GCSE Required Practical –Chemistry 1 – Making a salt from a carbonate or oxide

Salt: an ionic substance soluble: something that dissolves in water insoluble: something that doesn't dissolve in water

Acid + metal carbonate → metal salt + water + carbon dioxide

Acid + metal oxide → metal salt + water

What's the point of the practical?

To find out how to make a pure, dry sample of a soluble salt from an insoluble carbonate or oxide.

Results

- Hydrochloric Acid makes Metal Chlorides
- Sulfuric Acid makes Metal Sulfates
- Nitric Acid makes Metal Nitrates

What may they ask us about?

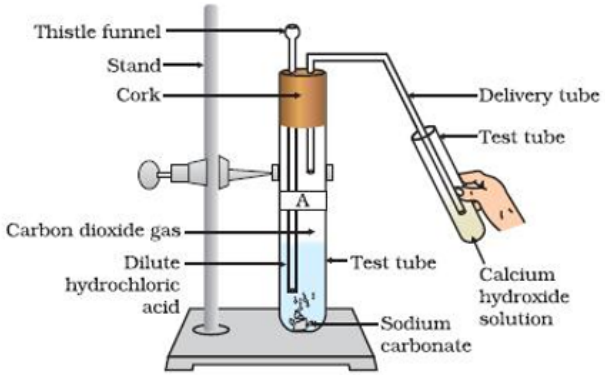
- How do you get solid crystals from the salt solution (*crystallize, evaporate the water*)
- Why do we heat the solution
- What are the risks and safety precautions
- Why do we filter the solution
- How could we test the pH of the salt solution?
- Name the salt produced.

Example Apparatus

Acid + Carbonate

Limewater (calcium hydroxide can be used

To show Co_z is produced



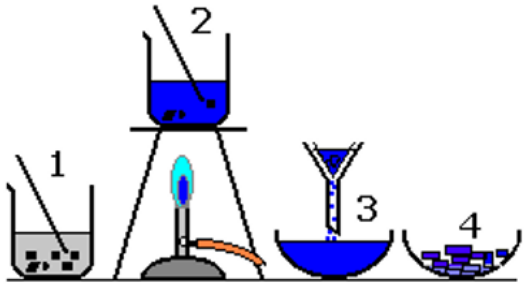
Acid + Metal Oxide

- Excess of metal oxide added
- Need to heat the solution

to ensure as acid fully reacts with available metal oxide particles

- Then filter to remove

Excess metal oxide



GCSE Required Practical – Chemistry 1 – Electrolysis

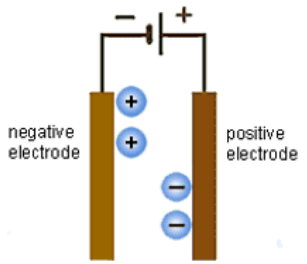
Electrolysis: when a salt solution is separated using electricity

What's the point of the practical?
To find out how different solutions behave when electrolysed

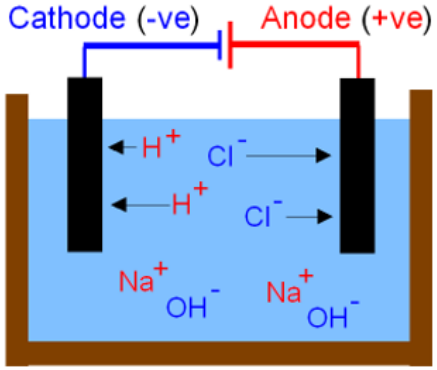
What may they ask us about?
- How could you test the gas that is produced (*hydrogen = pop, chlorine = bleaches damp litmus paper).*
- What happens when the ..... Ions get to the ..... Electrode? (*positive ions are reduced – gain electrons. Negative ions are oxidised – lose electrons).*
- What would happen if you added universal indicator to the solution? (*turns purple – hydroxide is produced – alkali).*

Example Apparatus
Molten compounds or less reactive salt solutions

- Positive ions to negative electrode. Negative ions to positive electrode. Easy.



More reactive metal solutions e.g. Sodium Chloride solution (Brine)
- If the metal is more reactive than Hydrogen
- Hydrogen is produced at the Negative electrode (instead of the metal).
- Metal hydroxide is produced In the solution.



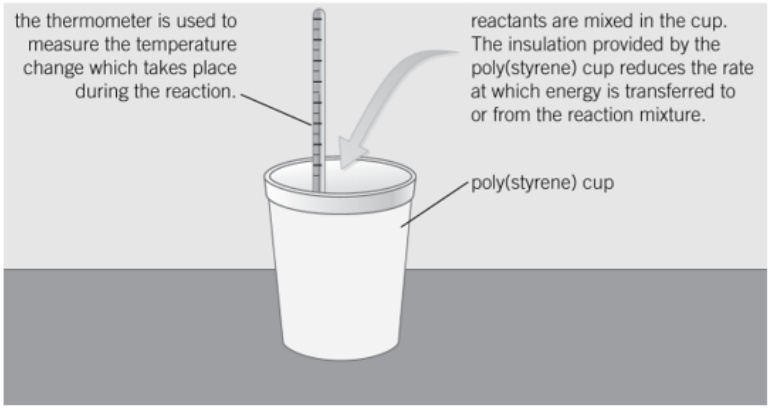
GCSE Required Practical –Chemistry 1 – Temperature changes in solutions

Exothermic reaction: releases energy (heat exits) Endothermic reaction: absorbs energy (gets cold)

What's the point of the practical?
To find out how different variables affect energy changes in solutions.

Results
- Displacement reactions are exothermic
- Neutralisation reactions are exothermic

Example Apparatus



- Displacement (e.g. Copper Sulfate + Iron → Iron Sulfate + Copper)
- Neutralisation

(e.g. Hydrochloric Acid + Sodium Hydroxide → Sodium Chloride + Water)

What may they ask us about?
- Why do you use a polystyrene cup / lid? (*to reduce temperature loss to the surroundings - makes results more accurate)*
- Resolution and accuracy of measurements.
- Repeatability, calculating mean results, uncertainty etc

GCSE Required Practical – Chemistry 2 – How does concentration affect rate of reaction

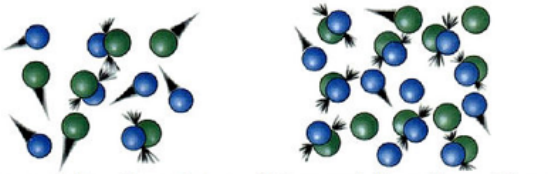
Concentration: the amount of substance in a certain space

What's the point of the practical?

To find out how changes in concentration affect the rate of reaction.

Results

- The higher the concentration, the faster the reaction rate



Low concentration = Few collisions

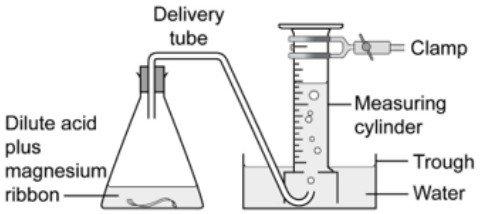
High concentration = More collisions

What may they ask us about?

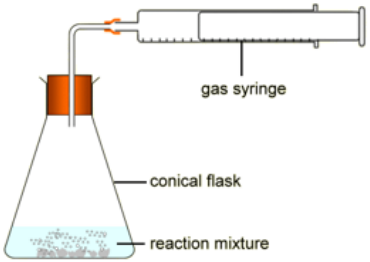
- What are the sources of errors that could lead to anomalous results? (*not getting the bung in quickly enough, starting the timer exactly on time etc)*
- Resolution and accuracy of measurements
- Control variables – just change the concentration – everything else has to stay the same (e.g. why must temperature be controlled)

Example Apparatus

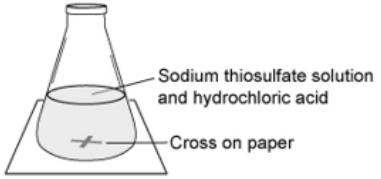
Measuring cylinder
- used to measure gas Production over time



Gas syringe - used to measure gas production over time



'Disappearing' cross – used to measure how quickly the colour changes



GCSE Required Practical –Chemistry 2 –Identifying substances using chromatography

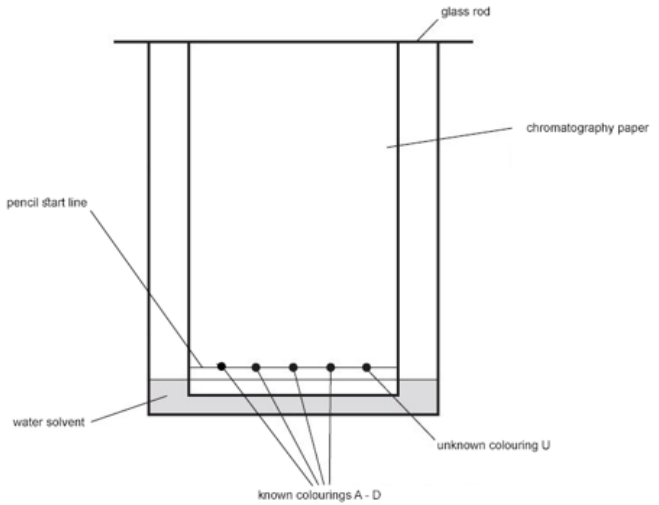
Chromatography: the process where a dissolved substance is separated by running a solvent along a material (e.g paper)

What's the point of the practical?
To separate substances and identify what they're made of

Results
- The substance moves up the paper (stationary phase). It is carried by the solvent (mobile phase). Each substance goes a certain distance

$$R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$$

Example Apparatus



What may they ask us about?
- Why must the start line be drawn in pencil? (*because pencil does not smudge/run in the solvent whereas pen would*)
- Why does there need to be a lid? (*to stop the solvent from evaporating*)
- Measure the R_f value – be accurate. Compare different substances with different R_f values. See what substances are contained in certain mixtures
- Sources of error, resolution or measurements etc

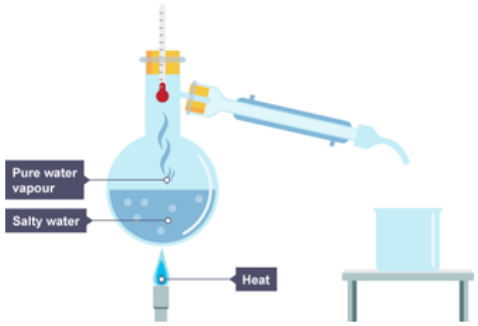
GCSE Required Practical –Chemistry 2 –Purifying and testing water

Potable water = drinkable water

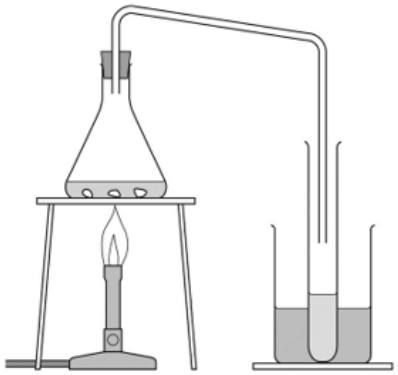
What's the point of the practical?

To analyse and purify water from different sources

Example Apparatus



Or..



Results

- Pure water boils at exactly 100°C and it's pH is 7
- Salt water contains sodium chloride
- Distillation = Heat the solution, the water evaporates, the salt stays in the container.

What may they ask us about?

- Explain how distillation works (*water evaporates at lower temperature as it has a lower boiling point than the dissolved solids, then it condenses back into liquid as it cools down)*
- Why is it not economical to do this on a large scale to make drinking water? (*it costs too much to heat the water*)
- Why may you not get all the water from the solution? (*some does not evaporate, some liquid stays in the tube*)

Exmouth Community College
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Chemistry required practicals

Topic	Title	What to do	Video link
C4.7 *Triple only*	Use titration to investigate reacting volumes.	Use titration to find out how much of an acid is needed to completely react with an alkali.	https://www.youtube.com/watch?v=8yHYoENtCEY
C5.5 C5.6	Prepare a salt from an insoluble metal carbonate or oxide.	Prepare with the appropriate apparatus and techniques, a pure, dry sample of a soluble salt from an insoluble carbonate or oxide.	https://www.youtube.com/watch?v=qIOMlwBoe_4
C6.4	Investigate the electrolysis of a solution.	Investigate the electrolysis of different aqueous solutions using inert electrodes.	https://www.youtube.com/watch?v=tCHE_7QeRUc
C7.1	Investigating temperature changes.	Use appropriate apparatus to investigate the variables that affect energy changes in reactions involving at least one solution.	https://www.youtube.com/watch?v=tKxcQYZ2YH8
C8.4	Investigating the effect of concentration on rate of reaction.	Investigate how changes in concentration affect rates of reactions using a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity.	https://www.youtube.com/watch?v=WlitM81qGqE
C12.2	Calculate Rf values.	Use paper chromatography to find out the Rf values of the dyes found in different food colourings.	https://www.youtube.com/watch?v=pnTGNAfu6GE
C12.5 *Triple only*	Use chemical tests to identify unknown compounds.	Use a range of chemical tests to identify negative and positive ions in ionic compounds.	https://www.youtube.com/watch?v=2vCU9pVAyVE
C14.2	Purify and test water	Analyse and purify water from different sources, including pH, dissolved solids and distillation.	https://www.youtube.com/watch?v=Ea3PH_q3kus