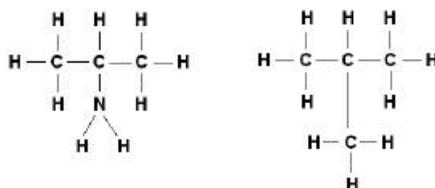


3.1 Intermolecular Forces Worksheet

- 1) For each pair of compounds listed below, identify the compound that has the highest boiling point. Justify your choice in terms of intermolecular forces.
- | | | |
|---|--|--|
| a. Br ₂ and I ₂ | f. Cl ₂ and H ₂ | k. CaOH or H ₂ O |
| b. NH ₃ and NCl ₃ | g. H ₂ O and H ₂ S | l. KCl or Cl ₂ |
| c. NH ₃ and CH ₄ | h. CH ₄ and SnH ₄ | m. F ₂ or Cl ₂ |
| d. CH ₄ and CCl ₄ | i. NH ₃ and PH ₃ | n. C ₂ H ₆ or C ₄ H ₁₀ |
| e. He and Ar | j. AsH ₃ and SbH ₃ | |
- 2) Explain why Cl₂ is a gas and Br₂ is a liquid at 25°C and 1 atm.
- 3) Explain why H₂ is a gas and I₂ is a solid at 25°C and 1 atm.
- 4) Explain why ethane, C₂H₆, melts at -183°C and nonane, C₉H₂₀, melts at -54°C.
- 5) Explain why propane, C₃H₈, is a gas and decane, C₁₀H₂₂, is a liquid at 25°C and 1 atm.
- 6) The structures for ethanal, C₂H₄O, and methanol, CH₃OH, are shown below.



- a. Identify the types of intermolecular forces that exist in a pure sample of ethanal.
- b. Identify the types of intermolecular forces that exist in a pure sample of methanol.
- 7) The structures for aminopropane, CH₃CHNH₂CH₃, and isobutane, C₄H₁₀, are shown below.



- a. Identify the types of intermolecular forces that exist in a pure sample of aminopropane.
- b. Identify the types of intermolecular forces that exist in a pure sample of isobutane.
- c. Which pure liquid has the highest boiling point? Explain.
- d. Explain why aminopropane is soluble in water, whereas isobutene is not soluble in water.

