



THERMOCHEMISTRY

Practice Problems

SECTION 17.1 THE FLOW OF ENERGY—HEAT AND WORK

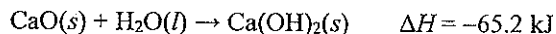
1. How many kilojoules of energy are in a donut that contains 200.0 Calories?
2. What is the specific heat of a substance that has a mass of 25.0 g and requires 525.0 calories to raise its temperature by 15.0°C?
3. Suppose 100.0 g of H₂O(s) absorbs 1255.0 J of heat. What is the corresponding temperature change? The specific heat capacity of H₂O(s) is 2.1 J/g•°C.
4. How many joules of heat energy are required to raise the temperature of 100.0 g of aluminum by 120.0°C? The specific heat capacity of aluminum is 0.90 J/g•°C.

SECTION 17.2 MEASURING AND EXPRESSING ENTHALPY CHANGES

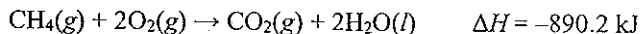
1. A student mixed 75.0 mL of water containing 0.75 mol HCl at 25°C with 75.0 mL of water containing 0.75 mol of NaOH at 25°C in a foam cup calorimeter. The temperature of the resulting solution increased to 35°C. How much heat in kilojoules was released by this reaction?

$$C_{\text{water}} = 4.18 \text{ J/g}\cdot^{\circ}\text{C}$$

2. Calculate the amount of heat evolved when 15.0 g of Ca(OH)₂ forms from the reaction of CaO(s) + H₂O(l).



3. Calculate the amount of heat produced when 52.4 g of methane, CH₄, burns in an excess of air, according to the following equation.



SECTION 17.3 HEAT IN CHANGES OF STATE

1. Calculate the amount of heat needed to melt 35.0 g of ice at 0°C. Express your answer in kilojoules.
2. Calculate the amount of heat needed to convert 190.0 g of liquid water at 18°C to steam at 100.0°C.



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Vocabulary Review

Match the correct vocabulary term to each numbered statement. Write the letter of the correct term on the line.

Column A

- _____ 1. the quantity of heat that raises the temperature of 1 g of pure water by 1°C
- _____ 2. the capacity to do work or to supply heat
- _____ 3. a device used to measure the amount of heat absorbed or released during chemical or physical processes
- _____ 4. the heat content of a substance
- _____ 5. the SI unit of energy
- _____ 6. the heat absorbed by 1 mole of a substance in melting from a solid to a liquid at a constant temperature
- _____ 7. the heat absorbed or released by the dissolution of 1 mole of substance
- _____ 8. a chemical change in which heat is absorbed
- _____ 9. a process that loses heat to the surroundings

Column B

- a. calorie
- b. joule
- c. exothermic
- d. molar heat of solution
- e. molar heat of fusion
- f. calorimeter
- g. enthalpy
- h. energy
- i. endothermic reaction