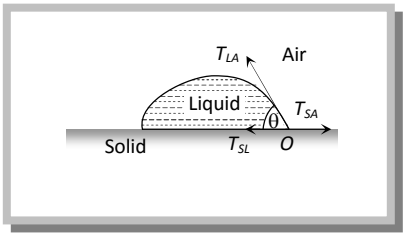
Shape of Drops.

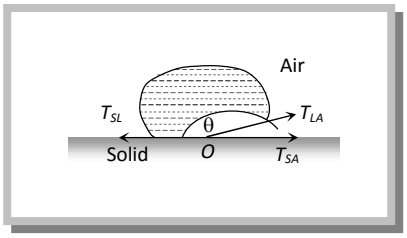
Whether the liquid will be in equilibrium in the form of a drop or it will spread out; depends on the relative strength of the force due to surface tension at the three interfaces.



TLA = surface tension at liquid-air interface, TSA = surface tension at solid-air interface.

TSL = surface tension at solid-liquid interface, θ = angle of contact between the liquid and solid.

For the equilibrium of molecule



TSL + TLA cosθ = TSA or $\cos\theta = \frac{T_{SA} - T_{SL}}{T_{LA}}$ .....(i)

Special Cases

TSA > TSL, cosθ is positive i.e. $0^o < \theta < 90^o$.

This condition is fulfilled when the molecules of liquid are strongly attracted to that of solid.

Example: (i) Water on glass.

(ii) Kerosene oil on any surface.

TSA < TSL, cosθ is negative i.e. $90^o < \theta < 180^o$.

This condition is fulfilled when the molecules of the liquid are strongly attracted to themselves and relatively weakly to that of solid.

Example: (i) Mercury on glass surface.

(ii) Water on lotus leaf (or a waxy or oily surface)

$(TSL + TLA \cos\theta) > TSA$

In this condition, the molecule of liquid will not be in equilibrium and experience a net force at the interface. As a result, the liquid spreads.

Example: (i) Water on a clean glass plate.