ADD TO IT NOTES

1) Go through the following PowerPoint

2) TAKE NOTES in BLACK PEN. And ONLY black pen.

3) LEAVE SPACE around your notes! VERY important

4) The next day in class we will go over the PowerPoint with more details added, and I will point out the key information

5) During step #4 you will ADD TO YOUR NOTES using a GREEN PEN that I will give you.

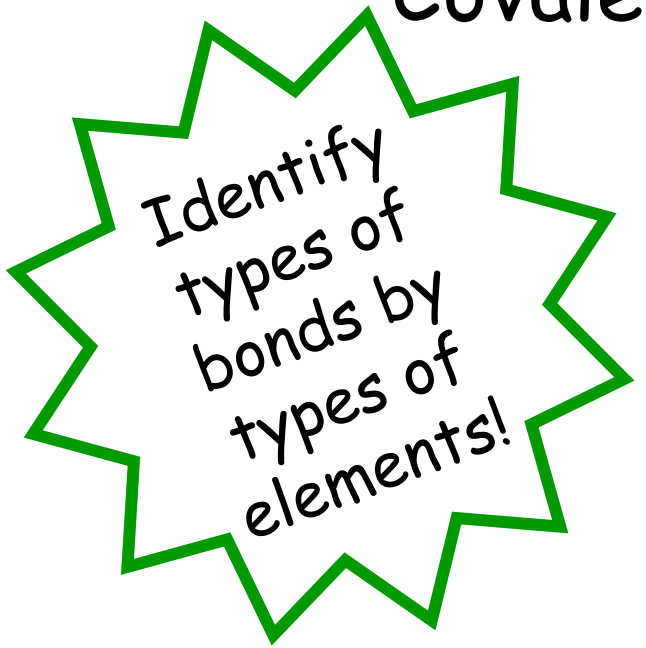
Introduction to Types of Bonds

Types of Chemical Bonds

Ionic (Metal - Nonmetal)

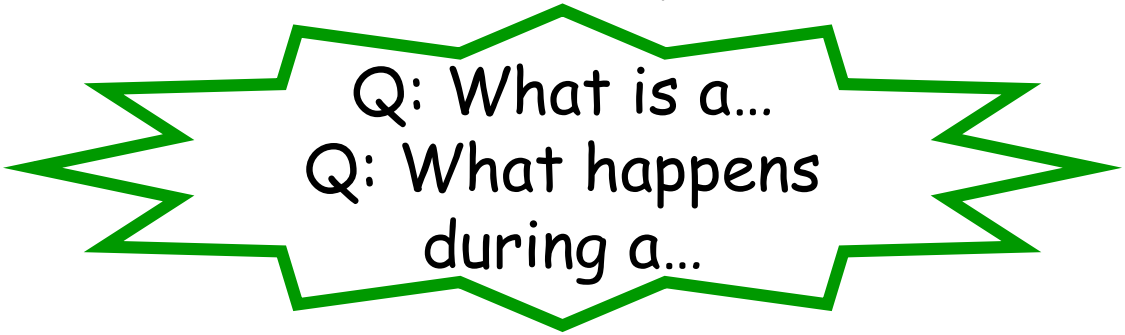
Covalent (Nonmetal - Nonmetal)

Metallic (Metal - Metal)



Chemical Reactions

- They do this by transferring or sharing electrons in order to make "bonds"



- Ionic – electrons transferred
- Covalent – electons shared
- Metallic – free flowing electrons

Why bother making bonds?

Atoms want to have a full outer shell like the noble gases have:

Ne: $1s^2 2s^2 2p^6$

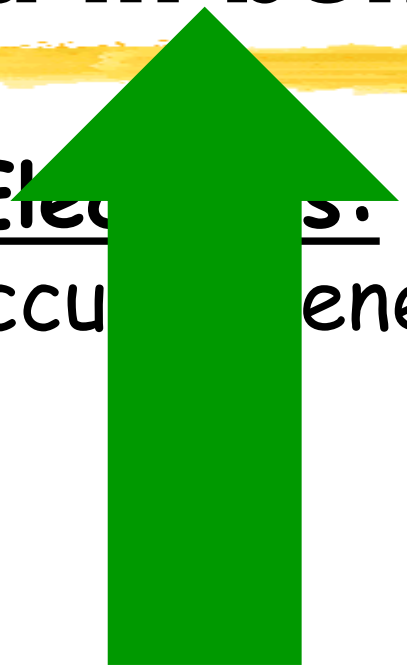
Ar: $1s^2 2s^2 2p^6 3s^2 3p^6$

WHY BOND???
TO HAVE A FULL VALENCE SHELL!

*NOTICE: A full outer shell = 8 e^-

Which electrons are involved in bonding?

- **Valence Electrons:** The e- in the highest occupied energy level of an atom



IONIC BONDS

Transferring Electrons

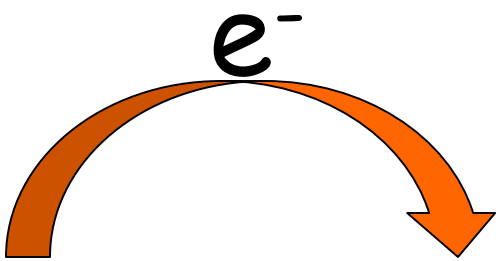
Ionic Bonds

metal + nonmetal

low ionization energy
Wants to get rid of an electron

high e^- affinity
Wants to gain an electron

Therefore:

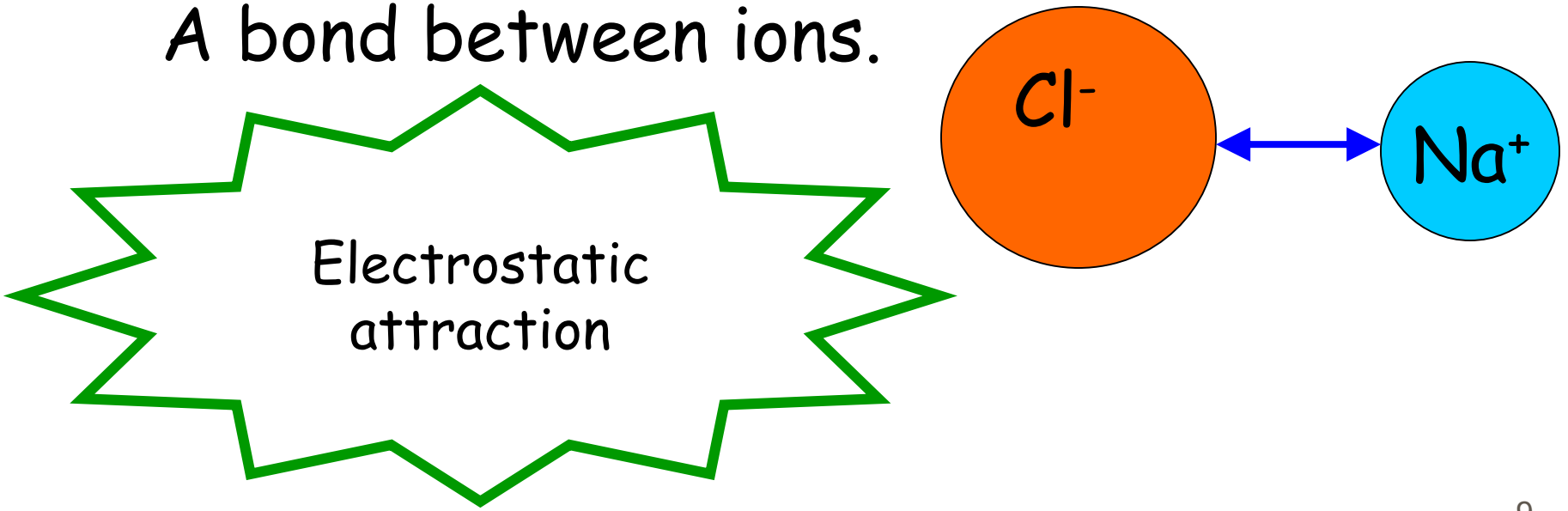


Metal + Nonmetal

Cation (positive) + Anion (negative)

NaCl – opposites attract!

The two "happy" ions now attract each other electrically. The resulting attraction is an ionic bond. A bond between ions.



Properties of Ionic Compounds

- They are solids with high melting points (typically > 400°C)

- Many are soluble in water

Properties of Ionic Compounds

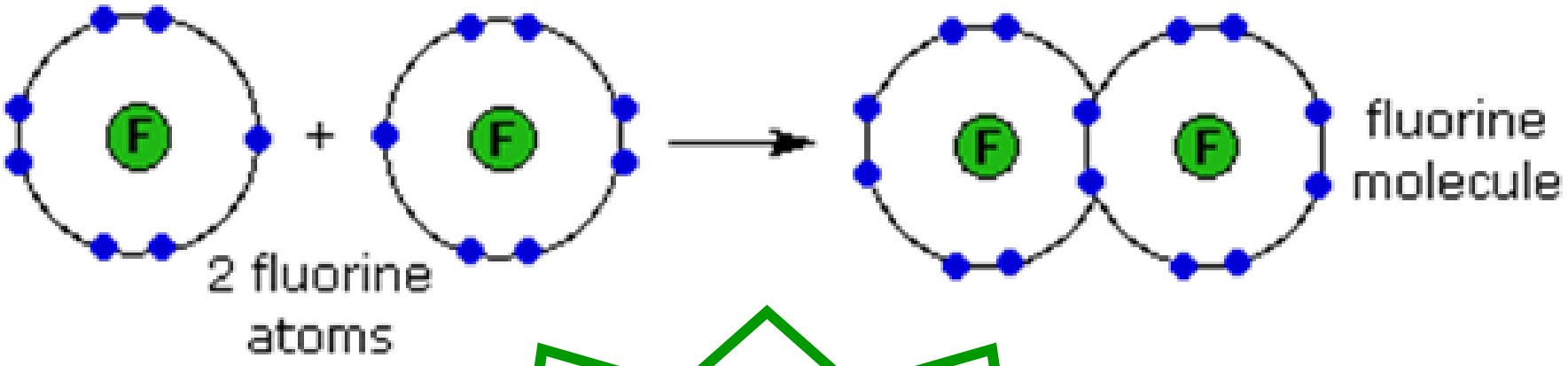
- Molten compounds conduct electricity well because they contain mobile charged particles (ions). ✓
- Aqueous solutions conduct electricity well for the same reason. ✓

Electrons can move around because ions are broken apart

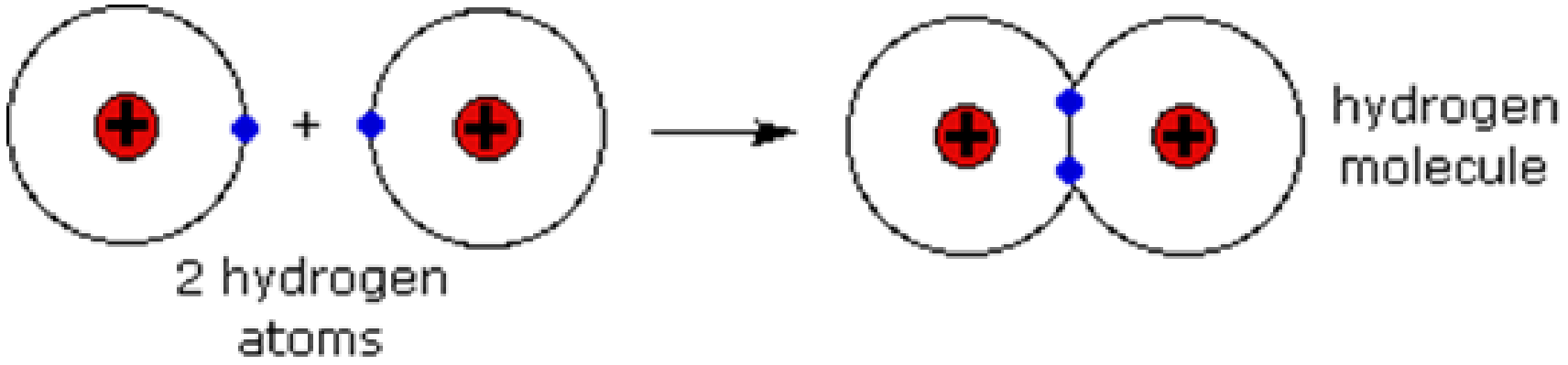
Like frogs on a lilypad

COVALENT BONDS

Sharing Electrons



Each atom is tricked into thinking it has a full shell



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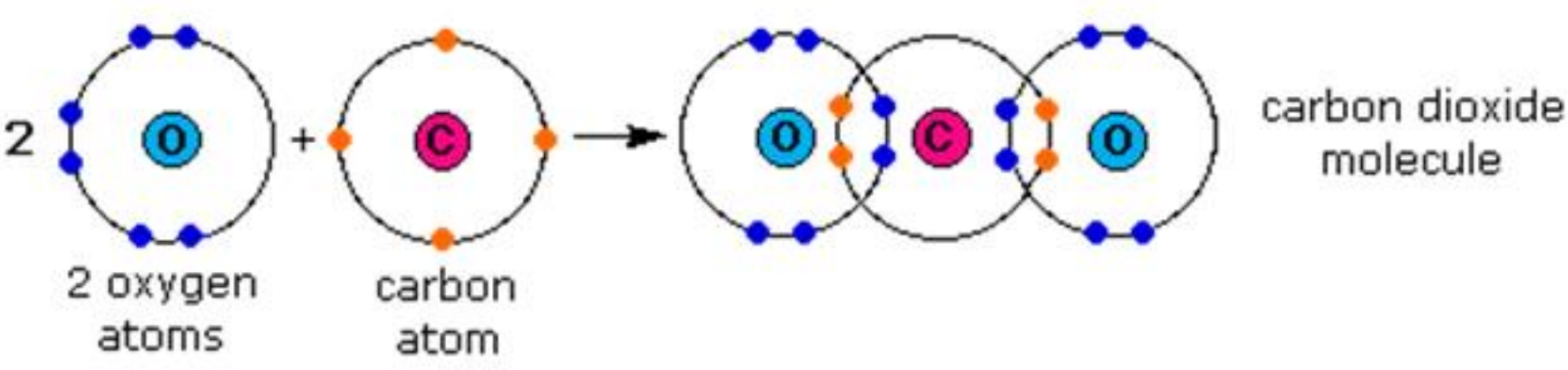
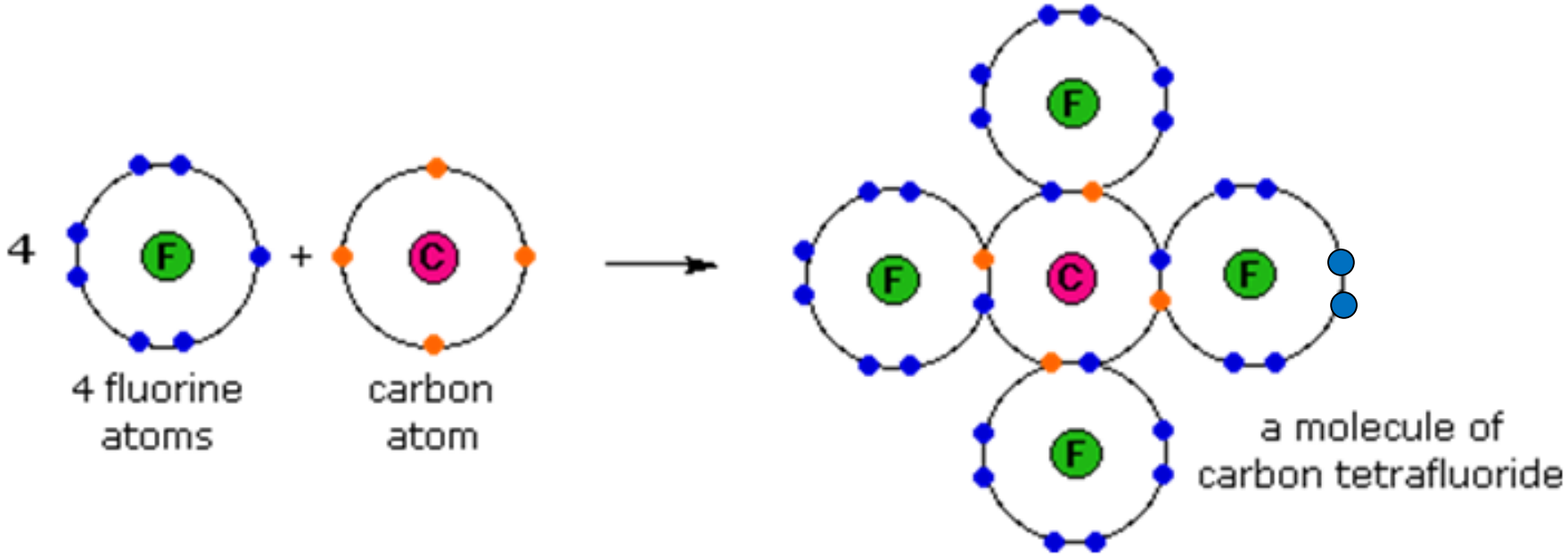


Can get complicated molecules


4
F
+
C
4 fluorine atoms
carbon atom
F
F
C
F
F
a molecule of carbon tetrafluoride

Properties of Covalent Bonds

- Don't Conduct Electricity ✓
- Low melting points ✓
- Usually not soluble in water ✓

METALLIC BONDS

Free Flowing Electrons

Metal – Metal

Electrons are able to flow freely through the metal in a

"SEA OF ELECTRONS"

Sea of Electrons Animation

Properties of Metals

- Solid at room temperature (except for mercury…it is a liquid!)
- Conduct electricity
- Malleable
- Ductile
- Have a wide range of melting points.