


Volumetric Analysis 1

To make a standard solution of sodium carbonate

Introduction

A standard solution is one whose concentration is known exactly. Standard solutions of liquids, for example acids, are easy to prepare and are usually supplied. Standard solutions of solids can be prepared by weighing a mass of solid, and dissolving it in a known volume of solution in a volumetric flask. Today, you are going to prepare a standard solution of sodium carbonate to use later in another practical.

Apparatus

Goggles	Glass rod	
Bench mat	Teat pipette	
100 cm ³ beaker	Spatula	
250 cm ³ beaker	Label	
250 cm ³ volumetric flask with stopper	De-ionised water	
Filter funnel	Anhydrous sodium carbonate, Na ₂ CO ₃ (s)	

Methods

Read through the Methods. Make a suitable blank results table, complete with units in the headings.

- Using the ± 0.1 g balance, weigh **approximately** between 1.2g and 1.4g of sodium carbonate into the small beaker. **Do not** record the mass.
- Using the ± 0.01 g balance, weigh the small beaker and its contents accurately.
Record this mass.
- Transfer the contents of the small beaker into the large beaker.
Weigh the small beaker again using the ± 0.01 g balance.
Record this mass.
The difference between the two accurate masses is the mass of sodium carbonate in your beaker.
- Add de-ionised water **cautiously** down the side of the large beaker.
Use about 150cm³ of water, and swirl the beaker to mix the contents.
- Stir using a glass rod to dissolve the solid **completely**.
- Transfer the solution into the volumetric flask using the funnel.
Remember: pour down the glass rod;
remove the last drop of solution from the glass rod onto the funnel.
Wash the beaker, rod and funnel several times using de-ionised water from the wash bottle, letting the washings go into the flask.
- Make up to the mark on the volumetric flask with de-ionised water.
Stopper firmly, and shake the flask thoroughly to mix the contents.
- Label the flask clearly with your name, the date, and the contents of the flask.

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Technician's Notes

Prior to practical

Sodium carbonate

Heat required amount of sodium carbonate (Na_2CO_3) to drive off water of crystallisation.

Either: heat in an evaporating dish over a Bunsen burner for 30 minutes approx., or

heat in a drying oven at about 110°C for 1 hour.

Agitate the solid periodically with a clean glass rod.

Transfer to a desiccator after heating, and label it "sodium carbonate".

Care: Use tongs and eye protection.
Beware of hot solid and apparatus.
Sodium carbonate forms caustic alkaline solutions with water; if spilt on skin wash with plenty of water.

Analytical balances

Please check cleanliness and correct functioning of analytical balances.

De-ionised water

Please check 6th Form wash bottles are clean and filled with de-ionised water.

Make sure that additional de-ionised water is available in the aspirator.

Requirements per class

Sodium carbonate solid (see above). Minimum of 3g per student approx.

Analytical balances (see above).

Top pan digital balances (minimum of two if possible).

De-ionised water (see above).

Requirements per student

1 x 250cm^3 beaker (dry)

1 x 250cm^3 volumetric flask with stopper to fit

1 x glass funnel (check that it will enter the neck of the volumetric flask easily)

1 x glass rod

1 x weighing bottle with lid

1 x 6th Form wash bottle containing de-ionised water

1 x teat pipette

1 x small spatula

1 x self-adhesive label