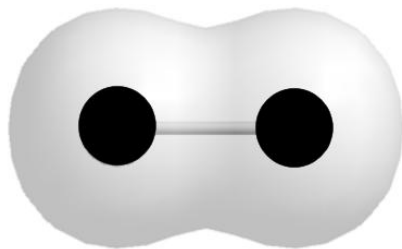


Electronegativity and Bond Polarity

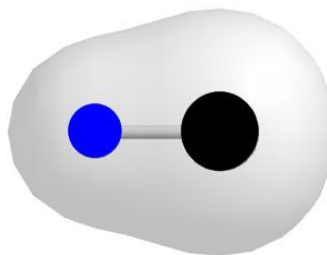
Chapter 4.3

Two Types of Covalent Bonds

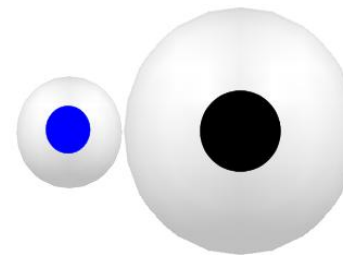
- A **non-polar covalent bond** is a covalent bond in which the electrons are shared equally between atoms
- A **polar covalent bond** is a covalent bond in which the electrons are not shared equally because one atom attracts them more strongly than the other atom



Nonpolar Covalent Bond



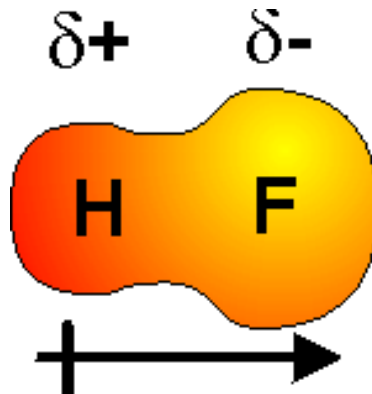
Polar Covalent Bond



Ionic Bond

Dipoles

- A **dipole** is a separation of positive and negative charges in a region of space
- A *polar bond* will have a slightly positive end and a slightly negative end
- A dipole is represented using an arrow:
 - The head of the arrow points toward the more negative end of the bond
 - The tail of the arrow is at the more positive end of the bond



Electronegativity

- **Electronegativity (EN)** is the ability of an atom in a molecule to attract shared electrons to itself

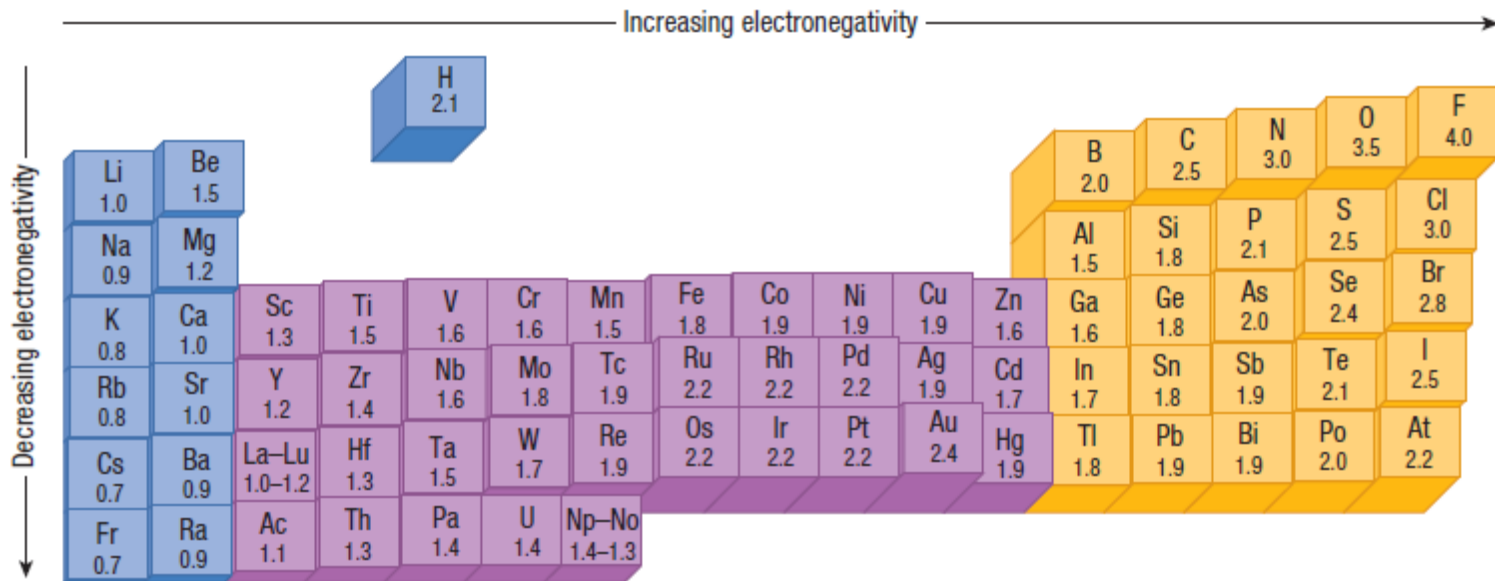


Figure 4 Electronegativity values as determined by Pauling. Electronegativity generally increases across a period and decreases down a group.

Difference in Electronegativity

- Calculating the difference in electronegativity (ΔEN) between two atoms gives us information about the bond that they will form

Table 1 Relationship between Electronegativity Difference and Bond Type

ΔEN	Bond type	Character
<0.5	non-polar covalent	covalent
0.5–1.7	polar covalent	covalent and ionic
>1.7	ionic	ionic

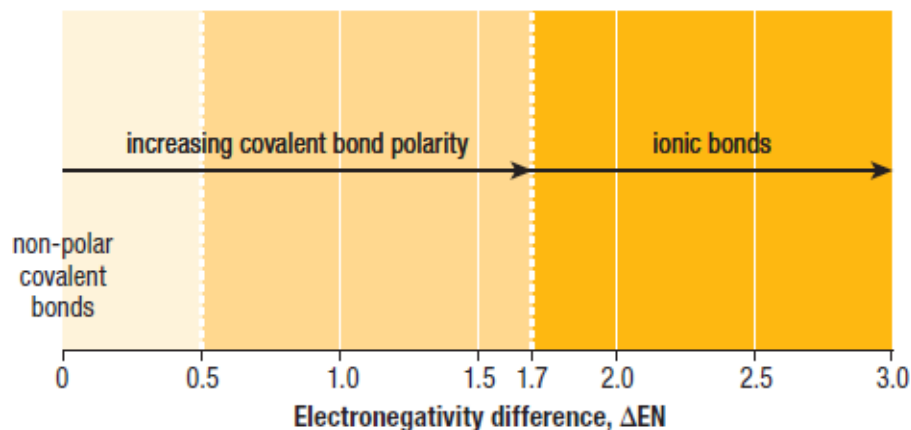


Figure 5 The difference in electronegativity between the atoms involved in bonding determines the character of the chemical bond. A small difference (≤ 1.7) indicates a covalent or polar covalent bond, and a large difference (> 1.7) indicates an ionic bond.

Practice

- Put the following bonds in order of increasing polarity



HOMework

Required Reading:

p. 217-221

(remember to supplement your notes!)

Questions:

p. 220 #1-2

p. 221 #1-10

