**In-Class Assignment/Exercise**

**Thermochemistry**

***Declaration*:** This set of questions has been adapted for a science-major General Chemistry course from Chemistry: Atom First ([Openstax](https://openstax.org/)) and its supporting information .

**Time: 60 minutes**

Report the results with the correct number of significant figures and show your calculations to receive full credit.

Student Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How much heat, in joules and in calories, must be added to a 75.0‑g iron block with a specific heat of 0.449 J/g °C to increase its temperature from 25 °C to its melting temperature of 1535 °C?

Solution:

1. How much will the temperature of a cup (180 g) of coffee at 95 °C be reduced when a 45‑g silver spoon (specific heat 0.24 J/g °C) at 25 °C is placed in the coffee and the two are allowed to reach the same temperature? Assume that the coffee has the same density and specific heat as water.

Solution:

1. How much heat is produced when 100 mL of 0.250 *M* HCl (density, 1.00 g/mL) and 200 mL of 0.150 *M* NaOH (density, 1.00 g/mL) are mixed?



If both solutions are at the same temperature and the heat capacity of the products is 4.19 J/g °C, how much will the temperature increase? What assumption did you make in your calculation?

Solution

1. Joseph Priestly prepared oxygen in 1774 by heating red mercury(II) oxide with sunlight focused through a lens. How much heat is required to decompose exactly 1 mole of red HgO(*s*) to Hg(*l*) and O2(*g*) under standard conditions?

Solution

1. Using the data in Appendix G, calculate the standard enthalpy change for each of the following reactions:

(a) 

(b) 

(c) 

(d) 

Solution

Describe the following terms:

1. The first law of thermodynamic:
2. internal energy and variation of internal energy:
3. enthalpy and variation of enthalpy: