States Of Matter 4

Heating and cooling Graph-

Change of state on a graph/heating and Cooling Graph.
A heating curve through is a graph showing the temperature of a substance plotted against the amount of energy it has absorbed cooling graph is obtained when a substance cools down and changes state.

A substance must absorb heat energy so that it can melt or boil. The temperature of the substance does not change during melting , boiling or freezing, even though energy is still being transferred.

The temperature also stays the same while a liquid freezes even though heat energy is still being released to the surroundings.

Vaporization:
=> phase transition or change of state from liquid to gas or vapor
=> two types, 1. evaporation and 2. boiling.
=> Both, change of state from liquid to gas natural process happens on its own, unnatural process cannot happen its own.

Evaporation	Boiling
Natural Process => Happens on its own	Unnatural Process => Cannot happen on its own
Heat energy is not required So, evaporation is a slow process.	Heat energy is required, So boiling is a rapid process
No bubbling effect is seen	Bubbling effect is seen
This takes place at the surface of the liquid. **Greater the surface area of the liquid, the higher the evaporation and vice versa	This takes place throughout the entire liquid.
Evaporation occurs at any temperature. **The higher the temperature of the surroundings, the faster The evaporation occurs and vice versa.	Boiling occurs only at boiling point.

Difference:
Evaporation is sometimes confused with boiling, they both involve liquids, turning to gases, but evaporation is different because:

- it occurs at any temperature, not just the boiling point.
- It only happens at the surface of the liquid, not throughout the Boiling,
- boiling requires an energy input whereas evaporation is the release of the molecules with the highest energy.
- Evaporation cools liquids, as a result of this energy loss operation is increased by higher temperature and the greater surface area.

Diffusion: can occur in solid or liquid or gas.

1. Diffusion has an inverse relation with the force of attraction between the particles,
   => the stronger the force of attraction between the particles. the laser the diffusion.
   => The weaker the force of attraction between the particles, the greater the diffusion.

2. So there is no diffusion in solid, or no diffusion occurs in solid
3. Diffusion in gas is extremely high because there is no very weak force of attraction between the particles.
4. Diffusion in liquid is molecule, water red, because the force of attraction between the particles is also moderate.

Diffusion : is the neutral mixing of particles, diffusion does not take place in a solid sense particles are not permanently dissolved

and dissolved in liquid and gaseous materials, Both display diffusion in gases are much faster than that in liquid. Since particles and gaseous state has greater kinetic energy or weak force of attraction.
Diffusion occurs when particles are free to move. This is true in gases and for particles dissolved in solutions. Particles diffuse down to concentration to an area of low concentration . This is how the smell of cooking travels around the house from the kitchen, for example.

Diffusion in liquid:
=> Force of attraction is strong but less than that of in solid (moderate).
=>diffusion in liquid occurs moderately.

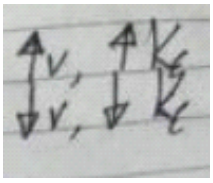
Diffusion in liquid:
=> Force of attraction is ->Non-existent/Weak.
=>diffusion in gas occurs highly.

*The rate (speed) of diffusion is a liquid / gas depends on the kinetic energy of the particles.

kE= 1/2(mv^2)

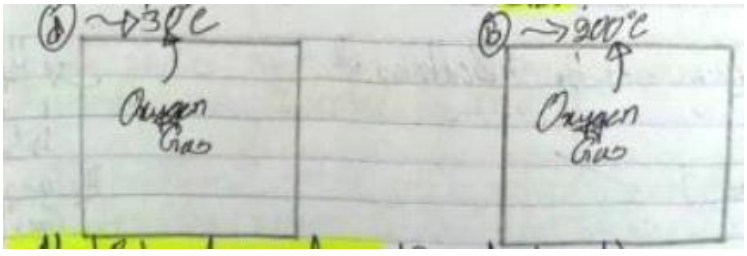
M = mass; v= velocity; (KE is proportional to velocity)

Kinetic Energy of the particles:
=> Refers to How fast are the particles moving?



- ✧ If the particles have Higher/Greater kinetic Energy, that is they are moving faster, than the rate(speed) of diffusion is also Higher.
- ✧ If the particles have lower kinetic energy, that is they are moving slower, than the rate(speed) of diffusion is slower.

Comparison:
Gas:
=> In it, the particles Move Quickly,
=> Have lower kinetic Energy.
=> Rate of diffusion is slow,

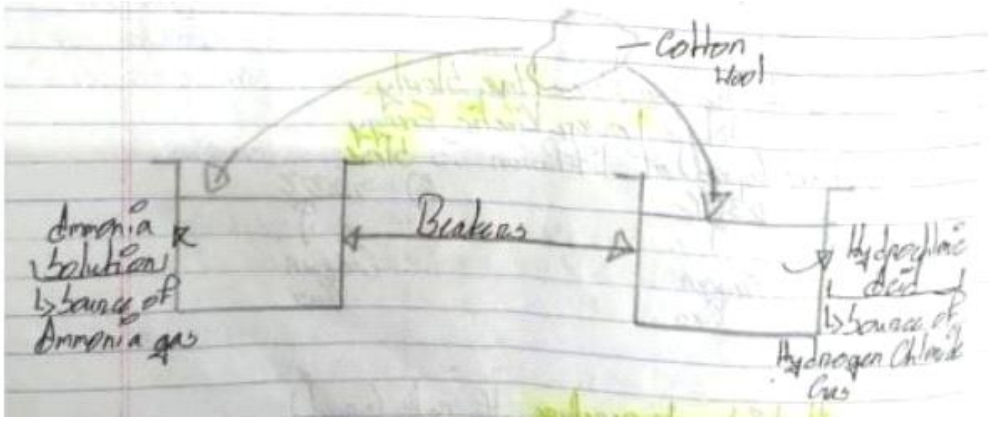


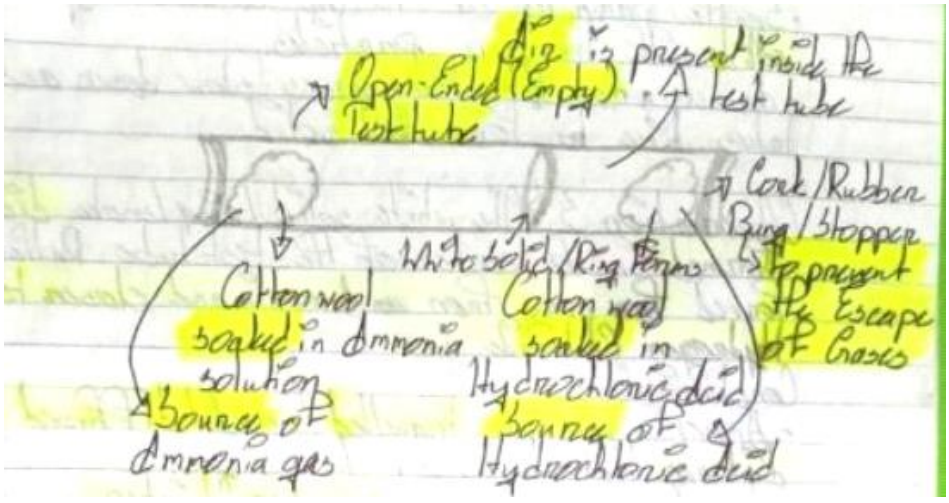
At higher temperature, the rate(speed) of diffusion is More, because the particles have more kinetic energy.

Experiment:
=> Related to Diffusion In gases.

1. To demonstrate the diffusion in gas.
2. Factors affecting the diffusion rate of different gases (at the same temperature)

Experiment based on 2 gases:
1. Ammonia Gas.
2. Hydrogen Chloride Gas.
   Both gases are colorless.





**Ammonia Gas + Hydrogen Chloride Gas ----> Ammonium Chloride Solid.(White Solid)
The gases in the product side does not react with any other gases present in Air.

Observation:
A white solid smoke form conclusion.

Conclusion:
This shows that two colorless gases diffused, travelled and reacted together.

Observation 2:
The white solid/ring/smoke to a few minutes.
For instance, five to seven minutes to form.

Conclusion:
1. Air is present inside the test.
2. So the particles of the two colorless gases collide with your particles.

3. As a result, the gases, slow down, and takes time to form the solid.

Observation 3:
the white solid/ ring or smoke did not found in the center of the test tube, rather it formed far away from the ammonia and closer to the hydrogen chloride gas.

Conclusion:
ammonia gas has traveled, or moved or diffused greater distance than hydrogen chloride gas. So ammonia gas has greater or higher speed than hydrogen fluoride gas does ammonia gas is lighter and hydrogen chloride. Gas is heavier.
**Time is constant, or same for both of the two gases to Diffuse.

Factors which affects mass, how different gases affect their divisions speed or rate gases, which have higher mass, they diffuse slowly gases which lighter mass, they diffuse faster

Procedure:
Eye protection must be worn. The glass tube should be about one meter long, and 5cm diameter bits of cotton wool are soaked in concentrated ammonia solution as a source of ammonia gas and concentrated hydrochloric gas acid as a source of hydrogen chloride gas. These are placed in the end of a solid glass tube with rubber bonds to stop the poisonous gases from escaping. While white ring of ammonium chloride takes a little time to form (depending on the length and the diameter of the tube), and appears closer to the hydrochloric acid end. In the time to it takes for the ring to form the ammonia particles have travelled further. That's because the speed is higher. Ammonia particles are lighter than hydrochloric particles like particles are faster than the heavier ones at the same temperature.

A. Describe what happens when water vapour cools to form liquid water. Your answer should include the change in the energy, arrangement and movement of the particles

ANSWER: => Change in energy: The lose of kinetic energy,
=> Chang in arrangement: They move closer together or packed more closely.
=> Changing movement: They move more slowly, or less randomly or do not move as freely.