Liquids

The difference between a gas, liquid and solid is the distance separating the individual particles.

Gas - particles separated by large distances, no attractions
Solid - particles very close together, highly ordered
Liquid - particles are close, some order, some attractive forces

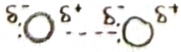
Intramolecular forces: Forces within an individual molecule Chemical bonds

Intermolecular forces: Forces between different molecules

Intermolecular Forces

London Dispersion Force (or London Force): Weak attractive forces exhibited by all particles (regardless of dipole moment).

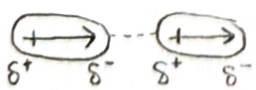
Temporary fluctuations in electron distribution between atoms or molecules



Dipole-Dipole Force: A partially positive end of one molecule attracts a partially negative end of another molecule.

About 1% as strong as an actual covalent or ionic bond.

Polar molecule (pemanent dipole moment)

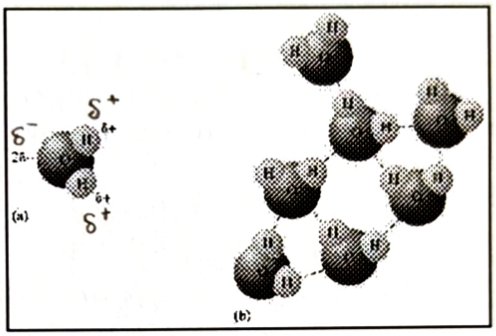


Intermolecular Forces

Hydrogen Bonding: Special dipole-dipole attraction between H atoms and N, O or F atoms.

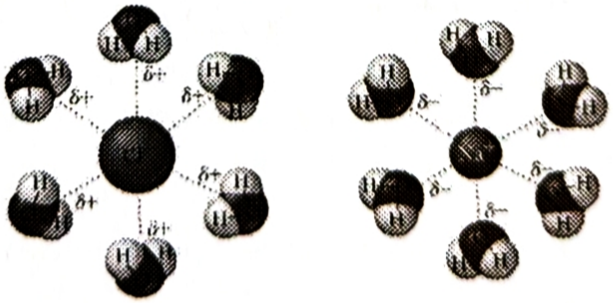
Covalently bonded

2-5% as strong as covalent bonds



Intermolecular Forces

Ion-Dipole Force: Very strong attractive force between ions and polar molecules.

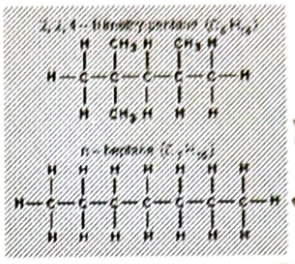


Miscibility of Ethanol in Gasoline and Diesel Fuel

Gasoline

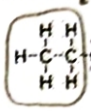
Aliphatic hydrocarbons

Contain C-H bonds



Nonpolar

Contains up to 10% ethanol (C_2H_5OH)



Polar

H bonds

Like likes like.