Alkene reactions: bromine evidence

Student activity • observation and reasoning

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The question

What does loss of bromine colour establish?

Interpret a controlled recorded bromine-water comparison, then model addition and combustion equations. This lesson supplies paper evidence, not a pupil bromine-handling method.

Equipment

• Booklet, reference-evidence cards and molecular model kit; no chemicals

Desk activity only; keep small model pieces away from mouths.

Course coverage: Shared core: 4.12 and 4.27–4.28, bromine addition and the alkane/alkene test. Recorded-evidence workshop.

Plan, model or apparatus sketch

Draw a labelled structure or model to explain your reasoning for this lesson.

Method and reasoning

Read the whole sequence before starting

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1. Read the explicitly supplied reference observations for fresh bromine water, a saturated hydrocarbon and an alkene.

2. Identify the initial orange colour and the alkene's decolourisation; keep the comparison away from ultraviolet-light substitution conditions.

3. Draw $CH_2=CH_2+Br_2 \rightarrow CH_2BrCH_2Br$ as the syllabus addition model. Retain a single C–C bond and put one Br on each carbon.

4. Explain why loss of colour supports reaction with bromine but cannot alone identify an unknown compound.

5. Balance complete combustion of ethene to CO_2 and H_2O.

6. Describe the controls needed for a valid observed comparison and distinguish reference evidence from personal observations.

Cleanup

- Return shared equipment and retain corrected reasoning.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Supplied teaching observations, not today's experimental results: dilute bromine water is orange; in a controlled comparison away from UV, the alkene removes the colour while a saturated hydrocarbon does not rapidly do so. Colour moving between liquid layers is not proof of reaction. The displayed dibromo-product equation is the syllabus model; aqueous chemistry may include other products.

Task	My structure / working	Reason / correction
Reference comparison		
Addition structure		
Combustion / evaluation		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What is the initial bromine-water colour?

2. What change supports an alkene in the controlled comparison?

3. Draw the ethene addition product.

4. Why is this addition rather than substitution?

5. Balance ethene combustion.

6. Why is decolourisation not a unique identity test?