

Name: CHAN CHI HEI

Class: 6LS

Class no :1

Date :5/10/2009

Title: prepare a standard solution

Date of experiment : 15/09/2009

Aim : to prepare a standard solution of sodium carbonate

Aim

The purpose of this experiment is to prepare a standard solution of sodium carbonate.

Theory:

Standard solution means that a solution with known molarity. Standard solution can be used as titration which is used to find out the concentration of other solution.

Requirements

watch glass/weighing bottle, spatula, sodium carbonate Na_2CO_3 , 250 cm³ beaker, wash bottle of distilled water, glass rod, 250 cm³ volumetric flask, filter funnel, dropper

Procedures

1. Transfer 2.65 g of Na_2CO_3 onto the watch glass/weighing bottle and weigh it to the nearest 0.01g.
2. Put the solute into the beaker, and wash down the rest with the wash bottle.
3. Stir to dissolve the solid, adding more water if necessary.
4. Transfer the solution to the volumetric flask through the filter funnel. Rinse the beaker well, making sure all liquid goes into the volumetric flask.
5. Add distilled water until the level is within about 1 cm of the mark on the neck of the flask. Insert the stopper and shake to mix the contents.
6. Using the dropper, add enough water to bring the bottom of the meniscus to the mark. Insert the stopper and shake thoroughly ten times to ensure complete mixing.

Results and Calculations

| | |
|---|-------------------------|
| Molar mass of sodium carbonate, M | 106 g |
| Mass of bottle and contents before transfer ,m1 | 8.274 g |
| Mass of bottle and contents after transfer ,m2 | 5.629 g |
| Mass of sodium carbonate, m=(m1-m2) | 2.645 g |
| Amount of sodium carbonate, n= m/M | 0.025 mol |
| Volume of solution , V | 0.25 dm ³ |
| Concentration of the sodium carbonate solution | 0.1 mol/dm ³ |

Discussions

1. What effect would each of the errors described below have on the concentration of sodium carbonate?

a) Some of the solid sodium carbonate was spilled in making the transfer.

The concentration of sodium carbonate will record a lower value than its true value because by $n=m/M$, since mass decrease, the number of mols of Na_2CO_3 will decrease. Then Concentration of the Na_2CO_3 is calculated by (no of mol of Na_2CO_3 /Volume of solution) so that when no of mol of Na_2CO_3 decrease, the concentration will decrease.

b) Not enough water was added to bring the volume up to the mark.

The concentration of sodium carbonate will record a higher value than its true value because concentration of the Na_2CO_3 is calculated by (no of mol of Na_2CO_3 /Volume of solution) so that when the volume of solution decrease, the value of Na_2CO_3 will larger.

I think there is a little error when I was performing the experiment. First, I forgot to rinsed the volumetric flask before the experiment, so that Na_2CO_3 solution may contaminated with some other solution and this will affected the result. Also, I cannot add the water to the volumetric flask until the graduation mark accurately, and there are an error about 1-2 cm^3 and it will affect the concentration of Na_2CO_3 solution.

After doing the experiment, I found that every step is very important in preparing standard solution. If we missed some of the steps, the concentration of the solution can be greatly affected. For example, while we are weighting the Na_2CO_3 , the top of the balance may contain some Na_2CO_3 , to make sure the experiment is accurate, we have to clean the solid on the top of the balance first. Also, we need to use washing the bottle to wash the beaker 2-3 times to make sure all the Na_2CO_3 is transferred into the volumetric flask. Besides, when we are adding the water to the graduation mark, our eye level must be same as the graduation mark. Also, we need to make the Na_2CO_3 solution in volumetric flask upside down to make sure that it is evenly distributed.

Conclusion The molarity of the standard solution is 0.1mol/dm^3 .