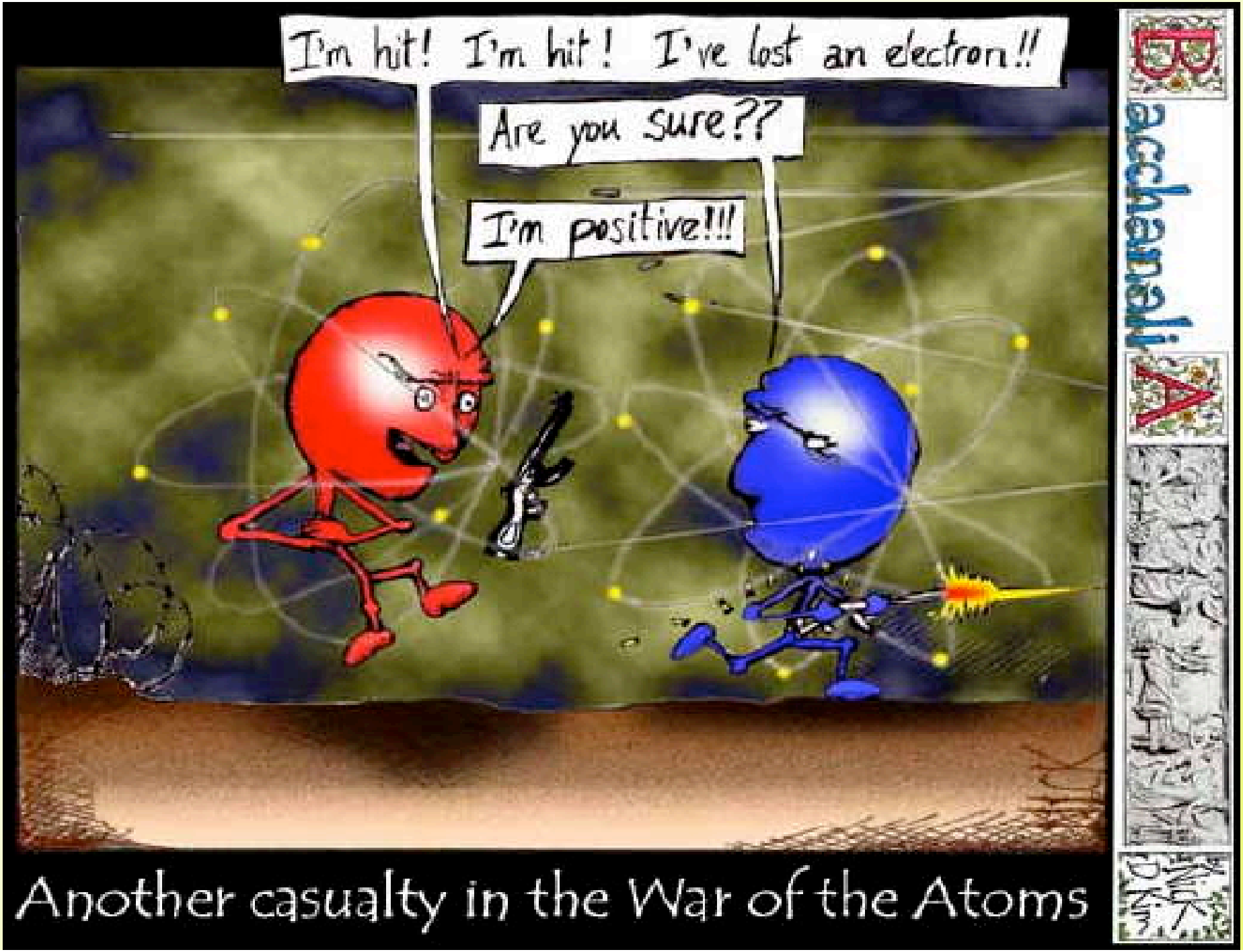
CHARGED IONS



"Perhaps one of you gentlemen would mind telling me just what it is outside the window that you find so attractive...?"

Let's Practice

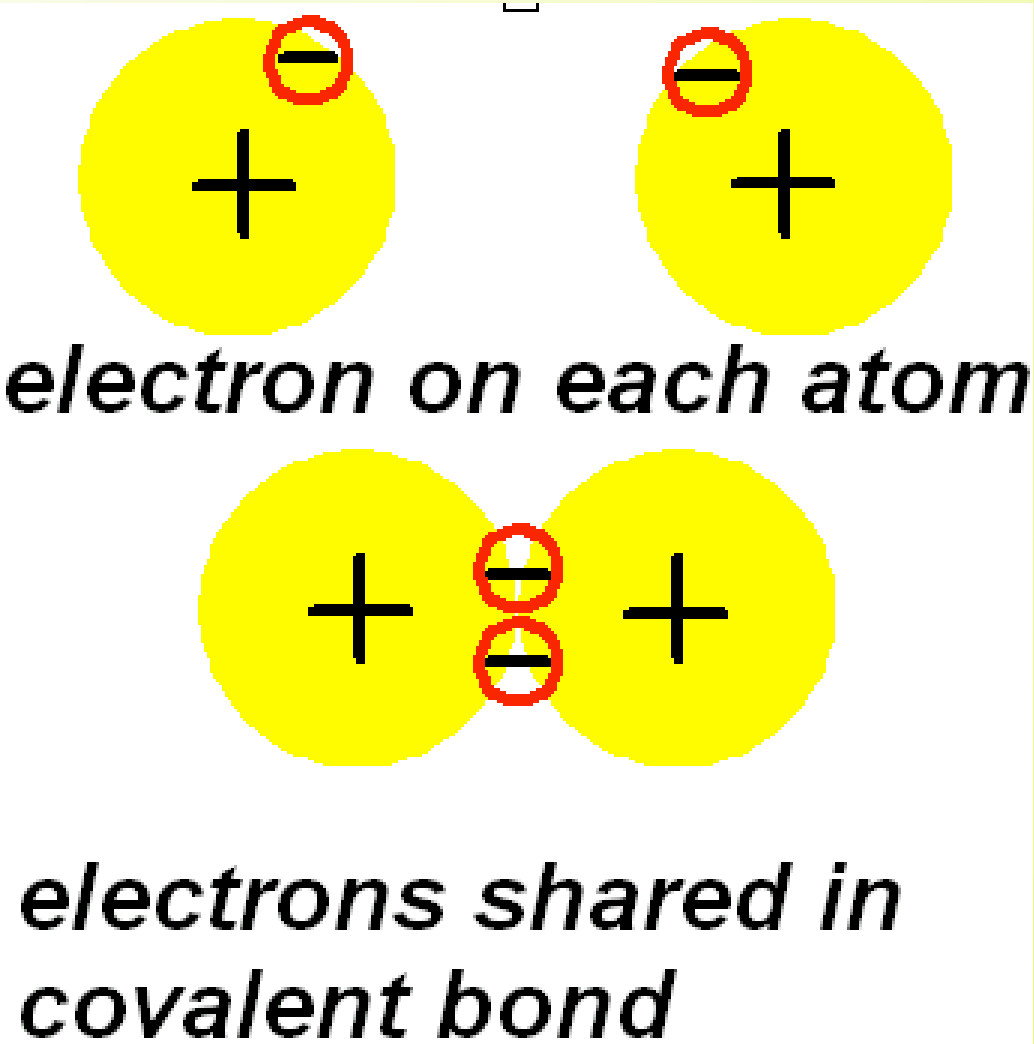




Another casualty in the War of the Atoms

COVALENT BONDING

- When atoms SHARE electrons.
- Usually between 2 nonmetals.

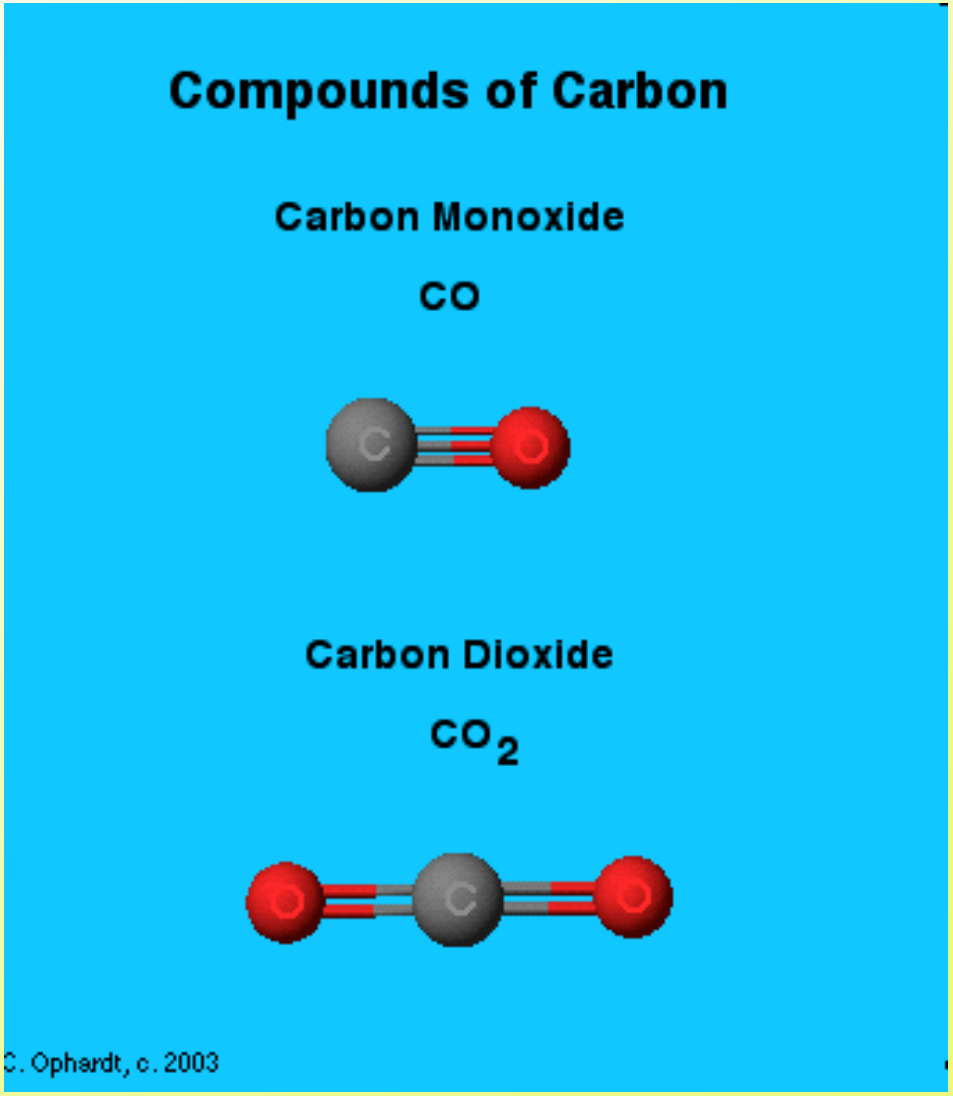


COVALENT BONDING

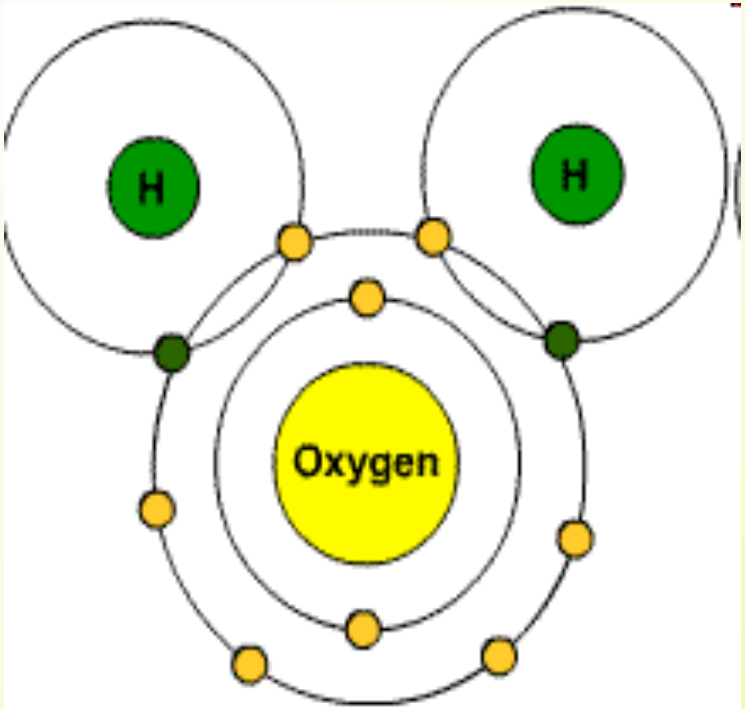
- Double bond: share 2 pairs of electrons.

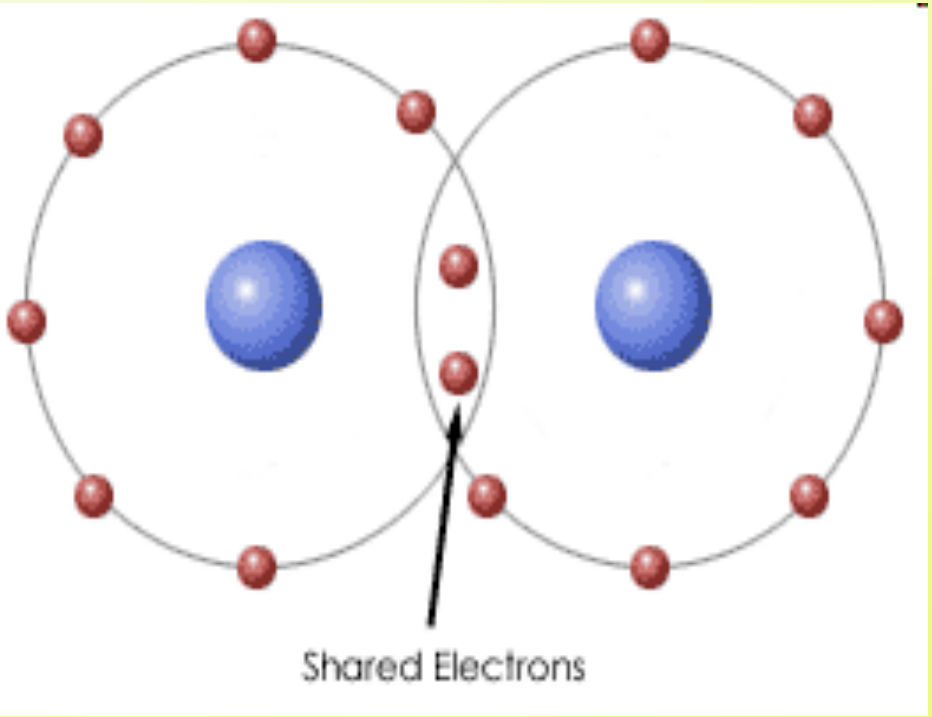
  ie: O=O
- Triple bond: share 3 pairs of electrons.

  ie: N=N



COVALENT BONDS: Share





BONDING

- POLAR BOND: Electrons shared unequally. ie: H2O
- NONPOLAR: Electrons shared equally. ie: F2

LET’S TAKE TIME TO THINK ABOUT WHAT WE HAVE LEARNED. :)