AQA Chemistry A-Level

RP4 - Identification of cations and anions

Flashcards

How do you test for group 2 metal cations?

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- Place 10 drops of a group 2 compound in test tube (0.1 mol dm^{-3}).
- Add 10 drops of 0.6 mol dm^{-3} NaOH to test tube. Record any observations.
- Continue to add NaOH so it is in excess. Record any observations.
- Repeat with other group 2 compounds.

What are the results from these reactions?

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	Barium Chloride	Calcium Bromide	Magnesium Chloride	Strontium Chloride
Initial	Colourless solution	Colourless solution	Colourless solution	Colourless solution
10 drops of NaOH	Colourless solution	Slight white precipitate	Slight white precipitate	Slight white precipitate
Excess NaOH	Colourless solution	Slight white precipitate	White precipitate	Slight white precipitate

How would you distinguish between calcium bromide and strontium chloride?

How would you distinguish between calcium bromide and strontium chloride?

- Place 10 drops of $BaCl_2$ (0.1 mol dm^{-3}) in a test tube.
- Add 10 drops of sulfuric acid (1 mol dm^{-3}). Record observations.
- Continue to add H_2SO_4 until in excess. Record observations.
- Repeat for other the group 2 compounds

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	Barium Chloride	Calcium Bromide	Magnesium Chloride	Strontium Chloride
Initial	Colourless solution	Colourless solution	Colourless solution	Colourless solution
10 drops of H_2SO_4	White precipitate	Slight white precipitate	Slight white precipitate	White precipitate
Excess H_2SO_4	White precipitate	Slight white precipitate	Colourless solution	White precipitate

What are the overall results for the Group 2 reactions?

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	Ba^{2+}	Ca^{2+}	Mg^{2+}	Sr^{2+}
Excess NaOH	No change	White precipitate of $Ca(OH)_2$	White precipitate of $Mg(OH)_2$	Slight white precipitate
Excess H_2SO_4	White precipitate	Slight white precipitate	Colourless solution	White precipitate

How do you test for ammonium (NH_4^+) ions?

How do you test for ammonium (NH_4^+) ions?

- Place 10 drops of NH_4Cl into a test tube.
- Add 10 drops of NaOH solution. Shake.
- Warm the solution in the test tube.
- Test the gas released with damp red litmus paper.
- If it goes blue, ammonium ions are present.

How do you test for group 7/halide ions?

How do you test for group 7/halide ions?

- To the compound being tested, add nitric acid and silver nitrate. Record observations.
- To samples of this solution, add dilute and then concentrated ammonia.

What are the results from these reactions?

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	Cl^-	Br^-	I^-
Silver nitrate	White precipitate	Cream precipitate	Yellow precipitate
Dilute NH_3	White precipitate disappears (solution is therefore colourless)	Cream precipitate remains	Yellow precipitate remains
Concentrated NH_3	Remains colourless	Cream precipitate disappears (solution therefore colourless)	Yellow precipitate remains

How do you test for hydroxide (OH^-) ions?

How do you test for hydroxide (OH^-) ions?

1. Test a 1 cm depth of solution in a test tube with red litmus paper or universal indicator paper.
2. Record your observations.
3. Sodium hydroxide will turn damp red litmus paper blue.

How do you test for carbonate (CO_3^{2-}) ions?

How do you test for carbonate (CO_3^{2-}) ions?

- Put 2 cm^3 of $Ca(OH)_2$ into a test tube.
- Add 3 cm^3 Na_2CO_3 (0.5 mol dm^{-3}) in another test tube then add an equal volume of dilute HCl (1.0 mol dm^{-3}).
- Immediately put in delivery tube with open end into the $Ca(OH)_2$ test tube.
- If $Ca(OH)_2$ goes cloudy, carbonate ions were present in the other test tube.

How do you test for sulfate (SO_4^{2-}) ions?

How do you test for sulfate (SO_4^{2-}) ions?

- Add HCl and $BaCl_2$ to the suspected sulfate solution.
- If sulfate ions are present, a white precipitate of $BaSO_4$ will form.

What is the order of testing ions? (Carbonate, halide and sulfate)

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Carbonate → Sulfate → Halide

This prevents false positive results occurring i.e. Unexpected insoluble precipitates such as Ag_2SO_4, Ag_2CO_3 and $BaCO_3$ could form.