Name _____ Date _____ Period _____

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6.5 Energy of Phase Changes

AP Chemistry

Show work with units and sig figs. Use the data below for water.

$q = n\Delta H$ $q = mc\Delta T$	ΔH_{fus} = 6.01 kJ/mol | ΔH_{vap} = 40.7 kJ/mol | molar mass 18.02 g/mol | c (liquid) = 4.18 J/(g·°C)

1. (a) How much heat is absorbed when 54.0 g of ice melts at 0°C?
(b) How much heat is released when 54.0 g of liquid water freezes at 0°C?

2. (a) How much heat is released when 15.0 g of steam condenses to liquid water at 100°C?
(b) How much heat is absorbed when 100.0 g of liquid water boils at 100°C?

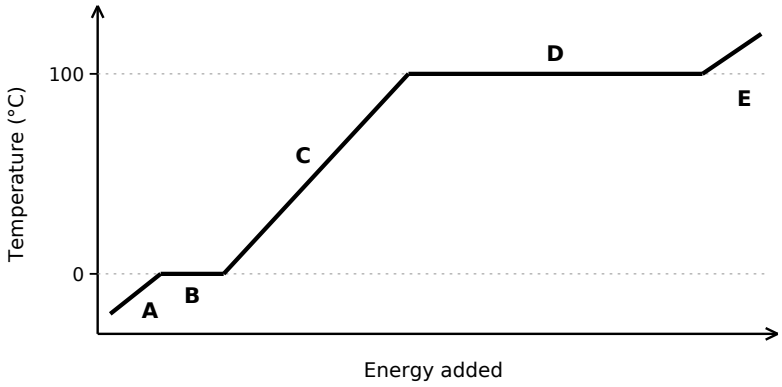
3. Energy is added to a mixture of ice and water at 0°C, and the temperature stays at 0°C until all the ice has melted. Where does the added energy go?

4. How much energy, in kJ, is required to change 30.0 g of ice at 0.0°C into liquid water at 40.0°C? Which step absorbs more energy?

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5. ΔH_{vap} (40.7 kJ/mol) is much larger than ΔH_{fus} (6.01 kJ/mol) for water. Explain why in terms of the attractions between molecules.

6. The heating curve shows water warming from −20°C to 120°C as energy is added. For each segment A to E, say what is happening and which equation ($q = mc\Delta T$ or $q = n\Delta H$) applies. Which flat segment is longer, and why?



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