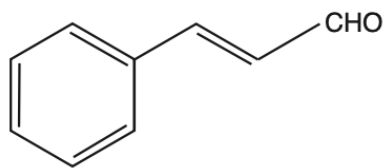


A level Chemistry A

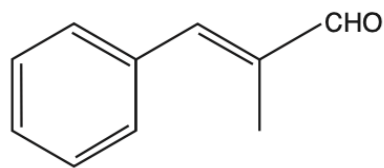
H432/02 Synthesis and analytical techniques

Question Set 18

1. Cinnamaldehyde and methylcinnamaldehyde are naturally occurring organic compounds.



cinnamaldehyde



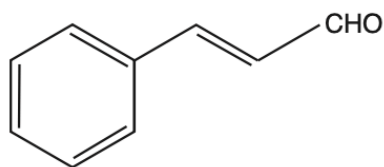
methylcinnamaldehyde

- (a) Methylcinnamaldehyde is an *E* stereoisomer.

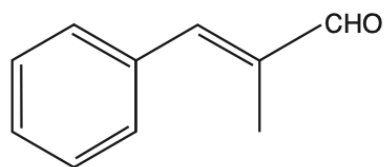
Explain this statement in terms of the Cahn-Ingold-Prelog (CIP) rules.

[2]

- (b) A student plans to carry out some chemical tests on both cinnamaldehyde and methylcinnamaldehyde.



cinnamaldehyde



methylcinnamaldehyde

- (i) Suggest a suitable chemical test to confirm that both compounds contain an unsaturated carbon chain.

Your answer should include the reagent and observations.

[1]

- (ii) Describe a chemical test to confirm that both compounds contain an aldehyde functional group.

Your answer should include the reagent and observations.

[1]

- (iii) Describe a chemical test to confirm that cinnamaldehyde and methylcinnamaldehyde contain a carbonyl group.

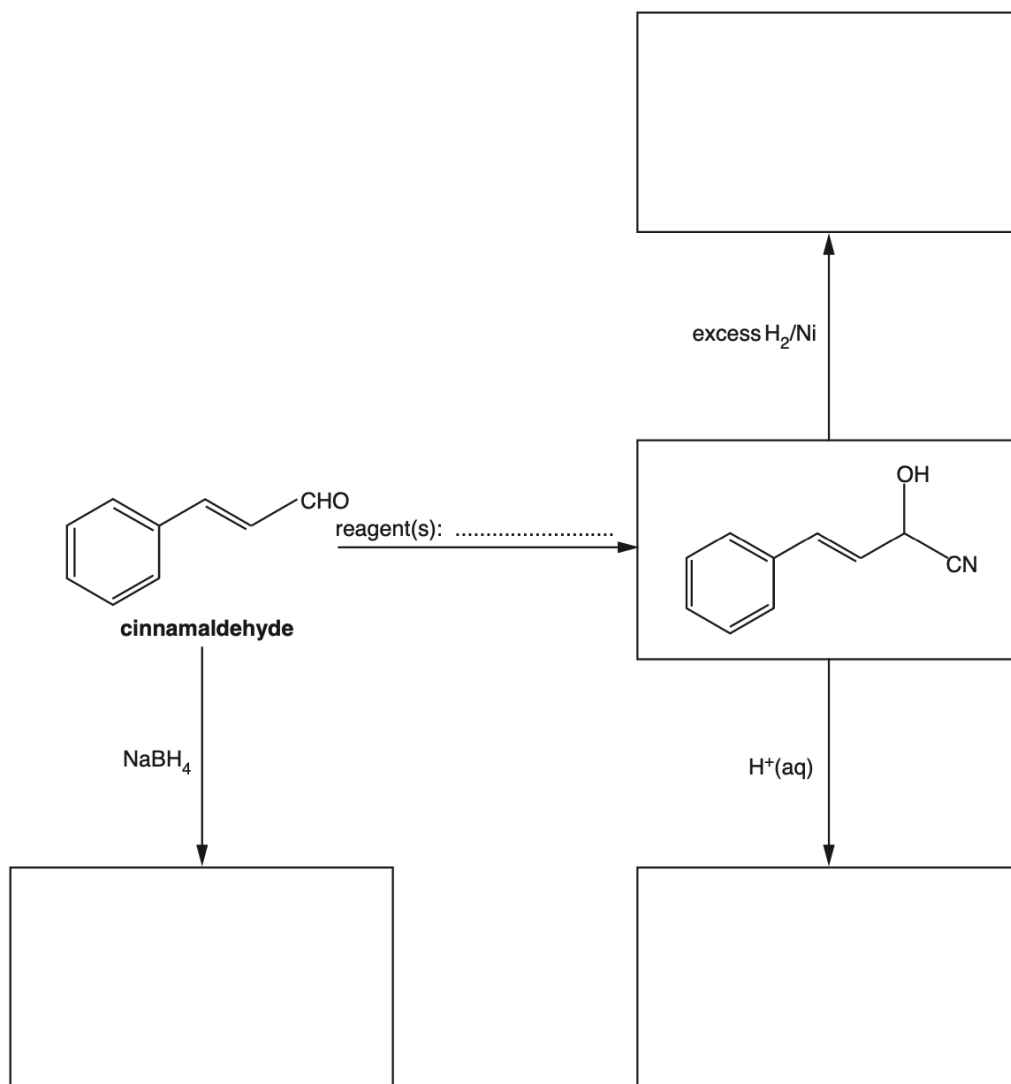
How could the products of this test be used to distinguish between the two compounds?

Your answer should **not** include spectroscopy.

[3]

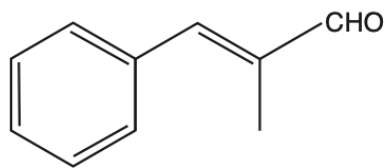
(c) The flowchart below shows some reactions starting with cinnamaldehyde.

Draw the structures of the missing organic compounds in the boxes and add the missing reagent(s) on the dotted line.



[5]

- (d)* Methylcinnamaldehyde reacts with iodine monochloride, ICl , by electrophilic addition. The reaction produces a mixture containing two different organic products.



methylcinnamaldehyde

The electronegativity values of chlorine and iodine are given in the table below.

	Pauling electronegativity value
Cl	3.0
I	2.5

Outline the mechanism, using the 'curly arrow' model, for the formation of **one** of the organic products and explain which of the two possible organic products is more likely to be formed.

In your mechanism, you can show the phenyl group as C_6H_5 .

[6]

Total Marks for Question Set 18: 18

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