



# BOND POLARITY

## Electronegativity

Electronegativity =

											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 1.7	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

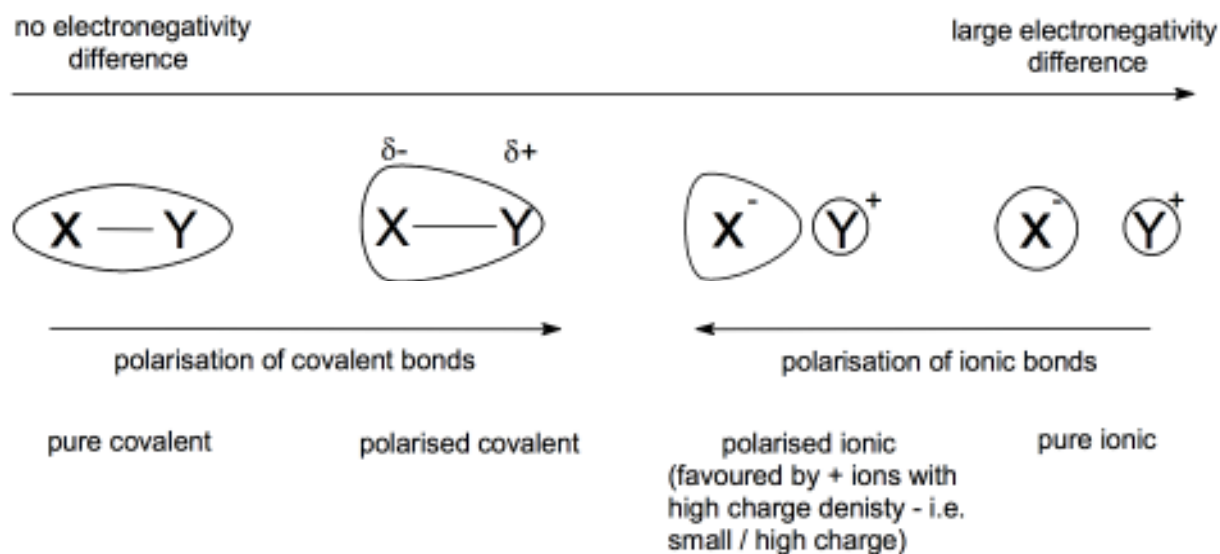
Factors that affect electronegativity:

- 1)
- 2)
- 3)

Electronegativity trend down a group:

Electronegativity trend across a period:

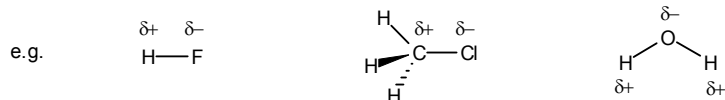
## Polarisation of bonds



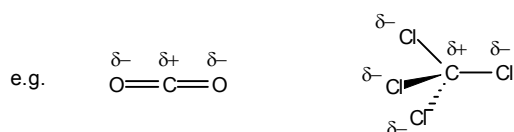
## Polar bonds and polar molecules

When the two atoms in a covalent bond have different electronegativities, the electrons are attracted more towards the more electronegative atom. This creates a slight charge separation with the more electronegative atoms being  $\delta^-$  and the less electronegative atom being  $\delta^+$ . This charge separation creates a **dipole** and makes the bond **polar**.

Many molecules with polar bonds are themselves polar and have a permanent dipole.



However, some molecules with polar bonds do not have a permanent dipole as the bond polarities cancel each other out.



Which of the following molecules are polar?

