24.

Sodium and Potassium Hydroxide Solutions

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Abstract:

In studying chemistry, sodium hydroxide and potassium hydroxide are common chemical solutions used for carrying out chemical reactions. In many cases, both solutions shows similar actions. This project is intended to find the diverging property or point where the two solutions differ from each other.

Method:

Experiment to investigate the point at which sodium hydroxide solution may differ from potassium hydroxide solution. In order to mark the diverging point(s), the two solutions were prepared at different concentrations. The diverging property or point was observed by decolouralization of phenolphthalein.

MATERIALS: Sodium hydroxide pellets, Potassium hydroxide pellets, phenolphthalein solution, water, test tubes, stop watch, test tube rack, beaker, white paper, graph paper, and dropper.

PROCEDURES:

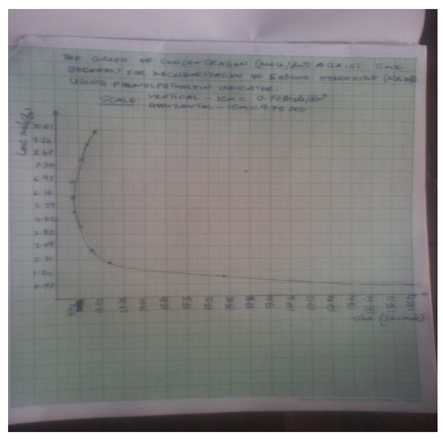
1. Collect the materials stated above.
2. Prepare both solutions (sodium hydroxide and potassium hydroxide) with different concentrations. E.g. 0.1M,0.2M, 1.0M,2.0M,3.0M,4.0M,5.0M,6.0M,7.0M,8.M,9.0M,10.0M.
3. Put 4-5cm^3 of Sodium hydroxide solution in test tube. Then, add few drops of phenolphthalein and shake strongly. Immediately start stop watch.
4. Observe what will happen. Record the time for the solution to decoluorize.
5. Repeat procedure 3 and 4 for both solutions to all concentrations.

Results:

The data for the experiment above were collected in the tables below:

-Table 1.Decolouralization of sodium hydroxide (NaOH) with phenolphthalein solution.

Concentration inMole/dm^3	0.1	0.2	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Decolourization Time (seconds)	-	-	166	75	23	16	9	6	7	7	13	13	14



The graph of concentration in mole /dm^3 against Time in seconds For Sodium hydroxide

Concentration in mole/dm^3	0.1	0.2	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Decolourization Time (seconds)	-	-	425	298	54	18	10	12	9	9	9	10	12

Table 2. Decolourization of Potassium Hydroxide (KOH) with phenolphthalein indicator

Sodium hydroxide (NaOH) and potassium Hydroxide (KOH) are similar in many chemical reactions. But because they are two different compounds ,they have certain point where they differ from each other. This was observed by adding few drops of phenolphthalein into both solutions with different concentrations. Eg. 0.1M to 10.0M.The time of decolourization for solution is analyzed below:-

1.When the two solutions were at very low concentration below 0.2M, there was no decolourization.

2.When the concentrations were about 0.5M to 2.0M, both solutions decolourized at different time. Sodium has short time than potassium. There is significant differences.

3.When the concentrations were above 3.0M,decolourizatin time is very short to both solutions.

The results above imply that sodium hydroxide and potassium hydroxide have different capacity to release free electros into solutions. This is detected by the loss of pink colour formed when phenolphthalein solution as an indicator was added. If the concentration is below 0.2M there ***were enough free electrons*** released into solutions leading to complete formation of complex compound furnished by phenolphthalein molecules. The solutions shows pink colour and do not decolourise. But when the solutions haveconcentrations about 0.5M to 2.0M, the quantity of electrons released into solutions is low, not enough and quantity differ. Because of this, there were few molecules furnished with phenolphthalein to form pink colouration. The molecules furnished (stained) stay for short time and disappear. The time for losing pink colour is short with sodium than with potassium. Such property can clearly give the diverging point between sodium and potassium hydroxide solutions. The time for decolourization is very small if concentration is beyond 2.0M.for both solutions.

Conclusions:

Sodium hydroxide and Potassium hydroxide are similar in many chemical reactions. But they have significant difference when concentration is about 0.5M to 2.0M.The diverging on time of decoulorazation is too large. It has been observed that sodium hydroxide lose pink colouration with phenolphthalein faster than potassium hydroxide. This mean that at about 0.5M to 2.0M, potassium hydroxide has more free electrons into solution than sodium hydroxide. On the other concentration above 2.0M the difference is very small.