

What is a Thin **Film** \rightarrow Supported.
 \rightarrow unsupported.

Date : 17.01.2022

Lecture 05.

What is Surface Tension \rightarrow Intermolecular interaction.

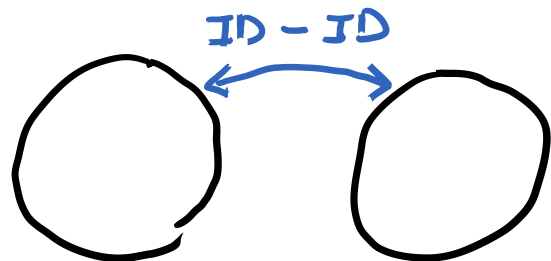


Induced Dipole - Induced Dipole Van der Waal's forces

(Discussed how this interaction results in the Pressure Correction Term in VANDER waal's E.O.S.)

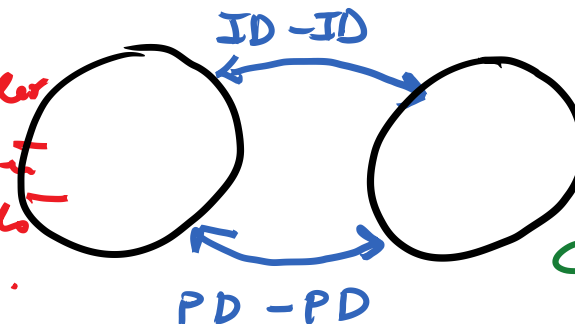
\rightarrow Born Repulsion \rightarrow Lennard Jones potential
6-12 potential.

a - Polar Molecule



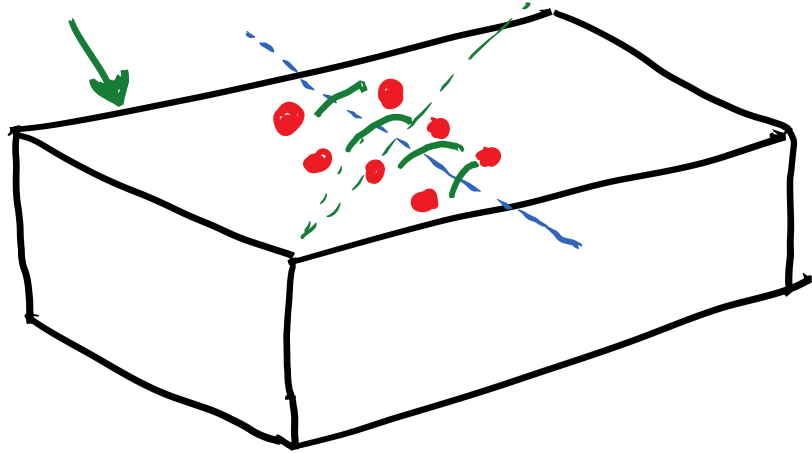
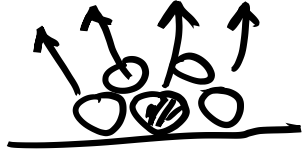
Intermolecular Interaction in Polar molecules much stronger.

Polar molecule \rightarrow There will be PD - PD interaction over and above ID - ID interaction.

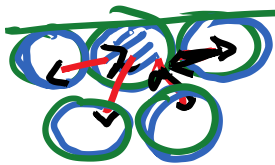


Consequence: \rightarrow

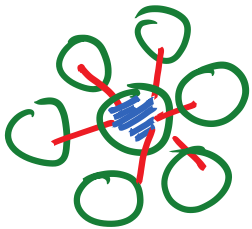
Surface Tension: - Energy required to create unit area of a Surface.



Direction of the Net Interaction Force? =

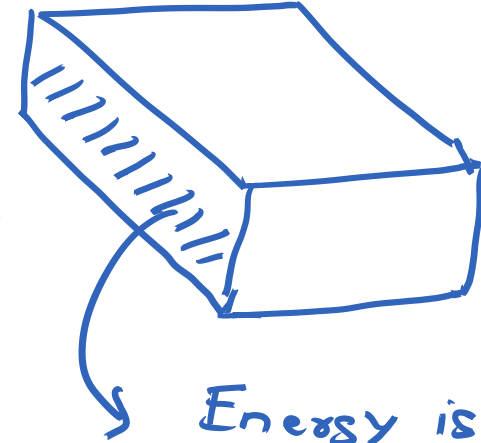
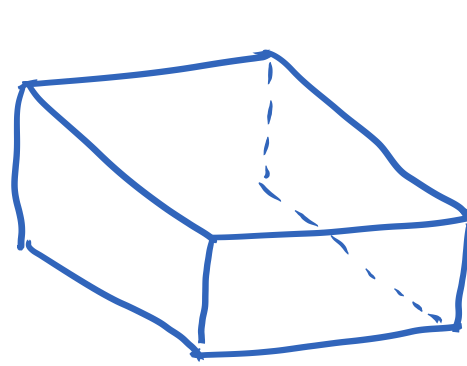


Net Inward Interaction == towards the bulk.



Surface

Bulk

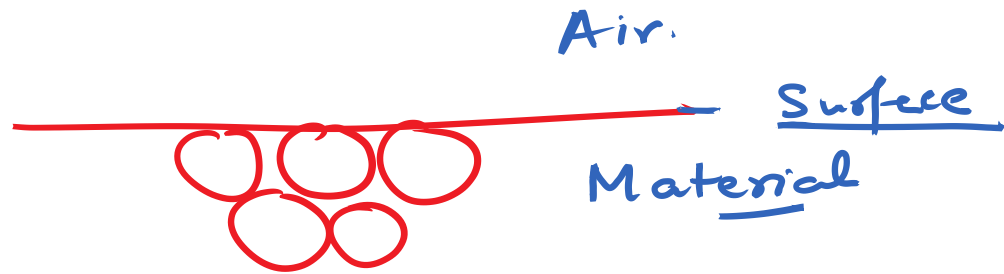


Energy is consumed to create this Surface.

Comment on the difference in the State of the two molecules :-

Net Interaction force on a Bulk molecule at any instance = 0.

Net Non Zero interaction on the Surface Molecule.



A Surface Molecule is in a state of Net.

In word attraction towards the bulk.

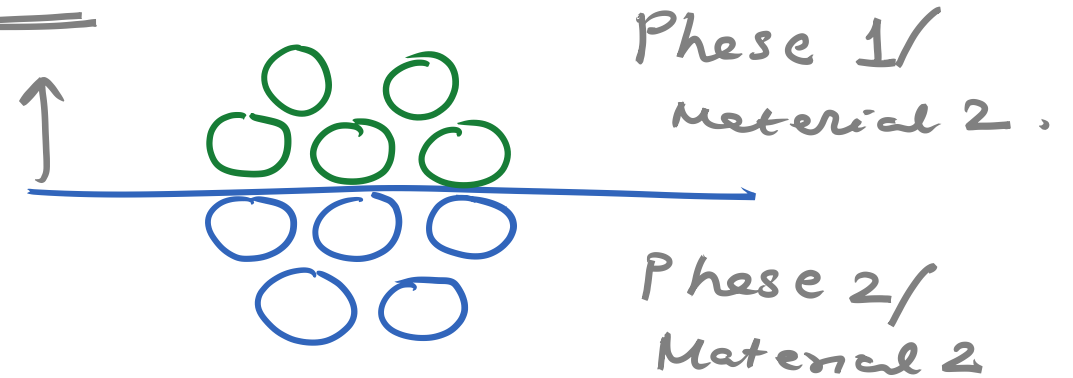
⇒ As if the bulk is pulling the molecule in word

⇒ Molecule is in a state of "Tension" towards the bulk.

"Surface Tension"

What is an Interface

Interface between 1 and 2.



Boundary Between two Condensed Phases.

Liquid and Solid Condensed Phases.

Non Condensed Phases → Gas.

* A Surface is a special case of an Interface, where one of the Phases is a gas or Non-Condensed.

Surface

Gas/Vacuum

NO interaction
this side

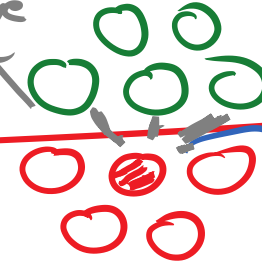
In a state of
Inward tension.

○ ○ ⇒ only interaction
possible similar
molecules

Cohesive Interaction

Interface

Some
adhesive
interaction



Difference in state
between a surface
molecule

May be in a state of
inward tension or,
May not be

Between



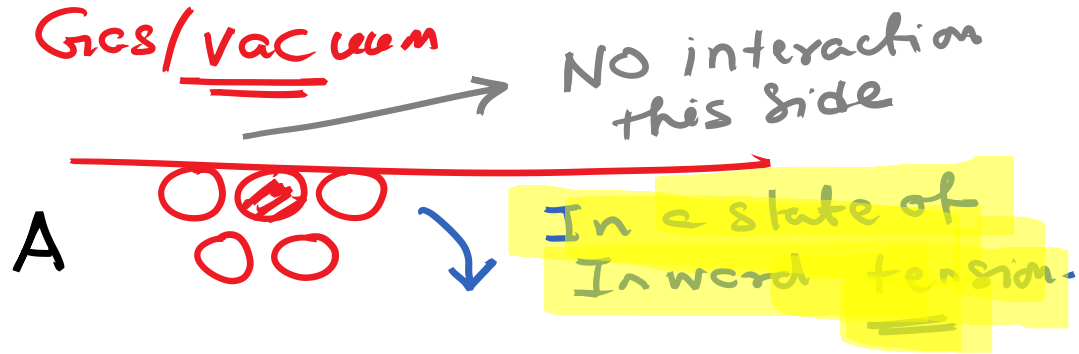
Between
Similar molecule

○ ○ dis-similar
molecules

Adhesive
Interaction.

⊗ In case the
adhesive interaction
is stronger, the the
molecule will experience an outward
force.

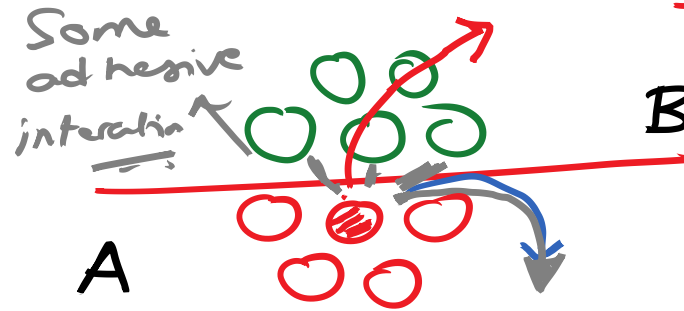
Surface



$\gamma_A \rightarrow$ Surface Tension
of A

Always need to spend
Some energy for creating a
Surface $\rightarrow \boxed{\gamma_A = +ve}$

Interface



$\gamma_{AB} \rightarrow$ Interfacial Tension
between A and B.

$\gamma_{AB} \rightarrow$ Is the energy reqd.
for creating an interface.
may be positive or Negative

① Even if γ_{AB} is +ve
 $|\gamma_{AB}| < |\gamma_A|$

If the adhesive
Interaction is
Stronger \rightarrow
Surface molecule
experiencing outward
pull $\rightarrow \boxed{\gamma_{AB} = -ve}$

