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BitPaper
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GCSE Chemistry

Complete Revision Summary

- Rates and Equilbrium
- Organic Chemistry
- Chemical Analysis
- Chemistry of the Atmosphere
- Using Resources

CHEMICAL TEST

- Pure Substances
- Formulations
- Chromatography
- Test for Gases
- Test for Cation
- Test for Anions
- Instrumental Analysis

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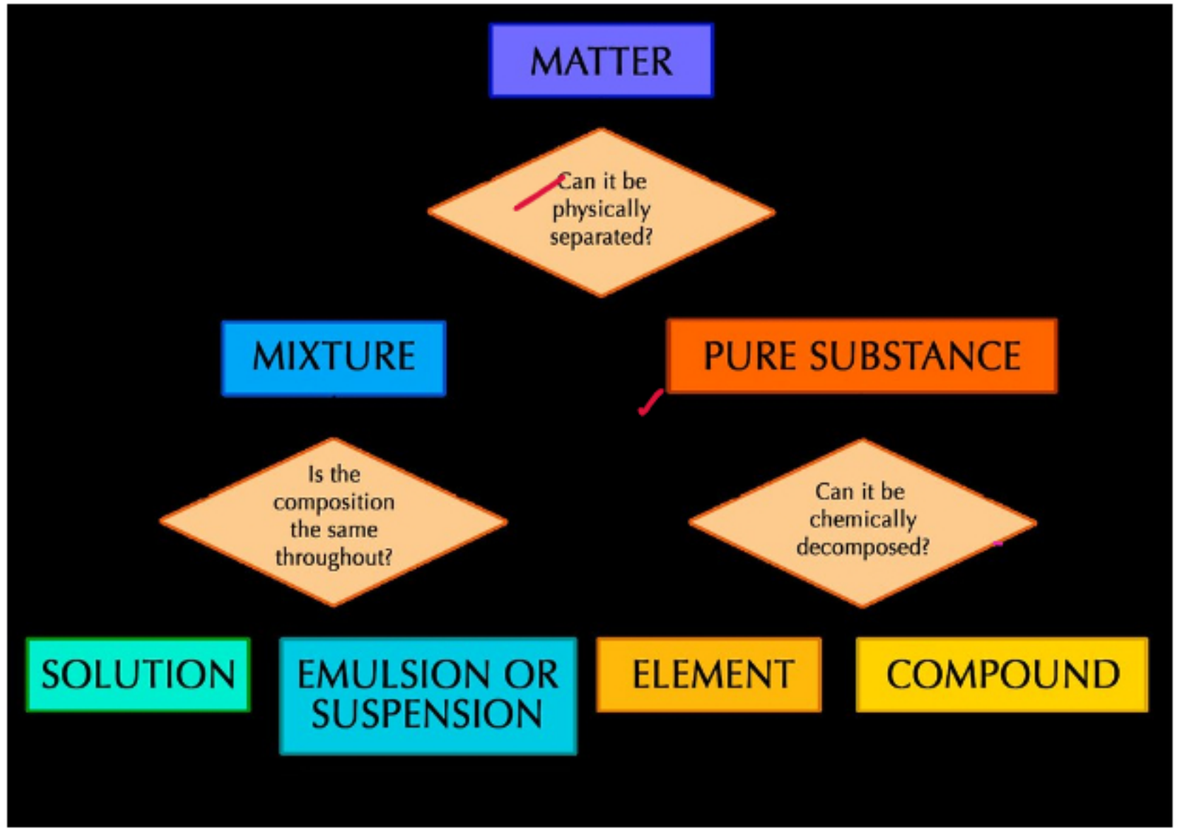
PURE SUBSTANCE



Source: Flickr.com

Pure Substance is an element or a compound that is made up of only one substance.

↓

Pure substances have fixed melting and boiling point. Finding the melting and boiling points will provide the test for purity.

↓

Impurities makes the substance impure and alters the meting and boiling point.

Impurities lowers the melting point but increases the boiling point.

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FORMULATIONS

Mixtures made to make it useful for the mankind.

- Fuels
- Cleaning Agents
- Paints
- Medicines
- Alloys
- Fertilizers
- Foods

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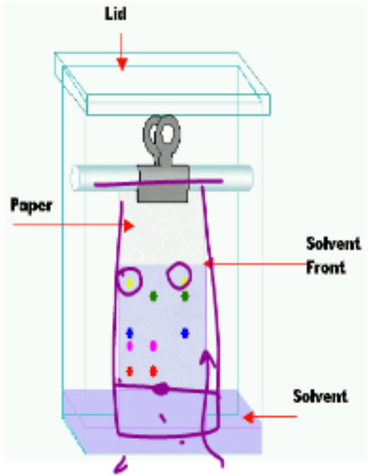
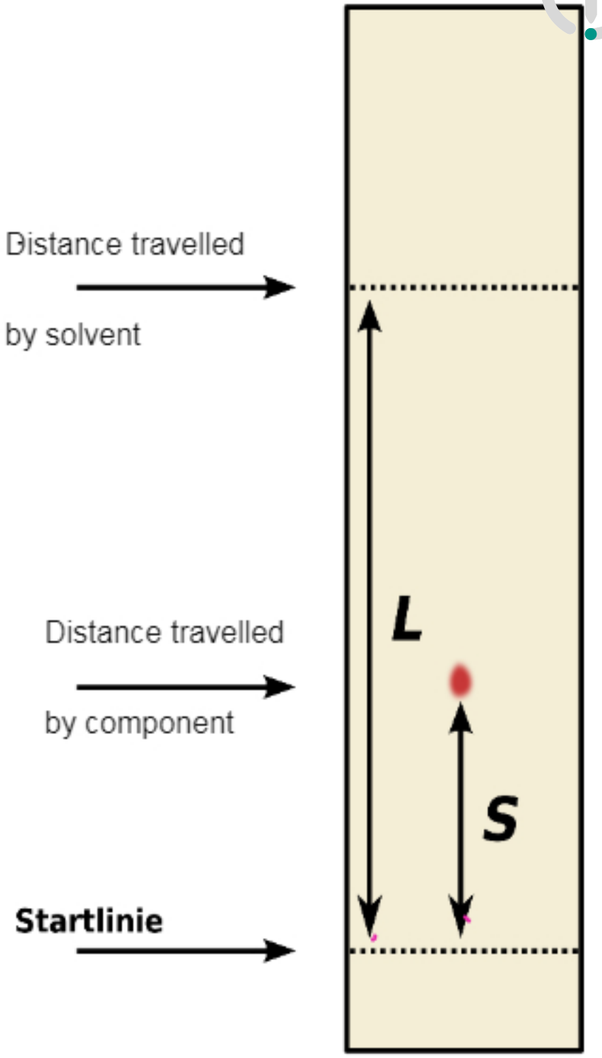
CHROMATOGRAPHY



Source: Wikimedia Commons

- Components in the mixture are separated on the basis of solubilties of different components of the mixture in a suitable solvent.
- A capillary tube is used to spot the mixture on the chromatography paper.
- The paper is put inside a solvent and the solvent is allowed to run up the chromatography paper.
- The component of the mixture which is more soluble in the solvent will travel greater distance and will leave its mark near the top.
- The component which is less soluble will have a mark near the bottom.



$$R_f = \frac{S}{L} \leftarrow \text{Distance travelled by solute}$$

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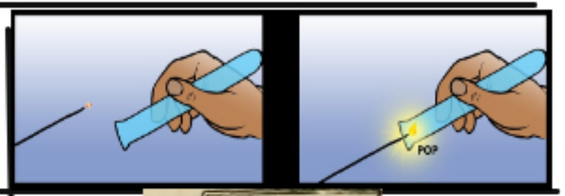
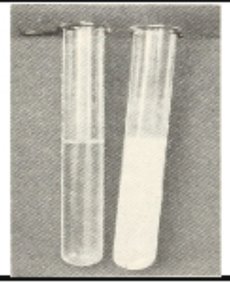
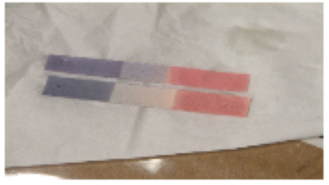
TEST FOR GASES

	Reaction	Test	Observation	
Hydrogen	Metal higher in reactivity than hydrogen react with acid producing hydrogen. $Mg + HCl \rightarrow MgCl_2 + H_2$	Bring a lighted splint to the mouth of the test tube containing hydrogen	The splint burns with the squeaky pop.	
Oxygen	Electrolysis of Water produced oxygen or decomposition of hydrogen peroxide	Bring a glowing splint to the mouth of the test tube containing oxygen.	The glowing splints relights.	
Carbon Dioxide	Metal carbonate with dilute acids produce carbon dioxide $MgCO_3 + 2HCl \rightarrow MgCl_2 + H_2O + CO_2$	Pass the gas released to lime water	Limewater will turn milky	
Chlroine	Electrolysis of brine	A damp blue litmus paper held at the mouth of the test tube	Bleached blue litmus paper	

TEST FOR CATIONS

Source: Flickr

Nichrome wire dipped in concentrated hydrochloric acid

↓ Heated

↓ Dipped in acid again

↓ Dipped in metal compound

Touched on the roaring blue bunsen flame ↑

Copper Cu^{2+}	BLUE GREEN
Potassium K^{+}	LILAC
Sodium (Na^{+})	YELLOW
Lithium (Li^{+})	CRIMSON
Calicium (Ca^{2+})	RED

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TEST FOR CATIONS

FLAME TEST

Add Aqueous Sodium Hydorxide

White Precipitate

Al^{3+} Mg^{2+} Ca^{2+}

Soluble.

excess Sodium hydroxide

Insoluble

Flame test

Nocolour red

Coloured Precipitate

Cu^{2+} → Light Blue Precipitate

Fe^{2+} → Light green precipitate

Fe^{3+} → reddish brown precipitate

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TEST FOR ANIONS

Carbonates CO_3^{2-}

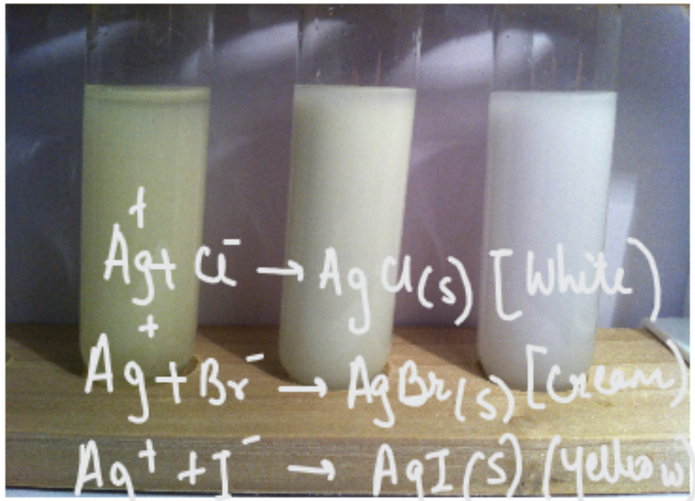
Add dilute acid

Effervescence of Carbondioxide

Pass to limewater

Limewater turns milky

Halides Cl^-, Br^-, I^-



Add dilute nitric acid
Add silver nitrate solution
Precipitate confirms the halide

Yellow precipitate — Iodide Ions — I^-
Cream Precipitate — bromide ions — Br^-
White precipitate — chloride ions — Cl^-

Sulphates SO_4^{2-}

Add dilute hydrochloric acid
Add barium chloride solution
A white precipitate confirms sulphate

$Ba^{2+}_{(aq)} + SO_4^{2-}_{(aq)} \rightarrow BaSO_{4(s)}$ (white)

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INSTRUMENTAL ANALYSIS

CHEMICAL TEST	INSTRUMENTAL TEST
Qualitative	Quantitative
Original sample destroyed	Original sample preserved
Less Accurate	More Accurate
Less Sensitive	Fast Accurate and Sensitive

Flame emission Spectroscopy

Each metal forms a chacteristic line spectrum when placed inside a spectrometer. ✓

The line spectrum is compared with the database to detect the metal ion ✓

The absorbance value gives the information about the concentration of metal ions.

Can detect traces of metal ions in sample of air, steel or any other metal.

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KEY TERMS

Pure Substance
Has a fixed melting and boiling point

Fixed Points
Same numerical value for boilling and melting?

Formulations
A mixture of elements which are placed together in fixed ratios

Chromatography
The seperation of a mixture using a solvent

Mobile Phase
The liquid or gas that flows through the chromtography paper

Stationary Phase
is contained on the paper and does not move through it

Chromatogram
the results to the seperation of the mixture

Retention Factor
the amount that each substance travels in comparision to the solvent movement

Flame Test
a test used to detect certain metal ions depending on the colour they burn when placed

Intrumental Analysis
A more accurate and sensitive way of collecting data which is faster than the chemical test and even preserves each of the chemicals used . Its quanitativve.

Flame Emission Spectroscopy
an instrumental analysis method in which each element forms a charateristic line specturm when placed inside a spectrometer, this can be used to compare elements against one another.

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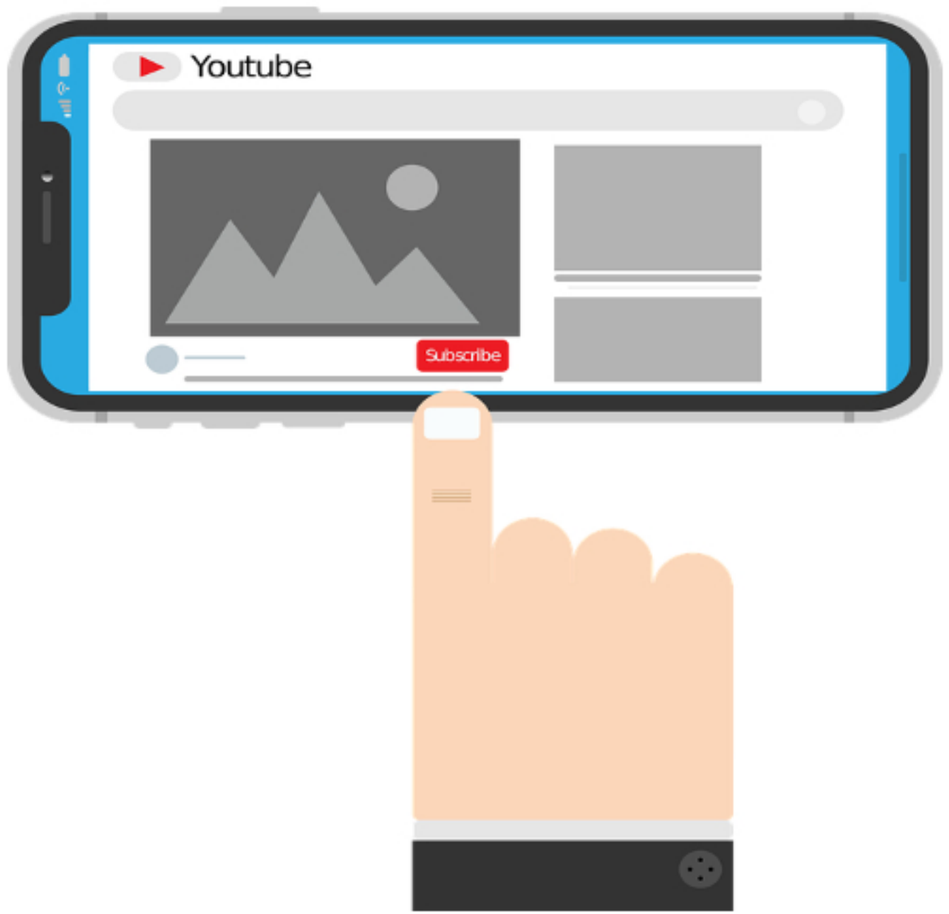
NEXT STEP



- CHECK SPECIFICATION
- EXAM QUESTIONS ON THIS TOPIC