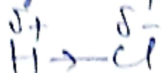


# Structure & Reactivity

The reactivity of molecules is directly related to their structures. For instance if we consider  $H-H$  &  $H-Cl$  molecule, in which hydrogen is covalently bonded to hydrogen & chlorine respectively, but their properties differ. This can be explained by partial polarisation of electron cloud due to difference in electronegativity in the latter case, leading to charge separation as



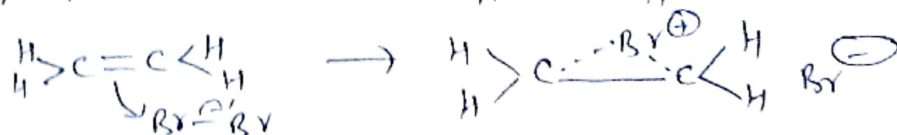
So, in solvents having good dielectric constant,  $HCl$  behaves as an acid, i.e.,  $H^+$  donor, but  $H_2$  shows no acidic behaviour.

So it is clear that polarities of electron cloud towards a particular atom depends on the structure of the molecule. The extent of polarisation varies from one molecule to another which are structurally different. The polarisation causes an electronic imbalance, causing the molecule to ~~show~~ differ in reactivity. However besides electronic polarisation, other factors like steric factor, also govern the reactivity of the molecule. Polarisation is classified as: —



(i) Temporary polarisation:— such polarisation is felt only in the excited state of the molecule, i.e., when the molecule comes in contact with ~~each~~ <sup>some</sup> other molecule during a chemical reaction.

e.g., Addition of  $Br_2$  on  $H_2C=CH_2$



This temporary polarisation is known as electromeric effect.

(ii) Permanent polarisation:— such polarisation is an inherent property of certain molecules & found in ~~the~~ <sup>its</sup> ground state. Such polarisation gets relayed from one site to another in the molecule & on the basis of modes of relay it is of three kinds:— (i) Inductive effect (ii) Mesomeric effect (iii) Hyperconjugation.