

Intermolecular forces

Monday, 26 February 2024 9:32 am

Intermolecular attraction - the attraction between molecule

Intermolecular force - force formed when there are attraction between molecule

- Intermolecular force have to overcome in order to let a substance to change its statement. - phase change which force of attraction between molecule is overcome (not the bond between the atom expect there are chemical changes)

Melting and evaporate - heat

Condense - cold

Intermolecular force form when there are attraction between molecular

London(dispersion) forces (all molecule have it even the electronegativity difference is low)

- Force between non-polar molecule or atom
- It became stronger as the molar mass increase (bigger molar mass more electron)

The electron distribute temporarily in the middle of a bond between two atom as the electron are not stationary - however, some electrons may slightly closer to one side than the other (this could be reversed) so there have temporarily dipole
This presence of these temporary dipoles causes attraction between neighboring molecule that both experience this asymmetry in electron distribution

(It is the attraction between molecule which cause by the moving electron temporarily distribution in the molecule.)

Dipole - dipole include in the dispersion forces

The attraction between the partial positive of one polar molecule and the partial negative of the another polar molecule (between permanent dipole (exist in asymmetrical molecule))

- Stronger than the dispersion forces

Hydrogen bonding (dipole - induced - dipole)

- Type of Dipole - dipole bond
 - Only exist in N,O, F bond to H - molecule has special dipole - dipole force
 - FON element must have a non - bonding pair of electron
 - The attraction between the S+ hydrogen bonded FON with non bonding pair of electron molecule and nearby molecule that has the similar structure which electronegative element - H.
- Strong attraction because the electronegativity of H, as element allow H have strong S+ (S+ increase as hydrogen has no inner electron to shield the impact of its nucleus) make the S+ hydrogen very attract to non-bonding pair of electron on neighboring molecules

Strength of intermolecular force

Molecular size (molar mass) increase - the strength of intermolecular force increase

- The greater the number of electron in molecule, greater probability of electron distribute asymmetry or more susceptible the molecule develop an induced (bring about or give rise to/bring on) molecule from a charge nearby

For dipole - dipole (which has most polarity)

For hydrogen bonds (which has most nonbonding pair of electron)

For solubility

Non polar - polar (polar difference) > hydrogen bond > dipole - dipole bond > london dispersion

For isomers:

intermolecular forces of attraction also depend upon the contact surface area between the molecules. Less surface area exposed for attraction less attraction

Compare between molecule

- Hydrogen bond > dipole-dipole > London dispersion force
- Indicate the physical properties.

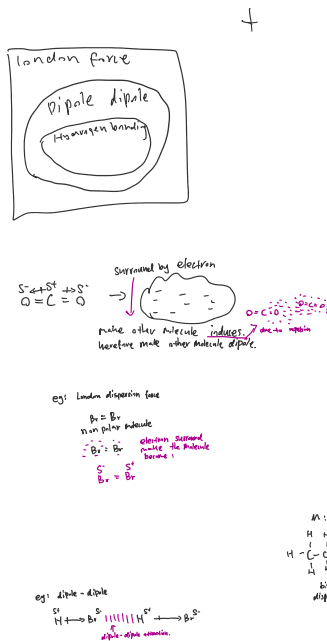
Intermolecular force stronger as the molar mass increase

Intramolecular forces - the force that holds atoms together within a molecule

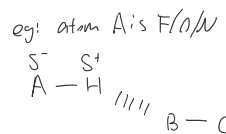
Intermolecular force - the attraction force that exist between molecules

Van der Waals forces - general term used to define the attraction of intermolecular forces between molecules

The electron distributed temporarily in the middle of the bond as the electron is constantly moving, however, some time, the electron can move slightly to a side of element therefore has temporarily dipole, this temporarily dipole cause the attraction with the neighbouring molecule that both experience this asymmetrical electron distribution



Permanent dipole net dipole is not zero



- Dipole-dipole forces involve interactions between permanent dipoles in polar molecules.
- London dispersion forces involve interactions between temporary dipoles in all molecules.
- Hydrogen bonds are a specific and particularly strong type of dipole-dipole interaction.

Which dipole-dipole force is not a type of london dispersion force, hydrogen bond is a type of dipole-dipole force.

Susceptible - how likely to be affect