

## Assignment Previewer

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## Chapter 6 (397928)

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## About this Assignment

## Description

Principles of Reactivity: Energy and Chemical Reactions

## Instructions

Principles of Reactivity: Energy and Chemical Reactions

1. KT6 6.P.020. [489840] [Show Details](#)

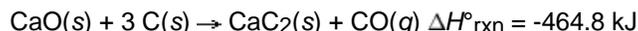
The heat energy required to melt 1.00 g of ice at 0°C is 333 J. If one ice cube has a mass of 57.0 g, and a tray contains 16 ice cubes, what quantity of energy is required to melt a tray of ice cubes to form liquid water at 0°C?

   J2. KT6 6.P.018. [489879] [Show Details](#)

A 237 g piece of molybdenum, initially at 100.0°C, is dropped into 244 g of water at 10.0°C. When the system comes to thermal equilibrium, the temperature is 15.3°C. What is the specific heat capacity of molybdenum?

   J/g · K3. KT6 6.P.028. [467506] [Show Details](#)

Calcium carbide, CaC<sub>2</sub>, is manufactured by the reaction of CaO with carbon at a high temperature. (Calcium carbide is then used to make acetylene.)



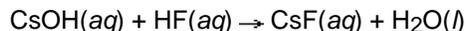
Is this reaction endothermic or exothermic?

- exothermic  
 endothermic

If 19.7 g of CaO is allowed to react with an excess of carbon, what quantity of heat is absorbed or evolved by the reaction?

   kJ4. KT6 6.P.032. [467265] [Show Details](#)

You mix 125 mL of 0.250 M CsOH with 50.0 mL of 0.625 M HF in a coffee-cup calorimeter, and the temperature of both solutions rises from 21.50°C before mixing to 24.40°C after the reaction.

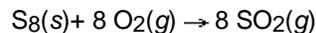


What is the enthalpy of reaction per mole of CsOH? Assume the densities of the solutions are all 1.00 g/mL and the specific heats of the solutions are 4.2 J/g · K.

   kJ/mol5. KT6 6.P.037. [467588] [Show Details](#)

Sulfur (1.81 g) is burned in a constant volume calorimeter with excess O<sub>2</sub>(g). The temperature increases from 21.25°C to 25.13°C. The bomb has a heat capacity of 923 J/K, and the calorimeter contains 815 g of

water. Calculate the heat evolved, per mole of SO<sub>2</sub> formed, for the reaction



kJ/mol



Sulfur burns in oxygen, with a bright blue flame, to give sulfur dioxide gas, SO<sub>2</sub>. (C.D. Winters)

6. KT6 6.P.039. [467575] [Show Details](#)

Suppose you burn 1.558 g of benzoic acid, C<sub>6</sub>H<sub>5</sub>CO<sub>2</sub>H, in a constant volume calorimeter and find that the temperature increases from 22.50°C to 31.85°C. The calorimeter contains 775 g of water, and the bomb has a heat capacity of 893 J/K. What quantity of heat is evolved in this combustion reaction, per mole of benzoic acid?

kJ/mol



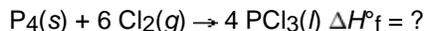
7. KT6 6.P.041. [467216] [Show Details](#)

An "ice calorimeter" can be used to determine the specific heat of a metal. A piece of hot metal is dropped into a weighed quantity of ice. The quantity of heat transferred from the metal to the ice can be determined from the amount of ice melted. Suppose you heat a 40.0 g piece of metal to 99.8°C and then drop it onto ice. When the metal's temperature has dropped to 0.0°C, it is found that 7.03 g of ice has melted. What is the specific heat capacity of silver?

J/g · K

8. KT6 6.P.046. [467149] [Show Details](#)

You wish to know the enthalpy change for the formation of liquid  $\text{PCl}_3$  from the elements shown below.



The enthalpy change for the formation of  $\text{PCl}_5$  from the elements can be determined experimentally, as can the enthalpy change for the reaction of  $\text{PCl}_3(\text{l})$  with more chlorine to give  $\text{PCl}_5(\text{s})$ .

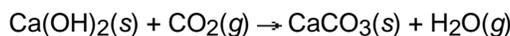


Use these data to calculate the enthalpy change for the formation of **1.80** mol of  $\text{PCl}_3(\text{l})$  from phosphorus and chlorine.

kJ

9. KT6 6.P.054. [467461] [Show Details](#)

The Romans used calcium oxide,  $\text{CaO}$ , to produce a strong mortar. The  $\text{CaO}$  was mixed with water to give  $\text{Ca}(\text{OH})_2$ , which reacted slowly with  $\text{CO}_2$  in the air to give  $\text{CaCO}_3$ .



(a) Calculate the standard enthalpy change for this reaction.

kJ

(b) What quantity of heat is evolved or absorbed if **1.40** kg of  $\text{Ca}(\text{OH})_2$  reacts with a stoichiometric amount of  $\text{CO}_2$ ?

kJ

10. KT6 6.P.107. [467354] [Show Details](#)

You want to heat the air in your house with natural gas ( $\text{CH}_4$ ). Assume your house has **241**  $\text{m}^2$  (about **2453**  $\text{ft}^2$ ) of floor area and that the ceilings are **2.20** m from the floors. The air in the house has a molar heat capacity of  $29.1 \text{ J/mol} \cdot \text{K}$ . (The number of moles of air in the house can be found by assuming that the average molar mass of air is  $28.9 \text{ g/mol}$  and that the density of air at these temperatures is  $1.22 \text{ g/L}$ .) What mass of methane do you have to burn to heat the air from **17.5** $^\circ\text{C}$  to **22.0** $^\circ\text{C}$ ?

g

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