

WJEC (Eduqas) Chemistry A-level

SP OA4d - Planning a Sequence of Tests to Identify Organic Compounds

Flashcards

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Describe briefly how 6 unknown organic samples can be identified from a list of possible samples



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Use various organic tests to identify which functional groups are present. Use the positive results to identify and eliminate certain compounds. The tests should be planned so that the samples are identified in the smallest number of tests possible.



How can aldehydes and ketones be identified from a collection of unknown organic samples?



How can aldehydes and ketones be identified from a collection of unknown organic samples?

Add 2,4-DNP to all possible samples.

The aldehydes and ketones will be identified by the positive result of a bright orange/yellow precipitate.



What reagents can be used to distinguish between aldehydes and ketones?



What reagents can be used to distinguish between aldehydes and ketones?

Tollens' reagent

Fehling's reagent



Describe the test for aldehydes using
Tollens' reagent



Describe the test for aldehydes using Tollens' reagent

Add the Tollens' reagent to the unknown sample. A positive result of a silver mirror forming on the inside of the test tube will indicate the presence of an aldehyde.



Describe the test for aldehydes using
Fehling's reagent



Describe the test for aldehydes using Fehling's reagent

Add the blue Fehling's reagent to the unknown sample. A positive result of the formation of a brick red precipitate will indicate the presence of an aldehyde.



How can you test for methyl ketones?



How can you test for methyl ketones?

Iodoform test:

Warm the sample with iodine and sodium hydroxide. A positive result is indicated by a yellow precipitate and an antiseptic smell.



What is the functional group of methyl ketones?



What is the functional group of methyl ketones?



What can be tested for to distinguish between butanone and diphenylmethanone?



What can be tested for to distinguish between butanone and diphenylmethanone?

Since butanone has the structure

$\text{CH}_3\text{COCH}_2\text{CH}_3$, it is a methyl ketone.

Therefore a test for methyl ketones (iodoform test) will distinguish between the two compounds.



How is litmus paper used to test for acids?



How is litmus paper used to test for acids?

Blue litmus paper will turn red when exposed to an acid.



How can you carry out a test for
carboxylic acids?



How can you carry out a test for carboxylic acids?

Add a carbonate (e.g. sodium carbonate) to the carboxylic acid. If effervescence occurs then carbon dioxide has been produced, indicating the presence of a carboxylic acid. The gas produced can be tested by bubbling through limewater. The limewater will turn cloudy if carbon dioxide is present.

The carboxylic acid can also be tested using blue litmus paper - which will turn red when exposed to an acid.



How can litmus paper be used to test for bases?



How can litmus paper be used to test for bases?

Red litmus paper will turn blue when exposed to a base.



How can you test for amides?



How can you test for amides?

Carry out alkaline hydrolysis. Heat the samples gently with sodium hydroxide. If the sample is an amide, it will produce ammonia gas. Test the vapour produced using damp red litmus paper. If ammonia is present, the litmus paper will turn blue - identifying the sample as an amide.



How can you test for esters?



How can you test for esters?

Use alkaline hydrolysis. Heat the samples with sodium hydroxide. If the sample is an ester, it will produce a sodium carboxylate salt and an alcohol. Add dilute sulfuric acid to produce a carboxylic acid from the sodium carboxylate salt. Test this with blue litmus paper - the acid will cause it to turn red. This result will confirm that the original sample was an ester.



Why might an ester be distinguished from a collection of unknown samples before even carrying out any tests?



Why might an ester be distinguished from a collection of unknown samples before even carrying out any tests?

Esters generally have distinct sweet smells which may allow them to be identified from the other samples.

