

Chemical Reactions - Why do elements react?

Almost all elements are unstable - reactive. Almost all elements are found combined together as compounds.

The noble gases do not react at all. All of their electron shells are filled. Lewis diagrams:

He

Ne

Ar

Kr

We call this arrangement a **stable octet**

All other elements rearrange their electrons in order to have the same arrangement as the noble gases.

One way elements rearrange their electrons is by transferring them

When elements lose and gain electrons they are called ions

- lose electrons they become positive ions - cations
- gain electrons they become negative ions - anions

Opposite charges attract each other this forms an ionic bond

Metals lose their valence electrons

Nonmetals gain electrons to fill their valence shell

Group 1 loses 1 electron $\rightarrow +1$

Group 2 loses 2 electrons $\rightarrow +2$

Group 13 loses 3 electrons $\rightarrow +3$

Group 15 gains 3 electrons \rightarrow -3

Group 16 gains 2 electrons \rightarrow -2

Group 17 gains 1 electron \rightarrow -1

Forming Compounds

- Draw the Lewis diagram for each element
- Identify the number of electrons needing to lose or gain
- Transfer the electrons add more atoms if required
- Identify the resulting ions that have formed

Example:

Calcium and Oxygen

Magnesium and Chlorine