CH 222 Guide to Polarity

Polarity arises when two atoms in a bond receive unequal distributions of electron density; i.e. one atom is slightly more negative than the other.

Example: In HCl, the Cl is more negative than the H

Polarity is an important property of molecules.
It affects physical properties such as melting point, boiling point and solubility.
Chemical properties also depend on polarity.
Dipole moment, μ, is a quantitative measure of the polarity of a molecule.

A molecule is **nonpolar** if the central atom is symmetrically substituted by identical atoms.

Examples: CO_2, CH_4 , CCl_4

A molecule will be **polar** if the geometry is not symmetrical.

Examples: H_2O, NH_3, CH_2Cl_2

The **degree of polarity** is a function of the *number* and *type* of polar bonds as well as the *geometry*.

For a molecule to be polar, the effects of bond polarity must not cancel out.