



BOND POLARITY

Electronegativity

Power of an atom to attract the two electrons in a covalent bond

																H 2.1						He
Li 1.0	Be 1.5											B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	Ne					
Na 0.9	Mg 1.2											Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Ar					
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 1.8	Ni 1.8	Cu 1.9	Zn 1.6	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr					
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					
Cs 0.7	Ba 0.9	La 1.1	Hf 1.3	Ta 1.5	W 1.77	Re 1.9	Os 2.2	Ir 2.2	Pt 2.2	Au 2.4	Hg 1.9	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2	Rn					

factors that affect electronegativity	what it is
1	
2	
3	

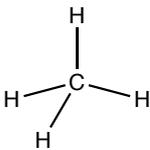
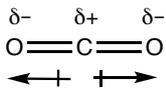
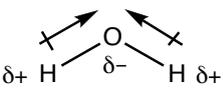
	trend in electronegativity	explanation
down a group		
across a period		

Polar covalent bonds

	non-polar covalent bond	polar covalent bond
when it happens	when the two atoms in a covalent bond have the <u>same</u> electronegativity	when the two atoms in a covalent bond have a <u>different</u> electronegativity
what it means	covalent bond where the two electrons are shared equally	covalent bond where the two electrons are not shared equally the more electronegative atom has a greater share of the two electrons and is δ^- while the less electronegative atom has a lower share and is δ^+
example	Cl-Cl bond in Cl ₂	HCl bond in HCl $\delta^+ \quad \delta^-$ H-Cl

- Note**
- Bonds that are polar have a **bond dipole moment** – this is a measure of the strength and direction of the polarity in the bond. In simple terms, the bigger the difference in electronegativity, the bigger the bond dipole moment.
 - C-H bonds in organic molecules are not regarded as being polar (although there is a small difference in electronegativity between the C and H)

Polar molecules

	non-polar molecule		polar molecule
description	no polar bonds	contains polar bonds but all the dipole moments <u>cancel</u> out	contains polar bonds but all the dipole moments do <u>not</u> cancel out
example	CH ₄ 	CO ₂ 	H ₂ O 
intermolecular forces	van der Waals' only	van der Waals' only	van der Waals' and dipole-dipole or H-bonds (depending on molecule)

Molecule	Sketch of shape	Does it contain polar bonds?	Is the molecule polar?	Intermolecular forces		
				van der Waals' (✓)	dipole-dipole (✓)	hydrogen bonds (✓)
PF ₃						
CH ₂ F ₂						
Br ₂						
BCl ₃						
CF ₄						
HCl						