Edexcel International Chemistry A Level

CP8 - Analysis of Some Inorganic and Organic Unknowns

Flashcards

Describe the test for carbonate ions

Describe the test for carbonate ions

Add aqueous acid and pass the gaseous product through limewater. If a white precipitate forms and the limewater turns cloudy, carbonate ions were present (CO_2 was the gas produced).

This test is the same for HCO_3^- ions

Describe the test for SO_4^{2-} ions

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Add acidified barium chloride solution. A white precipitate of barium sulfate will form if SO_4^{2-} ions are present.

Describe the test for halide ions

Describe the test for halide ions

Add a few drops of nitric acid followed by a few drops of silver nitrate. Observe the colour of the precipitate and test solubility in ammonia solution:

AgCl - white ppt, soluble in dilute NH_3
AgBr - cream ppt, soluble in concentrated NH_3
AgI - yellow ppt, insoluble in NH_3

What order should the anion tests be done in? Why?

What order should the anion tests be done in?

Carbonate, sulfate, halide

The presence of carbonate ions may give false positive results for the other tests.

Describe the test for carbon dioxide

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Pass the gas through limewater. If a white precipitate forms in the limewater, CO_2 is present.

Describe the test for oxygen

Describe the test for oxygen

Insert a glowing splint into a test tube of the gas. If oxygen is present, the splint will relight.

Describe how to carry out a flame test

Describe how to carry out a flame test

1. Clean a nichrome wire by dipping it in concentrated HCl and placing it in a bunsen burner flame
2. Dip the wire in the unknown compound and place in the Bunsen flame
3. Observe the colour of the flame

What colour is the flame test for lithium?

What colour is the flame test for lithium?

Red

What colour is the flame test for sodium?

What colour is the flame test for sodium?

Yellow

What colour is the flame test for potassium?

What colour is the flame test for potassium?

Lilac

What colour is the flame test for rubidium?

What colour is the flame test for rubidium?

Red (red-violet)

What colour is the flame test for caesium?

What colour is the flame test for caesium?

Blue-violet

What colour is the flame test for calcium?

What colour is the flame test for calcium?

Orange-red

What colour is the flame test for strontium?

What colour is the flame test for strontium?

Red

What colour is the flame test for barium?

What colour is the flame test for barium?

Pale green

Describe the test for alkenes

Describe the test for alkenes

Add bromine water. If an alkene is present, the bromine water will change from orange to colourless.

Describe the test for halogenoalkanes

Describe the test for halogenoalkanes

Hydrolyse the halogenoalkane to release the halide ions (see CP5 for full method). Add silver nitrate then test precipitate with ammonia solution:

AgCl - white ppt soluble in dilute ammonia

AgBr - cream ppt soluble in concentrated ammonia

AgI - yellow ppt insoluble in ammonia

Describe the test for alcohols

Describe the test for alcohols

React with potassium dichromate in dilute sulfuric acid:

- Primary alcohol - if the reagents are distilled, an aldehyde forms. If the products are refluxed, a carboxylic acid is produced
- Secondary alcohol - if the reagents are refluxed, a ketone is produced
- Tertiary alcohols - cannot be oxidised

When the alcohol is oxidised, there is a colour change from orange to green.

Describe the test for aldehydes

Describe the test for aldehydes

- Add Benedict's reagent / Fehling's solution. If an aldehyde is present, the blue solution turn from blue to red as a red precipitate forms.
- Add Tollens' solution. If an aldehyde is present, a silver mirror will form on the wall of the test tube.

Describe the test for carboxylic acids

Describe the test for carboxylic acids

Add sodium carbonate or sodium hydrogencarbonate. If the solution effervesces, a carboxylic acid is present.

After test-tube reactions have been completed, what further evidence could be used to identify an organic compound?

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Mass spectrum

Infrared spectrum

Briefly describe how a mass spectrum can be used to identify an organic compound

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m/z ratio of the molecular ion peak shows the relative formula mass.

m/z ratios of the fragment ions can be used to work out the different fragment ions formed from the compound.

Briefly explain how an infrared spectrum can be used to identify an organic compound

Briefly explain how an infrared spectrum can be used to identify an organic compound

The wavenumber of the peaks can be compared to the data book to identify which bonds are present in the compound. This is because each bond absorbs a unique frequency of infrared radiation which causes the bond to vibrate (stretch or bend).