

AS91388

Demonstrate understanding of spectroscopic data in chemistry

Level 3, Credits 3 (Internal)

This achievement standard involves demonstrating understanding of spectroscopic data in chemistry.

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of spectroscopic data in chemistry.	Demonstrate in-depth understanding of spectroscopic data in chemistry.	Demonstrate comprehensive understanding of spectroscopic data in chemistry.

Spectroscopic data is limited to that collected from

- ☐ mass spectroscopy
 - ☐ interpret the molecular ion
 - ☐ determine the molar mass of the compound
 - ☐ determine the presence or absence of nitrogen, chlorine or bromine
 - ☐ gain information about partial structures from typical mass fragments (single bond breakages)
- ☐ infrared (IR) spectroscopy
 - ☐ determine the presence or absence of particular functional groups
 - ☐ identify presence or absence of carbonyl functional group
 - ☐ identify presence or absence of hydrogen bonding (N-H or O-H)
- ☐ ^{13}C nuclear magnetic resonance (NMR) spectroscopy
 - ☐ determine the number of unique carbon environments in the structure and the number of signals
 - ☐ interpret the magnitude of chemical shifts (ppm) to identify possible functional groups
 - ☐ provide supporting evidence for aspects of the structure obtained from the other spectra

Spectroscopic data is used to

- ☐ identify discrete aspects of the structure of organic molecules
- ☐ determine the structure of organic molecules
- ☐ justify the structure of organic molecules

Organic molecules are limited to

- | | | | |
|-----------------------------------|--------------------------------------|---|---|
| <input type="checkbox"/> alkanes | <input type="checkbox"/> haloalkanes | <input type="checkbox"/> ketones | <input type="checkbox"/> acid chlorides |
| <input type="checkbox"/> alkenes | <input type="checkbox"/> amines | <input type="checkbox"/> carboxylic acids | <input type="checkbox"/> esters |
| <input type="checkbox"/> alcohols | <input type="checkbox"/> aldehydes | <input type="checkbox"/> amides | |

Aspects of structure are limited to

- | | |
|---|--|
| <input type="checkbox"/> molar mass | <input type="checkbox"/> functional groups |
| <input type="checkbox"/> molecular formulae | <input type="checkbox"/> carbon framework including structural isomers |

Tables will be provided for use in interpreting the data e.g. molecular formulae, isotopic masses and common ion fragments (mass spectrometry), characteristic absorptions (IR) and shifts (NMR). A periodic table of elements with molar masses may be provided.