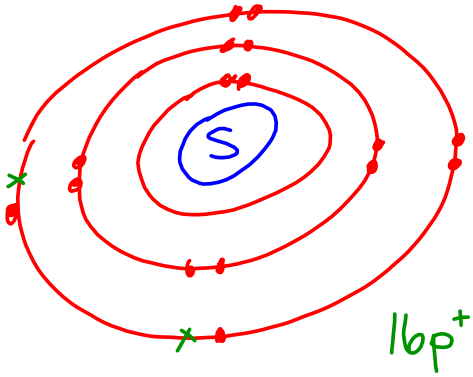
Warm Up

1. Draw a Bohr diagram of a sulfur atom.
   a) What does it need to fill it's outer shell?
   b) What is the charge on a sulfur ion?

16, S
2e⁻



$16p^+ + 18e^-$
$+16 - 18 = -2$

Simplifying the Bohr diagram

Since we've determined that it is the number of valence electrons that affect how atoms interact, we can focus on them!

Lewis Diagrams

Let's do a Lewis diagram for sulfur. We need to know 2 things:

1) What is the chemical symbol? - S

2) How many valence electrons does it have? - 6

← same positions as Bohr model, no circles, only dots.

Roman Numerals

I - 1 V - 5

II - 2 VI - 6

III - 3 VII - 7

IV - 4 VIII - 8

Do Lewis diagrams for each of the following:

1) Calcium
2) Fluorine
3) Oxygen
4) Silicon
5) Aluminum

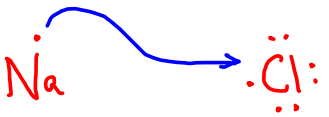
Ionic Compounds

Remember, a compound is a pure substance made up of more than one type of element.

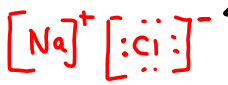
An ionic compound is a compound made up of *ions* held together by the electrical force of attraction between the ions.

Let's consider one of the most famous: Salt! - sodium, chlorine

Lewis diagram of atoms



Lewis diagram of ions



← brackets, charge outside bracket

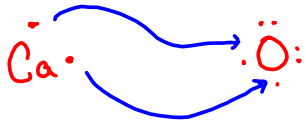
attract (opposites attract)

This force of attraction that holds the Na^+ and Cl^- together is called an ionic bond.

This compound is called Sodium Chloride.

How would Calcium and Oxygen form a compound?

Lewis of atoms

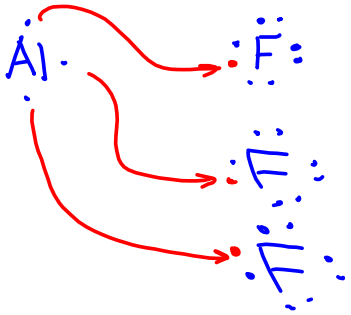


Lewis of ions

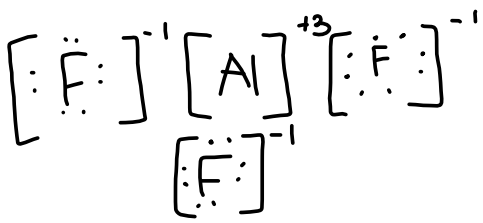
$[Ca]^{+2}$ $[:\ddot{O}:]^{-2}$

CaO - calcium oxide

What about Aluminum and Fluorine?



need 2 more F to take Al's other 2e⁻



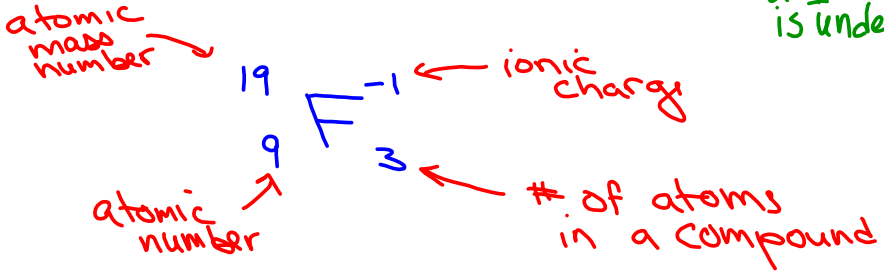
+3 + -1 + -1 + -1 = ☺

To make an ionic compound, the total charge must be ☺.

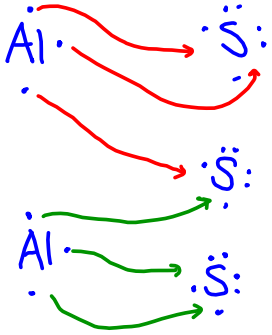
AlF_3

a 1 is understood

3 F atoms



What about Aluminum and Sulfur?



Al_2S_3

$[:\ddot{S}:]^{-2}\ [Al]^{+3}\ [:\ddot{S}:]^{-2}\ [Al]^{+3}\ [:\ddot{S}:]^{-2}$

$-2 + 3 - 2 + 3 - 2 =$ ☺

Naming simple ionic compounds

Simple: two different elements

Salt - NaCl

Rule 1: Name the positive ion first with the element name.

Sodium

Rule 2: Name the negative ion next changing the ending to -ide.

Chloride

Sodium chloride

different → Nitrogen → nitride
→ Oxygen → oxide
Fluorine → fluoride
→ Phosphorus → phosphide
Selenium → selenide
→ Antimony → Antimide
→ Sulfur → Sulfide

(anything ending in -ine just becomes -ide)

(anything ending in -ium becomes -ide

Name the other compounds we created.

In Class work/homework

Show, using Lewis diagrams, how the following substances would form ionic compounds:

1) Strontium and bromine
2) Sodium and phosphorus
3) Gallium and selenium
4) Barium and iodine

Name the four compounds.