

AQA Chemistry GCSE

Topic 8: Chemical Analysis

Flashcards

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What is a pure substance?



What is a pure substance?

A pure substance is a single element or compound, not mixed with any other substance



What is a formulation and how is it made? Give examples



What is a formulation and how is it made? Give examples

- A formulation is a mixture of compounds in measured quantities that has been designed as a useful product.
- Formulations include fuels, cleaning agents, paints, medicines, alloys, fertilisers and foods.
- E.g. alloys are mixtures of metals; they are harder than pure metals, so have a particular purpose.



Describe paper chromatography



Describe paper chromatography.

- a) A start line is drawn near the bottom of the paper. The mixture is spotted on the line.
- b) A beaker is filled with small amount of solvent (it cannot touch or go above the start line when paper is placed in a beaker)
- c) Paper is hung on a rod and placed in a beaker.
- d) Solvent travels up the paper, thus separating the components.
- e) Before solvent level reaches the end, the paper is taken out and the finish line is marked. The paper is dried.
- f) The procedure works when different compounds have different affinities for the solvent/paper. Stronger attraction for the paper - travels slowly with the solvent etc.
- g) Paper is called the stationary phase - it doesn't move. Solvent is the mobile phase.



How is R_f calculated?



How is R_f calculated?

Distance moved by the spot / distance moved by solvent



In a paper chromatography experiment, a compound A was found to have an R_f value of 0.85 - what does it tell you about the compound?



In a paper chromatography experiment, a compound A was found to have an R_f value of 0.85 - what does it tell you about the compound?

It has a higher affinity for the solvent than for the paper.



Describe the tests for
hydrogen, oxygen, carbon
dioxide and chlorine



Describe the tests for hydrogen, oxygen, carbon dioxide and chlorine

Hydrogen – pop with burning splint over gas

Oxygen – glowing splint relights

Carbon dioxide – turns limewater ($\text{Ca}(\text{OH})_2$) milky

Chlorine – bleaches damp litmus paper and makes it white



Describe the flame test results



Describe the flame test results

Lithium compounds – crimson red flame

Sodium compounds - yellow flame

Potassium compounds - lilac flame

Calcium compounds – orange red flame

Copper compounds -green flame.

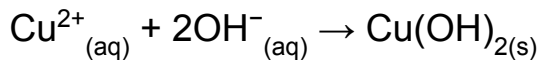


Describe the sodium
hydroxide test results and
write the equations

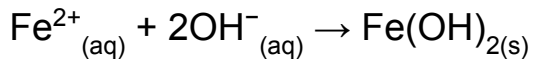


Describe the sodium hydroxide test results and write the equations

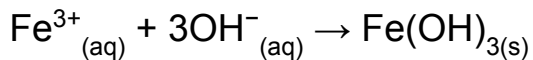
Copper(II) forms a blue precipitate:



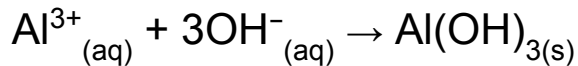
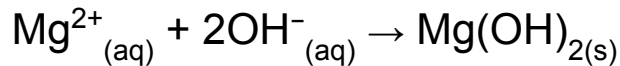
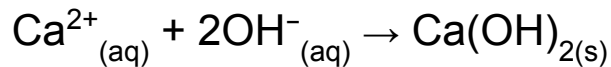
Iron(II) forms a dirty green precipitate:



iron(III) forms a brown precipitate:



Al^{3+} , Ca^{2+} , Mg^{2+} form white precipitates but only the $\text{Al}(\text{OH})_3$ dissolves in excess NaOH to form a colourless solution.



Describe the test for carbonate anions



Describe the test for carbonate anions

Add dilute acid, e.g. HCl

Fizzing observed, as CO₂ is released.



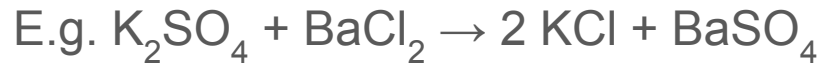
Describe the test for sulfate anions



Describe sulfate tests and give an equation

Add a solution containing Ba^{2+} cations, e.g. a solution of BaCl_2

White precipitate of BaSO_4 forms



(!!!) can also be thought of a test for barium (II); add sulfates - white precipitate forms.



Describe the test for halide anions



Describe silver nitrate tests and give equations

Add a solution of AgNO_3 (acidified with HNO_3)

Chlorides - white precipitate, silver chloride; $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$

Bromides - cream precipitate, silver bromide; $\text{Ag}^+ + \text{Br}^- \rightarrow \text{AgBr}$

Iodides - yellow precipitate, silver iodide; $\text{Ag}^+ + \text{I}^- \rightarrow \text{AgI}$



What are instrumental methods?



What are instrumental methods?

They are accurate, sensitive and rapid methods which are useful when the amount of sample is very small



Describe the flame emission spectroscopy



Describe the flame emission spectroscopy

- instrumental method used for identifying metal ions in solution or measuring their concentration
- Spectroscope measures the exact wavelength of the light emitted by a metal ion
- That allows for definite identification - sometimes colours are difficult to distinguish.
- Concentrations are found by measuring the intensity of light emitted. The more intense light, the greater the concentration of the metal ion in a solution.
- From the intensity vs concentration graph, you can read off a relevant concentration value at a given intensity.



What are cations and anions?



What are cations and anions?

Cations are the positive ions; anions are the negative ions.

