

Warm Up

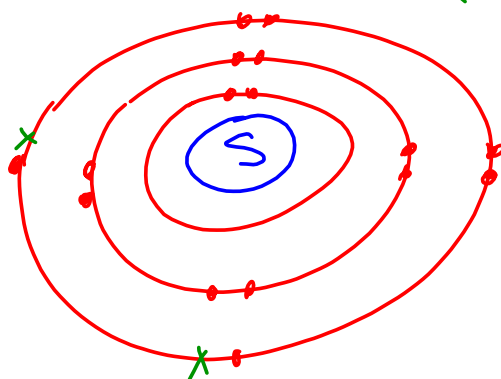


1. Draw a Bohr diagram of a sulfur atom.

a) What does it need to fill its outer shell?

b) What is the charge on a sulfur ion?

S, 16
add 2e⁻
-2



$$16p^{+} + 18e^{-}$$
$$+16 + (-18) = -2$$


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

Lewis diagram  ← e⁻s in same place as the Bohr model.

I = 1	<u>VI</u> = 6
II = 2	<u>VII</u> = 7
III = 3	<u>VIII</u> = 8
<i>one before S.</i> → IV = 4	<u>IX</u> = 9
V = 5	<u>X</u> = 10

on your periodic, the Roman numerals represent the valence electrons (at least for the 1st 3 rows) except He (but it's valence orbit is full with 2 e⁻)

Do Lewis diagrams for each of the following:

1) Calcium $\text{Ca} \cdot$

2) Fluorine $\cdot\ddot{\text{F}}\cdot$

3) Oxygen $\cdot\ddot{\text{O}}\cdot$

4) Silicon $\cdot\ddot{\text{Si}}\cdot$

5) Aluminum $\text{Al} \cdot$

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.

opposite charges attract.

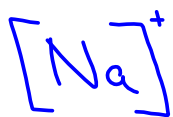
Let's consider one of the most famous: Salt!

Lewis diagram for atoms



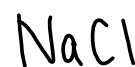
ionic charge

Lewis diagrams for ions



square brackets around ion

chemical formula



name → Sodium Chloride

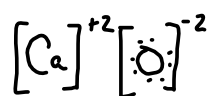
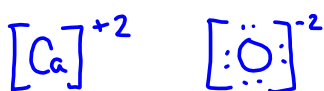
These attract. The electric force holding them together is called an ionic bond

How would Calcium and Oxygen form a compound?

Lewis for
atoms



Lewis for
ions

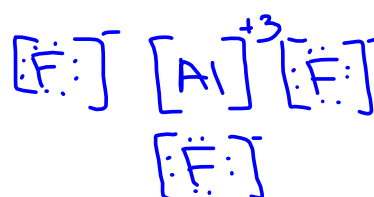
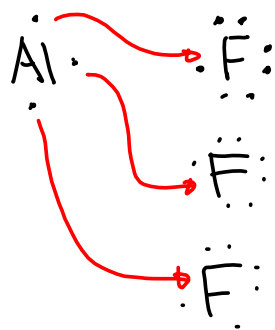


CaO Chemical formula
Calcium oxide

The total charge on an
ionic compound is \ominus (zero).

$$+2 + -2 = \ominus$$

What about Aluminum and Fluorine?

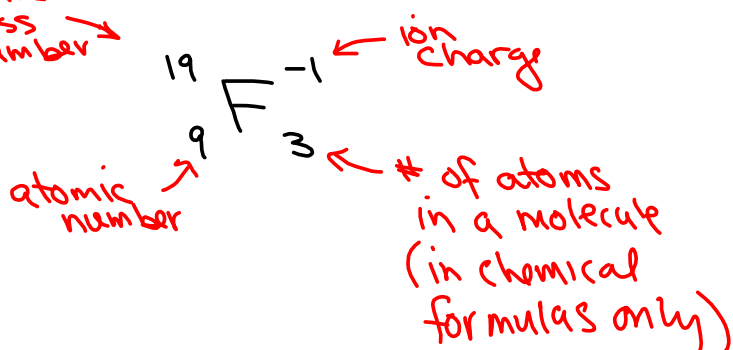


$$-1 + 3 - 1 - 1 = \text{☺}$$

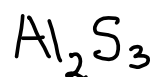
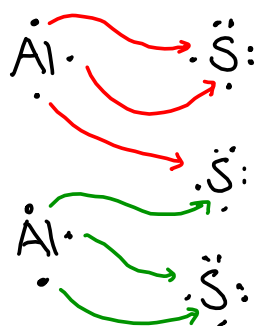


The 1 is understood
(we don't put it there)

atomic mass number →



What about Aluminum and Sulfur?



$$-2 + 3 - 2 + 3 - 2 = 0$$

Aluminum Sulfide.

Naming simple ionic compounds

Simple: two different elements

Salt - NaCl

Rule 1: Name the positive ion
with its element name

Sodium

Anything ending in -ine
or -ium
becomes -ide

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

Chloride

iodine → iodide
selenium → selenide

exceptions

nitrogen	→	nitride
oxygen	→	oxide
phosphorus	→	phosphide

sulfur	→	sulfide
arsenic	→	arsenide
antimony	→	antimide

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.