Lab.343

Experiment (1)

B) Determination of Absolute and Relative viscosities of ethanol

Viscosity

Viscosity is a measure of a fluid's resistance to flow.

- The greater the viscosity → the more slowly the liquid flows.

- Liquids that have strong intermolecular forces have higher viscosities than those that have weak intermolecular forces.

- $F \alpha A v/d$
- $F = \eta Av/d$, where η is coefficient of viscosity.
- Unit of viscosity is **poise.**
- **Poise** : The force (F) necessary to move a layer of liquid of area (A) $1cm^2$ with a velocity (v) of 1cm/sec past another layer at distance (d) of 1cm.

- $\eta_1 = \pi r^4 p_1 t_1 / 8 v L$ (ethanol)
- $\eta_2 = \pi r^4 p_2 t_2 / 8 v L$ (water)

$\eta_1 \backslash \eta_2 = p_1 t_1 / p_2 t_2$

Relative viscosity:

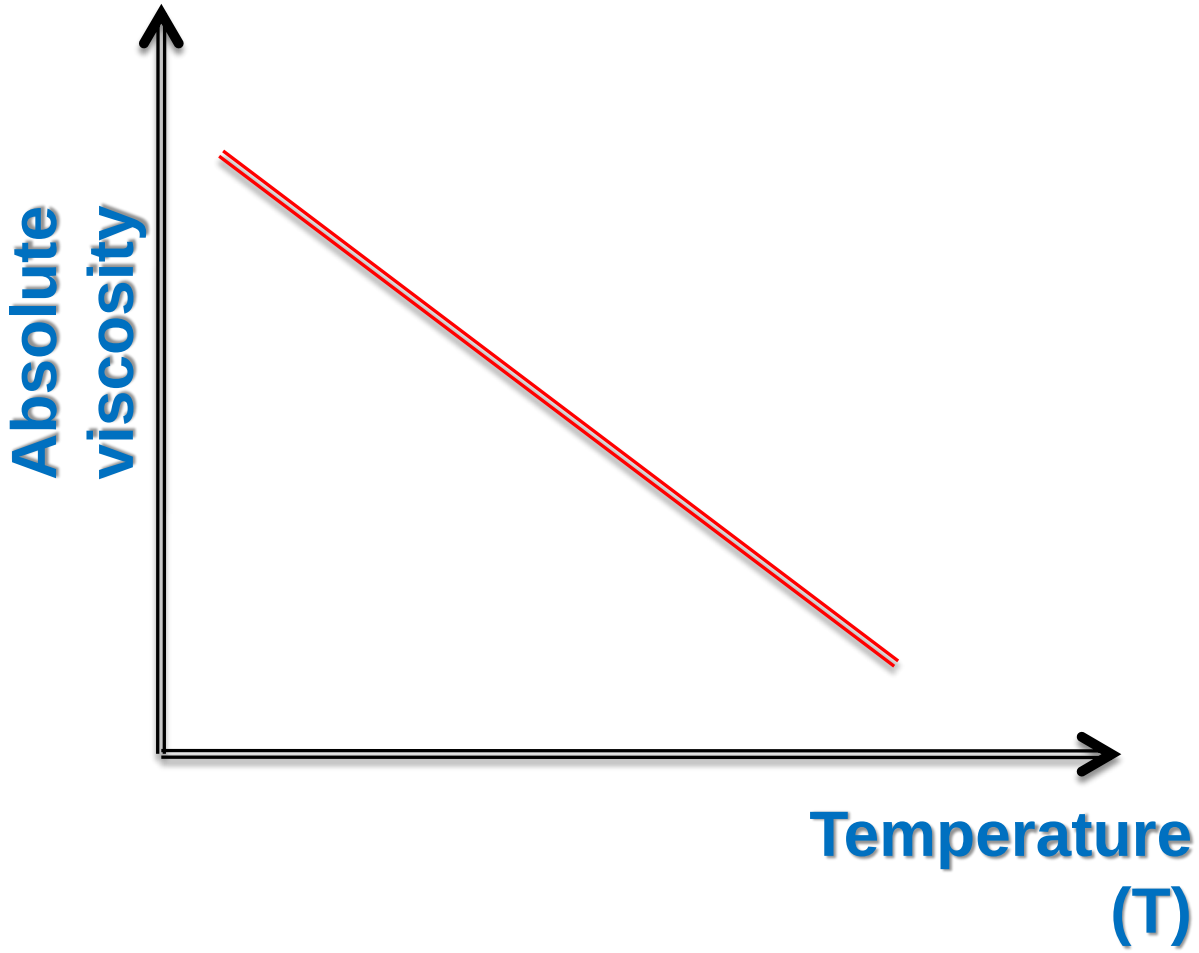
$\eta_1 \backslash \eta_2 = d_1 t_1 / d_2 t_2$

Factors effect on viscosity

- Temperature
- Volume of molecules.
- Intermolecular force.
- Hydrogen bonds.
- Pressure.

Results

T	d_1	d_2	η_2	t_1	t_2	$\eta_1 \backslash \eta_2 = d_1 t_1 / d_2 t_2$	$\eta_1 = \eta_2 * (d_1 t_1 / d_2 t_2)$
25			0.8937				
30			0.8007				
35			0.7225				
40			0.6540				


Absolute viscosity
Temperature (T)