

Boiling Point Elevation Quiz Answer Key PDF

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Which of the following is a colligative property?

- A. Density
- B. Viscosity
- C. Boiling point elevation ✓**
- D. Color

What is the unit of molality used in the boiling point elevation formula?

- A. moles per liter
- B. moles per kilogram ✓**
- C. grams per liter
- D. grams per kilogram

Describe how the van't Hoff factor influences the boiling point elevation of a solution.

The van't Hoff factor influences the boiling point elevation of a solution by determining the number of solute particles present; a higher van't Hoff factor leads to a greater elevation in boiling point.

What is boiling point elevation?

- A. A decrease in boiling point when a solute is added
- B. An increase in boiling point when a solute is added ✓**
- C. A decrease in freezing point when a solute is added
- D. An increase in freezing point when a solute is added

Discuss the real-world applications of boiling point elevation in industry.

In the automotive industry, boiling point elevation is applied in antifreeze formulations to prevent engine overheating. In food processing, it helps in preserving food by increasing the boiling point of

water, thus enhancing the effectiveness of cooking and sterilization processes. Additionally, in chemical manufacturing, it is used to optimize reaction conditions and improve product yields.

What are the components of the boiling point elevation formula? (Select all that apply)

- A. ΔT_b ✓
- B. K_b ✓
- C. i ✓
- D. Molality

Which of the following would result in a greater boiling point elevation?

- A. Adding sugar to water
- B. Adding salt to water ✓
- C. Adding alcohol to water
- D. Adding oil to water

Which of the following are examples of colligative properties? (Select all that apply)

- A. Boiling point elevation ✓
- B. Freezing point depression ✓
- C. Osmotic pressure ✓
- D. Surface tension

In the context of boiling point elevation, what does the term 'non-volatile solute' imply? (Select all that apply)

- A. The solute does not evaporate easily ✓
- B. The solute increases the solvent's vapor pressure
- C. The solute remains in the liquid phase ✓
- D. The solute evaporates quickly

Which constant is specific to each solvent in the boiling point elevation formula?

- A. Gas constant
- B. Ebullioscopic constant ✓
- C. Avogadro's constant

D. Planck's constant

What are the potential sources of error in an experiment measuring boiling point elevation, and how might they affect the results?

Sources of error may include: 1) Impurities in the solute or solvent, which can alter the boiling point; 2) Inaccurate thermometer readings due to calibration issues; 3) Inconsistent heating rates that can cause fluctuations in temperature; 4) Evaporation of the solvent during the experiment; 5) Atmospheric pressure variations that can affect boiling point measurements.

How would you experimentally determine the boiling point elevation of a solution?

1. Measure the boiling point of the pure solvent using a thermometer. 2. Prepare a solution by dissolving a known amount of solute in the solvent. 3. Measure the boiling point of the solution. 4. Calculate the boiling point elevation by subtracting the boiling point of the pure solvent from that of the solution.

What does the van't Hoff factor (i) represent in the boiling point elevation formula?

- A. The boiling point of the solvent
- B. The number of particles the solute splits into ✓**
- C. The mass of the solute
- D. The temperature change

In which industry is the understanding of boiling point elevation particularly important?

- A. Textile
- B. Food processing ✓**
- C. Construction
- D. Electronics

The boiling point elevation is primarily dependent on which factor?

- A. The identity of the solute
- B. The volume of the solvent
- C. The number of solute particles ✓**
- D. The temperature of the environment

Compare and contrast boiling point elevation with freezing point depression.

Boiling point elevation occurs when a solute is added to a solvent, raising its boiling point, while freezing point depression occurs when a solute is added, lowering its freezing point. Both phenomena are proportional to the concentration of solute particles.

Explain why boiling point elevation is considered a colligative property.

Boiling point elevation is considered a colligative property because it depends on the number of solute particles in a solution, not on the type of solute.

Which of the following statements about boiling point elevation are true? (Select all that apply)

- A. It is affected by the solute's identity
- B. It is a colligative property ✓**
- C. It depends on the number of solute particles ✓**
- D. It is independent of the solvent used

Which of the following factors affect boiling point elevation? (Select all that apply)

- A. Type of solvent ✓**
- B. Atmospheric pressure
- C. Concentration of solute ✓**
- D. Nature of solute ✓**

Why does adding a non-volatile solute to a solvent increase its boiling point? (Select all that apply)

- A. It increases the vapor pressure
- B. It decreases the vapor pressure ✓**
- C. It requires more energy to reach boiling ✓**
- D. It changes the solvent's chemical structure