

Exercise 0.71 – Physical properties

Q071-01 Select the substance with the higher boiling point in each of the following pairs. Explain your reasoning:

- a) C_2H_6 and C_3H_8
 - b) CH_3CH_2OH and CH_3OCH_3
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Q071-02 Which substance has the highest boiling point?

- A. CH_4
 - B. He
 - C. HF
 - D. Cl_2
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Q071-03 The very high heat of vaporization of H_2O is mainly a result of

- A. van der Waals forces
 - B. covalent bonds
 - C. inter-ionic attractions
 - D. hydrogen bonding
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Q071-04 Explain the following statement: "Cis-butenedioic acid has a lower melting point than its isomer trans-butenedioic acid."

Q071-05 Arrange the following compounds in order of increasing boiling point and explain your choice by reference to the intermolecular forces involved: Bromoethene, chloroethene, ethene

Q071-06 Aluminium fluoride AlF_3 is a solid up to temperatures of $1250^\circ C$, whereas nitrogen trifluoride is a gas above $-129^\circ C$. Describe the bonding and structure in samples of each of these substances.

Q071-07 Which statements are generally true about the melting points of substances?

- I - Melting points are higher for compounds containing ions than for compounds containing molecules.
 - II - A compound with a low melting point is less volatile than a compound with a higher melting point.
 - III - The melting point of a compound is decreases by the presence of impurities.
- A. I only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
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Q071-08 CH_3COCH_3 is the first member of the ketone homologous series. Draw the full structural formula of the next member of the homologous series and predict how its melting point compares with that of CH_3COCH_3

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Q071-09 The compounds A, B and C have approximately the same molar mass:

A	B	C
C_4H_{10}	$CH_3CH_2CH_2OH$	$CH_3OCH_2CH_3$

When the compounds are arranged in order of increasing boiling points (lowest boiling point first), the correct order is:

- A. A, C, B
- B. A, B, C
- C. B, C, A
- D. C, B, A

Q071-10 Identify the strongest type of intermolecular force present in each of the compounds propan-1-ol, propanal and propanoic acid. List these compounds in decreasing order of boiling point.
