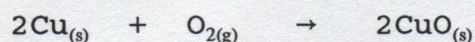
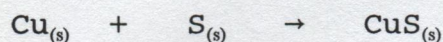


SHOW ALL WORK

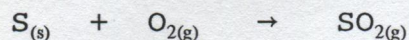
1. Given the following thermochemical equations:



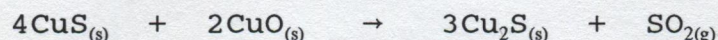
$$\Delta H^\circ = -155 \text{ kJ } \frac{1}{2}$$



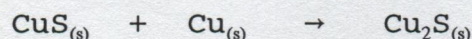
$$\Delta H^\circ = -53.1 \text{ kJ } \frac{1}{2}$$



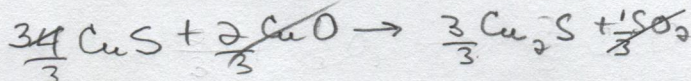
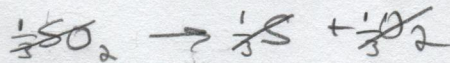
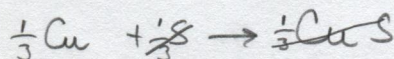
$$\Delta H^\circ = -297 \text{ kJ } -\frac{1}{2}$$



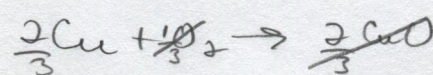
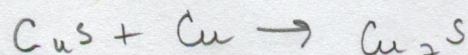
$$\Delta H^\circ = -13.1 \text{ kJ } \frac{1}{3}$$

calculate the value of  $\Delta H^\circ$  (in kilojoules) for the reaction

Q 6.68

 $\frac{1}{3}$ because  $\text{Cu}_2\text{S}$  is on right side $-\frac{1}{3}$ because  $\text{SO}_2$  must be cancelled. $\frac{1}{3}$ 

because S must be cancelled

 $\frac{1}{3}$ because  $\text{O}_2$  must be cancelled

$$\Delta H = 25.3 \text{ kJ}$$

2. How many joules are required to raise the temperature of 0.500 kilograms of liquid water by
- $24.0^\circ\text{C}$
- ? How many calories are needed?

Q 6.29

$$Q = m C_w \Delta T$$

$$(500\text{g})(4.184)(24.0)$$

$$50208 \text{ J}$$

$$50200 \text{ J}$$

$$12000 \text{ cal}$$



3. Why do the oceans have a moderating influence on the summer and winter temperatures of landmasses along their shores?

Large Specific heat of  $H_2O$  warms in cool weather  
+ Cools in warm weather

Question  
6.25

4. A metal specimen with a mass of 25.467 g was heated to 100.0°C in boiling water. The sample was quickly dried and placed in a styrofoam cup that contained 15.0 g of  $H_2O$  having a temperature of 24.3°C. The mixture was stirred quickly and the temperature of the water rose to 31.2°C. Calculate the specific heat of the metal.

$$Q_{\text{metal}} = (25.467 \text{ g}) C_{\text{metal}} (100.0 - 31.2) \quad T_i - T_f \text{ because } Q \text{ is } +$$

$$Q_{H_2O} = (15.0 \text{ g}) (4.184) (31.2 - 24.3)$$

$$Q_{\text{gained}} = Q_{\text{lost}}$$

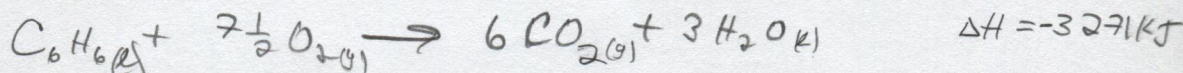
$$(25.467 \text{ g}) (C_{\text{metal}}) (68.8) = (15.0) (4.184) (6.9)$$

$$C = 0.25 \frac{\text{J}}{\text{g}^\circ\text{C}}$$

Q 6.32



5. The combustion of 1 mole of benzene,  $C_6H_{6(l)}$ , to produce  $CO_{2(g)}$  and  $H_2O_{(l)}$  liberates 3271 kJ when the products are returned to  $25^\circ C$  and 1 atm. What is the standard heat of formation of  $C_6H_{6(l)}$  expressed in kilojoules per mole?



$$\Delta H^\circ = [6\Delta H_{CO_2} + 3\Delta H_{H_2O}] - [\Delta H_{C_6H_6} + 7.5\Delta H_{O_2}]$$

$$-3271 = [6(-394) + 3(-286)] - [\Delta H_{C_6H_6} + 0]$$

$$\Delta H_f^\circ = +49 \text{ kJ/mole}$$

Example  
6.8

6. What is heat energy? By what mechanism does heat flow from a hot object into a cool object?

Collision of Fast moving Particle (hot) with slower moving Particle (slow) at interface.  $E$  is transferred from High to low.

Problem  
6.11