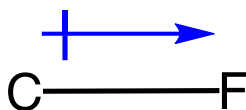


CONCEPT: DIPOLE MOMENT

- Recall, Electronegativity (EN) is a measurement of an element's ability to attract electrons to itself.
- ☐ **Periodic Trend:** Electronegativity _____ moving from left to right across a period and going up a group.

Electronegativity _____																	
1A (1)	2A (2)											3A (3)	4A (4)	5A (5)	6A (6)	7A (7)	8A (8)
1 H 2.1																	
2 Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	
3 Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	
4 K 0.8	Ca 1.0	Sc 1.3	Ti 1.5	V 1.6	Cr 1.6	Mn 1.5	Fe 1.8	Co 1.9	Ni 1.9	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr 3.0
5 Rb 0.8	Sr 1.0	Y 1.2	Zr 1.4	Nb 1.6	Mo 1.8	Tc 1.9	Ru 2.2	Rh 2.2	Pd 2.2	Ag 1.9	Cd 1.7	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	Xe 2.6
6 Cs 0.7	Ba 0.9	La 1.3	Hf 1.3	Ta 1.5	W 1.7	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.2	
7 Fr 0.7	Ra 0.9																

- Dipole Moment:** *Polarity* that arises when elements in a bond have a significant difference in their *electronegativities*.
- ☐ **Polarity:** _____ sharing of electrons between bonding atoms.
- ☐ A difference in electronegativity greater than _____ is considered significant.
- Difference in Electronegativity (ΔEN) = _____ electronegativity value - _____ electronegativity value.
- ☐ The dipole moment is illustrated by a *dipole arrow* that points towards the _____ electronegative element.



EXAMPLE: Calculate the difference in electronegativity values between carbon and fluorine.

- a) 0.5 b) 2.0 c) -1.5 d) 1.5 e) 0.0

PRACTICE: Arrange the following molecules in order of decreasing dipole moment.

H-I

H-F

H-Br


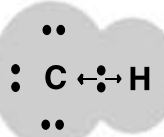
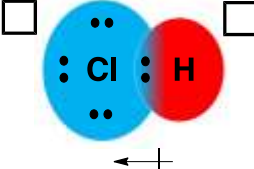
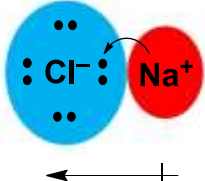
H-Cl

CONCEPT: DIPOLE MOMENT

Further Chemical Bond Classifications

- The difference in electronegativities between two elements can determine the type of chemical bond present.

□ The ____ difference in electronegativity then ____ the polarity of the bond.

Bond Classifications		
Electronegative Difference (ΔEN)	Bond Type	Bond Illustration
Zero (0.0)	_____	
Small (0.1 – 0.4)	_____	
Intermediate (0.5 – 1.7)	_____	
Large (> 1.7)	_____	

EXAMPLE: For those listed below, which has the most polar bond?

a) S–Se

b) S–H

c) Cl–F

d) S–F

e) S–O

PRACTICE: Which of the following correctly identifies the chemical bond between a carbon and oxygen atom?

a) Polar Covalent

b) Pure Covalent

c) Nonpolar Covalent

d) Ionic