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# HL Paper 1

Which analytical technique is used to measure bond lengths in solid compounds?

- A. IR spectroscopy
- B. Mass spectroscopy
- C. NMR spectroscopy
- D. X-ray crystallography

## Markscheme

D

## Examiners report

[N/A]

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Which would be the most effective method to distinguish between liquid propan-1-ol and propan-2-ol?

- A. Observation of colour change when warmed with acidified potassium dichromate
- B. Determination of  $m/z$  value of molecular ion in the mass spectrum
- C. Determination of percentage composition
- D.  $^1\text{H}$  NMR spectroscopy

## Markscheme

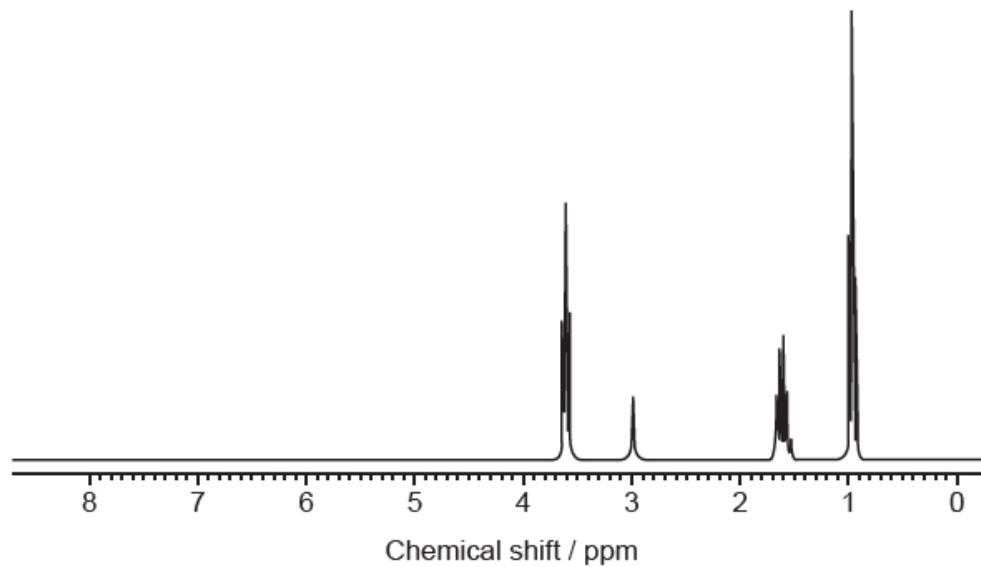
D

## Examiners report

[N/A]

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Which compound gives this  $^1\text{H}$  NMR spectrum?



- A.  $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$
- B.  $\text{CH}_3\text{CH}_2\text{OH}$
- C.  $\text{CH}_3\text{CH}_2\text{CH}_3$
- D.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

## Markscheme

D

## Examiners report

[N/A]

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Which technique can be used to identify bond length and bond angle?

- A. <sup>1</sup>H NMR spectroscopy
- B. IR spectroscopy
- C. Mass spectroscopy
- D. X-ray crystallography

## Markscheme

D

## Examiners report

[N/A]

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Which property explains why tetramethylsilane,  $\text{Si}(\text{CH}_3)_4$ , can be used as a reference standard in  $^1\text{H}$  NMR spectroscopy?

- A. It has a high boiling point.
- B. It is a reactive compound.
- C. All its protons are in the same chemical environment.
- D. It gives multiple signals.

## Markscheme

C

## Examiners report

[N/A]

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Which technique is used to determine the bond lengths and bond angles of a molecule?

- A. X-ray crystallography
- B. Infrared (IR) spectroscopy
- C. Mass spectroscopy
- D.  $^1\text{H}$  NMR spectroscopy

## Markscheme

A

## Examiners report

[N/A]

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