



100% sheet

Year 11 Chemical analysis

Pure substances	<i>A pure substance is a single element or compound, not mixed with any other substance.</i>	Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.
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Element	Colour flames
Lithium	<i>Crimson</i>
Sodium	<i>Yellow</i>
Potassium	<i>Lilac</i>
Calcium	<i>Orange-red</i>
Copper	<i>Green</i>

Sodium hydroxide	<i>Is added to solutions to identify metal ions.</i>
White precipitates	<i>Aluminium, calcium and magnesium ions form this with sodium hydroxide solution.</i>
Coloured precipitates	<i>Copper (II) = blue Iron (II) = green Iron (III) = brown</i>

Pure substances

Purity, formulations and chromatography

Flame tests (chem only)

Metal hydroxides (chem only)

Carbonates, halides and sulfates (chem only)

AQA Chemical analysis

Identification of ions (CHEMISTRY ONLY)

Identification of common gases

Flame emission spectroscopy

Instrumental methods

Melting point of a pure substance

Melting point of an impure substance

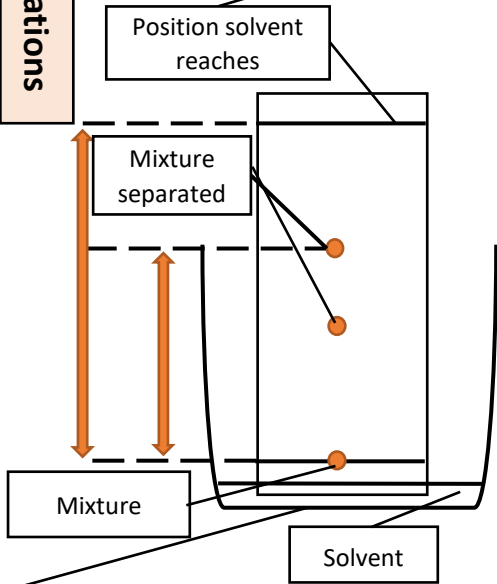
Formulation
A formulation is a mixture that has been designed as a useful product.

How are formulations made?
By mixing chemicals that have a particular purpose in careful quantities.

Examples of formulations.
Fuels, cleaning agents, paints, medicines and fertilisers.

Formulations

Chromatography



Chromatography
Can be used to separate mixtures and help identify substances.
Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).

R_f Values
The ratio of the distance moved by a compound to the distance moved by solvent.
 $R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$

Pure substances
The compounds in a mixture separate into different spots.
This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.

Gas	Test	Positive result
Hydrogen	<i>Burning splint</i>	'Pop' sound.
Oxygen	<i>Glowing splint</i>	Re-lights the splint.
Chlorine	<i>Litmus paper (damp)</i>	Bleaches the paper white.
Carbon dioxide	<i>Limewater</i>	Goes cloudy (as a solid calcium carbonate forms).

Instrumental methods
Methods that rely on machines
Can be used to identify elements and compounds. These methods are accurate, sensitive and rapid.

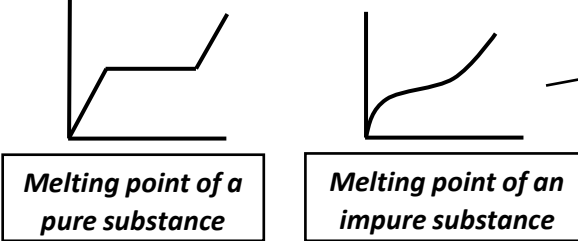
Flame emission spectroscopy
An instrumental method used to analyse metal ions.
The sample solution is put into a flame and the light that is given out is put through a spectroscope. The output line spectrum, can be analysed to identify the metal ions in the solution. It can also be used to measure concentrations.

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Purity, formulations and chromatography

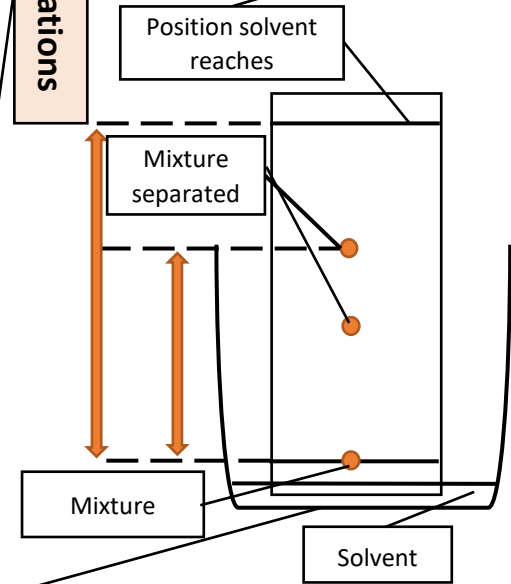
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Flame tests (chem only)

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Metal hydroxides (chem only)

Carbonates, halides and sulfates (chemistry only)

	<i>React with dilute acids to form carbon dioxide.</i>
	<i>When in a solution, they produce precipitates with silver nitrate solution in the presence of nitric acid.</i>
	<i>When in a solutions they produce a white precipitate with barium chloride solutions in the presence of hydrochloric acid.</i>

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Methods that rely on machines

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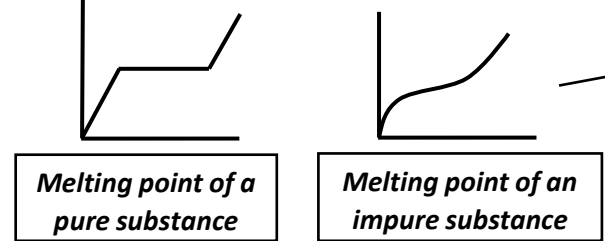
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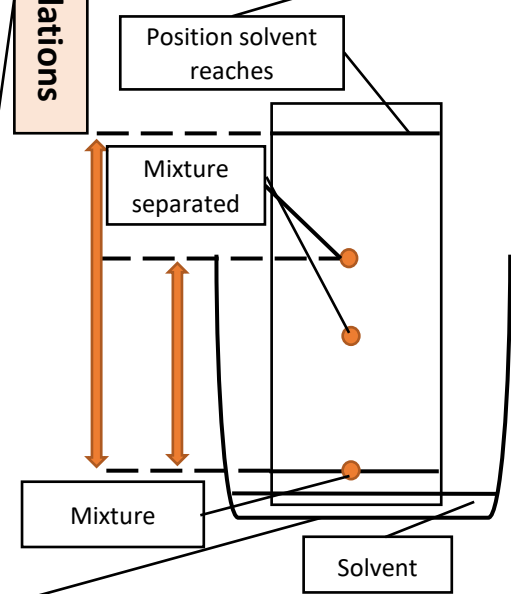
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Formulation	
How are formulations made?	
Examples of formulations.	

Formulations

Chromatography



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Halide ions	
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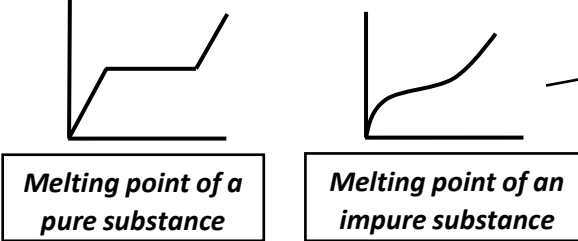
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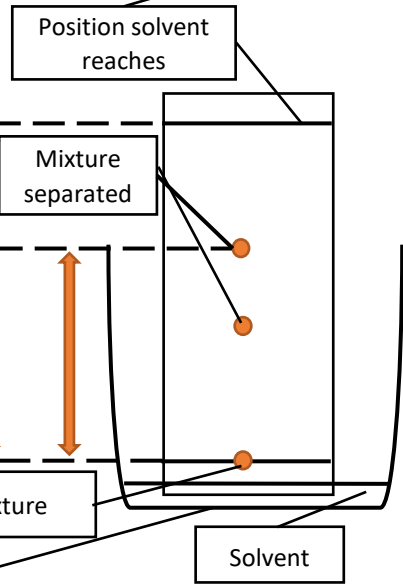
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