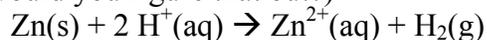


Thermochemistry – Ch. 11

1. A 75.0 g piece of Ag metal is heated to 80.0°C and dropped into 50.0 g of water at 23.2°C. The final temperature of the Ag-H₂O mixture is 27.6°C. What is the specific heat of silver?
2. A piece of stainless steel (sp. ht. = 0.50 J g⁻¹°C⁻¹) is transferred from an oven at 183°C into 125 mL of water at 23.2°C. The water temperature rises to 51.5°C. What is the mass of the steel?
3. Brass has a density of 8.40 g/cm³ and a specific heat of 0.385 J g⁻¹°C⁻¹. A 15.2 cm³ piece of brass at an initial temperature of 163 °C is dropped into an insulated container with 150.0 g water initially at 22.4 °C. What will be the final temperature of the brass-water mixture?
4. What mass of ice can be melted with the same quantity of heat as required to raise the temperature of 3.50 mol H₂O(l) by 50.0°C? [$\Delta H^\circ_{\text{fusion}} = 6.01 \text{ kJ/mol}$ for H₂O(s)]

5. *A coffee-cup calorimeter contains 100.0 mL of 0.300 M HCl at 20.3°C. When 1.82 g Zn(s) is added, the temperature rises to 30.5°C. What is the heat of reaction in kilojoules *per mol* Zn reacted? Assume the specific heat and density of HCl the same as water. (*Hint*: First figure out if you should determine the heat of reaction based on amount of Zn or amount of HCl. How would you figure that out?)



6. Calculate the quantity of work, in joules, associated with the compression of a gas from 5.62 L to 3.37 L by a constant pressure of 1.23 atm.

7. Find the change in internal energy, ΔU , for the following situations:

a. Absorbs 58 J of heat and does 58 J of work

b. Absorbs 125 J of heat and does 687 J of work

c. Evolves 280 cal of heat and has 1.25 kJ work done on it

8. Use Hess's law to determine ΔH° for the reaction $\text{C}_3\text{H}_4(\text{g}) + 2\text{H}_2(\text{g}) \rightarrow \text{C}_3\text{H}_8(\text{g})$ given that

