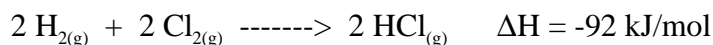


CHEM 130
Problem Set Ch.6

Key begins on page 3.

1. Define **specific heat** and **heat capacity**.

2. Consider the following reaction.



Is the reaction **endothermic** or **exothermic**? (circle one)

3. The specific heat of nickel is 0.444 J/g° . If 100.0 joules of heat are added to a 50.0 gram piece of nickel at 20°C , what is the final temperature of the nickel?

_____ $^\circ\text{C}$

4. Consider the following specific heats of metals.

<u>metal</u>	<u>specific heat</u>
copper	0.385 J/g°
magnesium	1.02 J/g°
mercury	0.138 J/g°
silver	0.237 J/g°
lead	0.129 J/g°

If the same amount of heat is added to 25.0 grams of each of the metals, which are all at the same temperature, which metal will have the highest temperature?

5. From a consideration of the reaction



calculate the heat released when 2.00×10^2 grams of SO_3 are produced.

_____ kJ

6. What is the molar heat of combustion of methanol, CH₃OH, if combustion of 1.00 gram of methanol causes a temperature rise of 3.68°C in a bomb calorimeter that has a heat capacity (including contents) of 6.43 kJ/°C?

_____kJ/mol

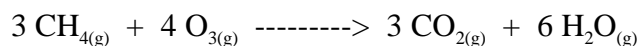
7. Given the following data,



find the heat required to convert graphite to diamond.

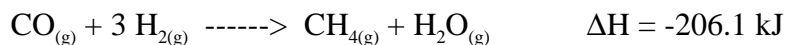
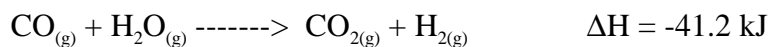
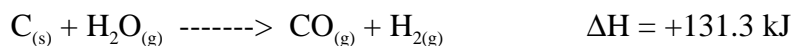
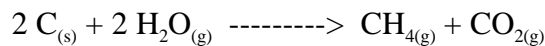
_____kJ/mol

8. Refer to the table of heats of formation and calculate the ΔH_{rxn} for the following equation.



ΔH = _____kJ

9. Using the following data, calculate the heat of reaction for the coal gasification process..

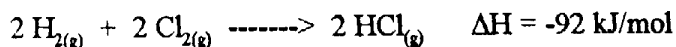


ΔH_{rxn} = _____kJ

1. Define specific heat and heat capacity.

IN TEXT

2. Consider the following reaction.



Is the reaction endothermic or exothermic? (circle one)

3. The specific heat of nickel is 0.444 J/g° . If 100.0 joules of heat are added to a 50.0 gram piece of nickel at 20°C , what is the final temperature of the nickel?

$$q = (\text{sp. HT.}) (\text{MASS}) (\Delta T)$$

$$\Delta T = \frac{q}{(\text{sp. HT.}) (\text{MASS})} = \frac{100.0 \text{ J}}{(0.444 \text{ J/g}^\circ)(50 \text{ g})} = 4.5^\circ$$

SO FINAL TEMP IS
 $20^\circ + 4.5^\circ = 24.5^\circ$
24.5 °C

4. Consider the following specific heats of metals.

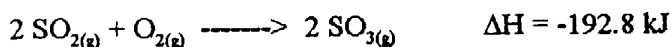
metal	specific heat
copper	0.385 J/g°
magnesium	1.02 J/g°
mercury	0.138 J/g°
silver	0.237 J/g°
lead	0.129 J/g°

— LOWEST PAYMENT PER °C

If the same amount of heat is added to 25.0 grams of each of the metals, which are all at the same temperature, which metal will have the highest temperature?

LEAD

5. From a consideration of the reaction



calculate the heat released when 2.00×10^2 grams of SO_3 are produced.

-192.8 kJ For 2 mol SO_3
160.2g

$$\frac{-192.8 \text{ kJ}}{160.2 \text{ g}} \times (2.00 \times 10^2 \text{ g}) = \frac{-481}{-241}$$

-481 kJ
-241

6. What is the molar heat of combustion of methanol, CH₃OH, if combustion of 1.00 gram of methanol causes a temperature rise of 3.68°C in a bomb calorimeter that has a heat capacity (including contents) of 6.43 kJ/°C?

$$q = -(6.43 \text{ kJ/}^\circ\text{C})(3.68^\circ\text{C}) = -23.66 \text{ kJ}$$

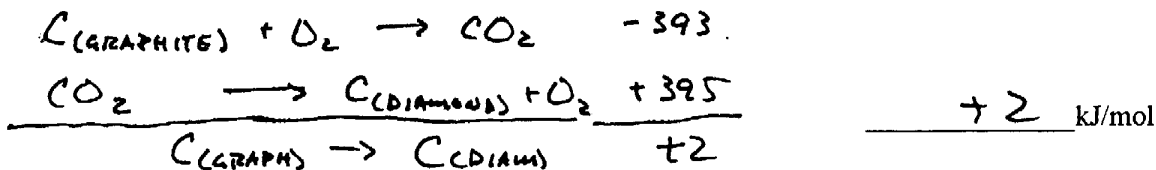
$$\frac{-23.66 \text{ kJ}}{1.00 \text{ g}} \times \frac{32.0 \text{ g}}{1 \text{ mol CH}_3\text{OH}} = -757 \text{ kJ released} \quad \xrightarrow{\text{EXOTHERMIC}} \quad -757 \text{ kJ/mol}$$

↑
FOR 1.00g

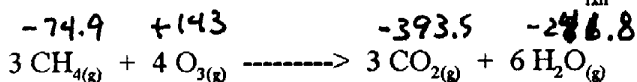
7. Given the following data,



find the heat required to convert graphite to diamond.



8. Refer to the table of heats of formation and calculate the ΔH_{rxn} for the following equation.



$$\left[6(-241.8) + 3(-393.5) \right] - \left[3(-74.9) + 4(+143) \right] = -2979$$

PRODUCTS

REACTANTS

$$\Delta H = -2979 \text{ kJ}$$

9. Using the following data, calculate the heat of reaction for the coal gasification process..

