Lab (2)

Experiment (5)
Gasses Diffusion

Materials used:

A glass tube with both ends open, ammonium hydroxide solution NH_4OH, concentrated hydrochloric acid HCl, cotton, a nylon bag with string, tweezers, and an iron holder.

The Method of Work:

1. Fix the glass tube horizontally using the iron stand.
2. Fix a suitable piece of clean cotton in each of the tube nozzles. Take out the two pieces of cotton and add to one of them a few drops of ammonium hydroxide solution and to the other the same number of drops of hydrochloric acid.
3. Replace the two pieces of cotton at the same time and set the time directly.
4. Notice the appearance of a white ring inside the tube. Indicate where they appear and adjust the time they are created directly.
5. Measure the distance traveled by the vapor of each of the two substances. Then calculate the relative propagation speed as follows:

Relative speed of propagation= $\frac{\textit{The fastest gas diffuses before the distance traveled}}{\textit{The slowest gas diffuses before the distance traveled}}$

$NH_4OH + HCl \longrightarrow NH_4Cl$ foggy

$NH_3 + HCl \longrightarrow NH_4Cl$ foggy

Experiment (6)
Effect of Particle Size on The Rate of its Diffusion

Materials used:

3% agar solution, test tubes, iodine solution, 0.5% starch solution, test tube holder.

The Method of Work:

1. Boil 100 ml of 3% agar solution for a few minutes over low heat until all the agar is dissolved. Divide the hot solution into two parts.
2. Add a few drops of iodine solution to one of the parts, then shake the mixture well.
3. Then pour the mixture into two test tubes, leaving a distance from the nozzle and marking with the letter A.
4. Add a few drops of starch solution to the other part of the solution. Shake the mixture well, then fill two test tubes, leaving a distance from the nozzle, and marking with the letter B.
5. Place the test tubes in an upright position using a test tube holder in the refrigerator so that the agar solution freezes completely. Determine the level of agar solution in the test tubes after removing them from the refrigerator.
6. Then add 1 ml of starch solution to the test tubes after removing them from the refrigerator.
7. Note the change in color of the agar solution in all cases after a while.

Experiment (7)

Effect of The Ions Charge on The Rate of its Diffusion

Materials used:

Potassium ferrocyanide solution, 0.02 M concentration, phenonphthalein reagent solution, ferric chloride solution, 0.02 M concentration, test tubes.

The Method of Work:

1. Prepare a 3% agar solution, add to it a few drops of potassium ferrous cyanide solution, a few drops of sodium hydroxide solution, as well as a few drops of phenonphthalein reagent, then shake the solution well.
2. Pour the solution into two test tubes, leaving 3 cm from the nozzle. Then place the tubes in the refrigerator in an upright position until the agar freezes well, then determine the level of the solution in each tube.

3. Then add a few drops of ferric chloride solution to the surface of the frozen agar in the two tubes.

4. Notice that the color of the agar solution in the tubes changes from pink to colorless gradually, starting from the surface of the solution. Notice that a dark area forms on the surface of the solution after that.

5. Calculate the color change distance and the diffusion distance of the dark blue area. Explain the results.

$$K_4Fe(CN)_6 + FeCl_3 + NaOH \longrightarrow K_4(Fe(CN))_6 + NaCl$$

Prussia complex (blue)