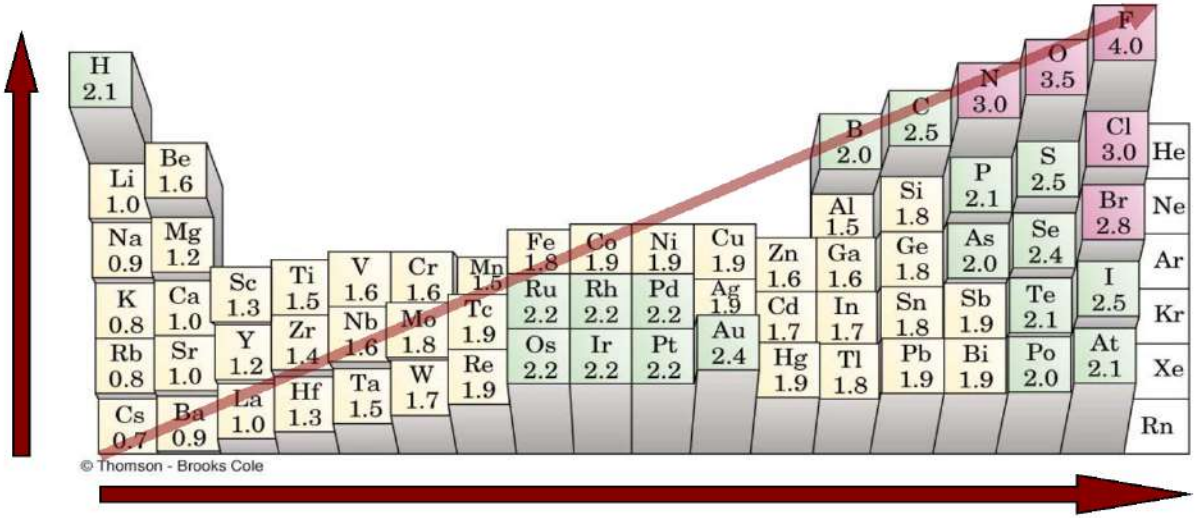
Thinking (Electro) Negatively

Making Sense page 139

The Periodic Table and Electronegativity



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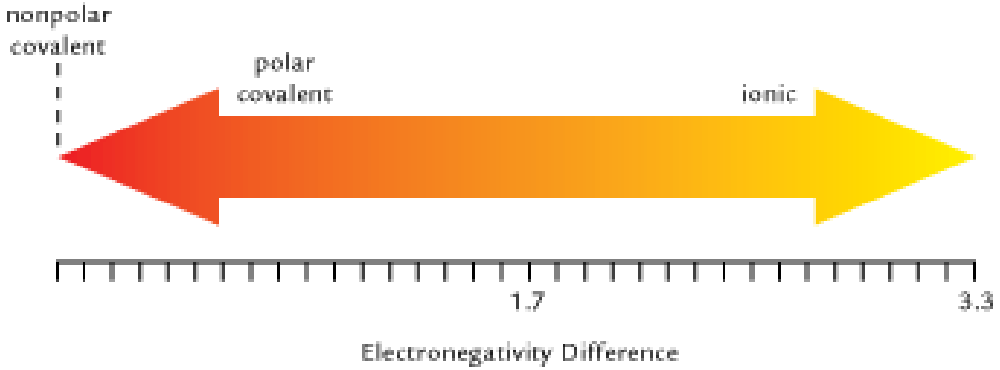
Electronegativity values increase from left to right on a period and up a group.

Electronegativity Difference



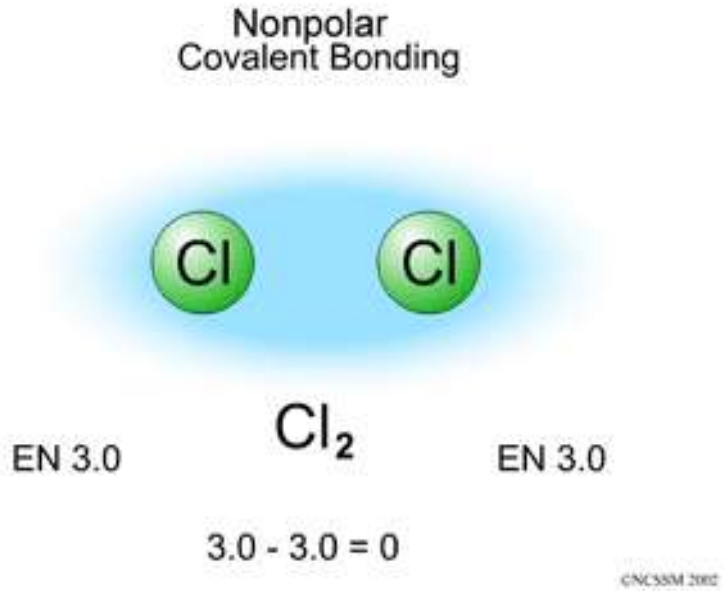
The difference of electronegativity values (EV) of two atoms determines the type of bond is between them.

Type of bond	EV difference
Nonpolar bond	0 to 0. 3
Polar bond	0.4 to 1.7
Ionic Bond	1.8 to 3.3

3 Types of Bonds

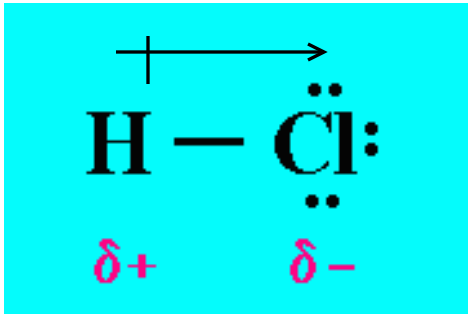
1. Bonded electrons are equally shared in a nonpolar covalent bond. It consists of nonmetals and there is no charge. Electronegativity difference is between 0 to 0.3.

Ex: Cl - Cl



2. A polar covalent bond consists of bonded electrons that are shared unequally between nonmetals. The electronegativity value difference is between 0.4 to 1.7 which results in partial charges.

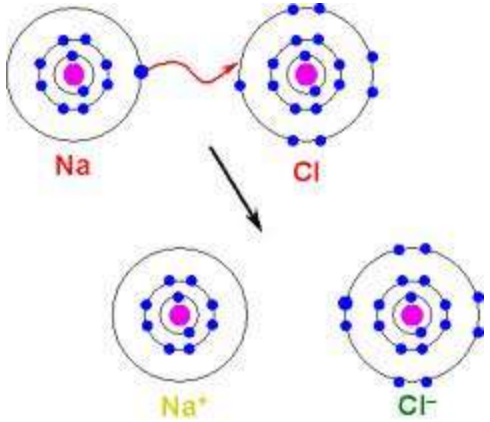
Ex: H_{EV}=2.10 Cl_{EV}=3.16 3.16-2.10 = 1.06



* Bonded electrons are pulled toward the chlorine atom.

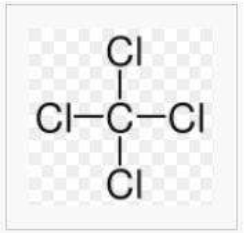
3. An ionic bond is when a nonmetal atom gains an electron(s) from a metal atom. The electronegativity value difference is between 1.8 to 3.3. The metal atom becomes a positive ion (caiton) and the nonmetal atom becomes a negative ion (anion).

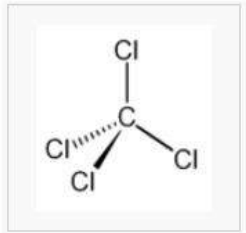
Ex: Na_{EV}= 0.93 Cl_{EV} = 3.16 3.16-0.93= 2.23



Na^+ Cl^-

Note: CCl_4 is a nonpolar molecule even though C-Cl is polar bond. Remember CCl_4 is symmetrical.





Exercises page. 139

What is the electronegativity value difference and type of bond for the following?

1. C-S
2. Li-F
3. H-I
4. C-O

Exercises page. 141

What is the electronegativity value difference and type of bond for the following?

1. C-S 2.55-2.58=0.03, nonpolar bond
2. Li-F 0.98-3.98=3.00, ionic bond
3. H-I 2.10-2.66=0.56, polar bond
4. C-O 2.55-3.44=0.89, polar bond