

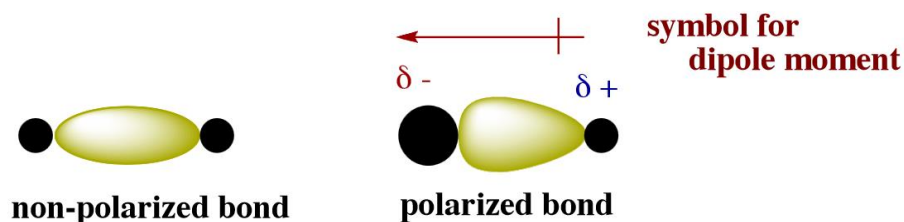
Answer on Question#38443 - Chemistry - Physical Chemistry

Question:

Polarization

Answer:

Polarization has to do with how the electrons are being shared in a covalent bond. When two atoms with different electronegativities bond together, the valence electrons are unevenly shared between them. The more electronegative atom will pull the electrons of the bond closer to itself because it has a strong "desire" for those electrons, thus making the bond polar.



The magnitude of this bond polarization is measurable and it is called bond moment, measured as the dipole moment.

Dipole Moments for Common Bonds

<u>Bond</u>	<u>Dipole moment (Debye)</u>	<u>Bond</u>	<u>Dipole moment (Debye)</u>
C-C	0.0	H-N	1.31
C-H	0.3	C=N	1.4
H-I	0.38	H-O	1.51
C-N	0.45	C-I	1.65
C-O	0.74	C-F	1.79
H-Br	0.78	C-Br	1.82
C-S	0.9	C-Cl	1.87
H-Cl	1.08	H-F	1.94
		C=O	2.4

In electrochemistry, polarization is an effect that counteracts and lowers the efficiency of electrochemical processes. The mechanism is typically depletion of reagents causing concentration gradients in boundary layers or the formation of compounds partly passivating the electrode surfaces and having the effect (depending on conditions) of decreasing the output voltage of batteries, increasing the voltage required by electrolysis cells or lowering currents. It is a type of kinetic deviation from equilibrium conditions. It is usually distinguished from overpotential.

Types of polarization

Activation-reaction at metal-electrolyte

Concentration-diffusion in electrolyte