Predicting Bond Type

Electronegativity (EN): An atom's ability to attract electrons in a chemical bond.

1. Increases across a period left to right (more protons in the nucleus, more attraction)
2. Decreases down a group (more orbitals, less attraction)

The difference in electronegativities (ΔEN) can be used to determine the type of bond between 2 elements.

3.3 ⟷ 1.7 ⟷ 0.4 ⟷ 0

ionic | polar covalent | slightly polar covalent | pure (non-polar) covalent

Ex. What type of bond would you get between?

1) S and O

2) Na and I

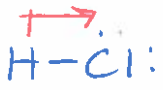
3) Br and Br

4) C and H

Polar bonds: unequal sharing of electrons between 2 atoms.

Ex HCl $\Delta EN = 0.96$

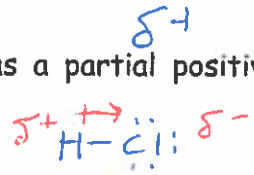
polar covalent (unequal sharing)



bond is polar

→ dipole points to the atom with higher EN (back of PT)

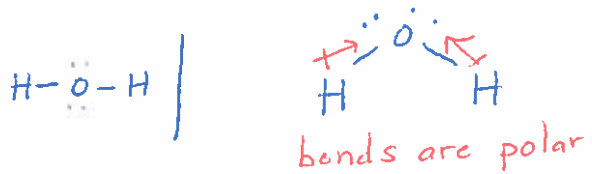
Polar compound: a molecule that has a partial positive and partial negative end (Overall Dipole)



***Just because a molecule has polar bonds, doesn't mean it is a polar compound.**

The 3-D shape of the molecule affects its polarity.

Ex 1. H_2O (Bent)

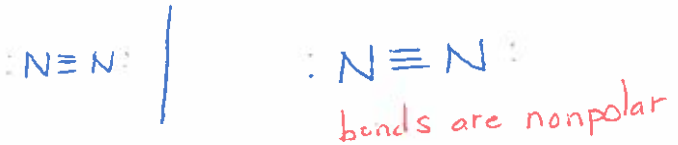


bonds are polar

molecule is polar

2 lp
2 bp

Ex 2. N_2 (Linear)

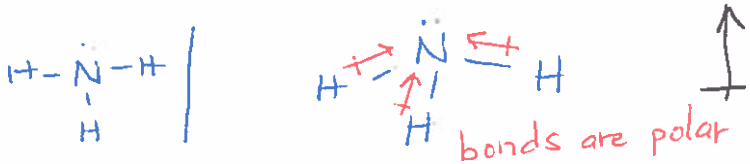


bonds are nonpolar

molecule is nonpolar

3 bp
2 lp

Ex 3. NH_3 (Pyramidal)

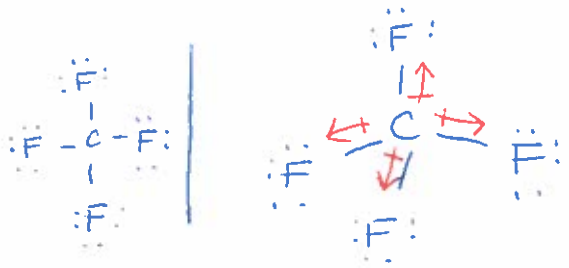


bonds are polar

molecule is polar

1 lp
3 bp

Ex 4. CF_4 (Tetrahedral)



bonds are polar

molecule is nonpolar

4 bp
12 lp