



14–16 years

Microscale simple cracking

Integrated instructions



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Integrated instructions

Integrated instructions use clear numbering, arrows and simple pictograms (for example, an eye showing when to make observations). They were developed using cognitive load theory and remove unnecessary information. Therefore, the instructions reduce extraneous load on learners, increasing the capacity of their working memory to think about what they are doing and why.

Read more at rsc.li/47bIKi5.

Learning objectives

1. Observe the colour change associated with the bromine water test for unsaturated hydrocarbons.
2. Explain the purpose of cracking, as used in the petrochemical industry.



❶ ~0.5 cm³ liquid
paraffin ☐
Mineral wool ☐

❷ Aluminium
oxide ☐

❺ Clamp gently ☐

❹ Attach pipette ☐

❸ Bromine water ☐

❻ Heat at junction ☐

❼ Observe ☐

RSC Microscale chemistry

Cracking hydrocarbons on a microscale

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Discussion questions

1. Liquid paraffin is a mixture of hydrocarbons. There will be no visible change when bromine water is added to liquid paraffin. What does this suggest about the composition of the paraffin mixture?
2. Mineral wool is inert and does not participate in this reaction. Suggest why it is added to the pipette.
3. What do the results of the bromine water test indicate has occurred during the reaction?
4. Suggest the benefits of using an aluminium oxide based catalyst, such as a zeolite, in industry.
5. Cracking reactions produce a mixture of alkanes and alkenes of different chain lengths. Suggest how this mixture could be separated.