



ST ANDREW'S SECONDARY SCHOOL

NAME

CLASS

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CHEMISTRY

6092

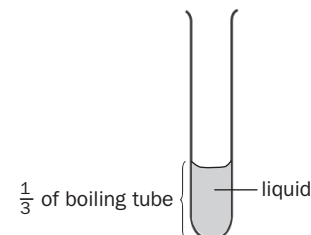
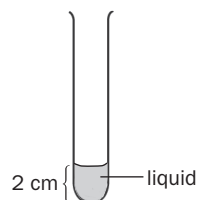
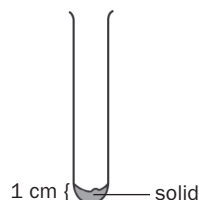


Chemical Data of Common Ionic Compounds: A Summary

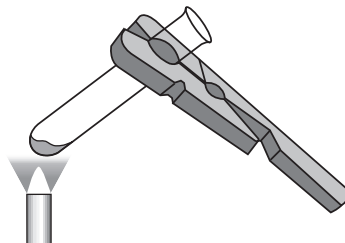
Solubility, colour, chemical analysis

General advice

- It is essential that you follow the instructions and read the information **carefully** before you carry out the experiment(s). Apart from testing of gases, you should **not** use additional reagents for any test in the experiment.
- Amount to use:



- Reagents selected for use in tests must be included in your answers with their full chemical name/ correct formulae.
E.g: Dilute hydrochloric acid : HCl (aq) [NOT H^+ / dilute acid]
Dilute silver nitrate solution : AgNO_3 (aq) [NOT Ag^+ / nitrate solution / Ag_2NO_3]
- Check for contradictions within your answers.
E.g: When recording the observation for Zn^{2+} in excess NaOH (aq):
“White insoluble precipitate dissolves” does not make sense!
You should record it as:
“White precipitate formed at first, soluble in excess NaOH (aq) forming a colourless solution”
- When you are asked to test the pH, you should give the pH number and NOT acidic / alkaline.
pH is determined using Universal Indicator; litmus paper can only determine if it is acidic / alkaline.
E.g: Turns blue litmus paper red = the solution is acidic
Blue litmus paper remains unchanged = the solution is NOT acidic
(either alkaline or neutral)
- When heating a solid, heat gently first then strongly.
When heating a liquid or solution, move the test tube in and out of the flame every now and then.



Use a test tube holder!

Recording observations

You will be asked to carry out experiment(s) to investigate an unknown substance or substance(s). Follow the instructions for each test and record your observation.

- The observations must be recorded in the same order as they are made.
E.g: Test A → B → C Observation A → B → C
- When you are asked to describe the appearance of a substance, you should provide its **colour** and **physical state**.
E.g: Black solid : C Colourless solution (aq) / liquid (l) Brown gas : NO₂
- Observations are what you can see, hear, smell or feel by touch in each test. Examples include:
 - colour of solids/ precipitates (white, black, brown, etc)
 - colour of solutions – use *colourless* if the solution has no colour and NOT *clear*
 - effervescence, bubbles or fizzing
 - pop sound
 - test tube feels warm
 - pungent odour of a gas (usually NH₃)



Proper method to observe the odour

- Do not give conclusions when recording observations.

E.g: “A gas is given off/ evolved” is a conclusion; you should record as
“Effervescence observed. The gas produced extinguishes lighted splint with a pop sound”.

except for ammonia

Must include “gas produced” for the observation, as it turns damp red litmus paper blue.

- Always use the same language as the Qualitative Analysis Notes provided.

E.g: *Light blue* precipitate formed at first, soluble in excess aqueous ammonia solution giving a *dark blue* solution.

In rare cases where you cannot find similar observations in the notes, then record what you observed.

E.g: Turns white solid (anhydrous copper(II) sulfate) to blue.

- Where the instruction of a single test specifies several steps, this implies that several observations are expected. Often in tests which are allowed to stand for a short period of time (a few minutes). Record even if no further changes were observed.

E.g: Green precipitate formed, insoluble in excess NaOH solution. Green ppt turned reddish-brown slowly on standing.

- You are expected to proceed in identifying the gas evolved:

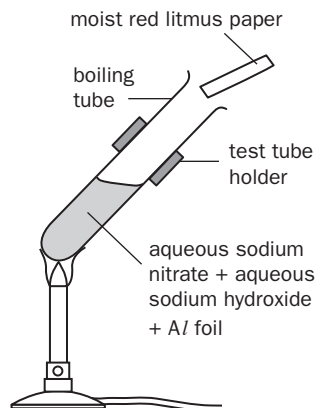
- Effervescence observed: usually H_2 (acid rxn with metals) or CO_2 (acid rxn with metal carbonates).

- Strong heating in thermal decomposition of solids: brown gas (NO_2) indicates metal nitrates (you will need to test for O_2 as NO_3^- forms NO_2 and O_2 gas) or CO_2 indicates metal carbonates or colourless liquid that condenses at the mouth of test tube (H_2O) indicates metal hydroxides or hydrates salts. [Check for any brown gas evolved first, then for condensation. When both were not observed, then proceed to test for CO_2 .]

Conclusions

- Heating with Al foil and NaOH: a pungent gas is formed that turns damp red litmus paper blue (NH_3 gas), NO_3^- is present.

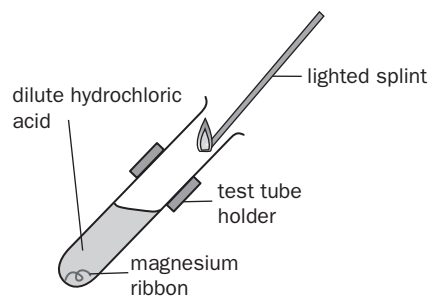
Heating without Al foil (only NaOH), a pungent gas that turns damp red litmus paper blue is formed still (NH_3 gas), NH_4^+ is present instead.



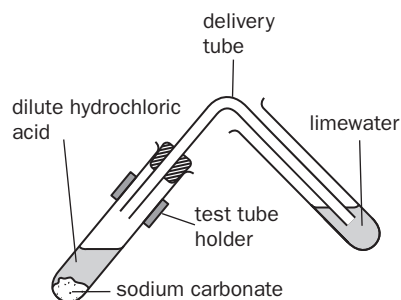
- Addition of HNO_3 to $\text{Ba}(\text{NO}_3)_2$ solution (to test for SO_4^{2-}) and AgNO_3 solution (to test for Cl^-) is to eliminate possible CO_3^{2-} that may be present in the solution.
- Always remember to add NaOH and aq. NH_3 solution dropwise! Record down any ppt (esp. white!) that forms at first, then add excess solution till the test tube is 2/3 full.

Common gases

- Effervescence when acids are used:
 - H_2 gas



- CO_2 gas (common)



- When using damp litmus paper to test for NH_3 , remember to hold it above the mouth of test tube to prevent both in contact with each other.