

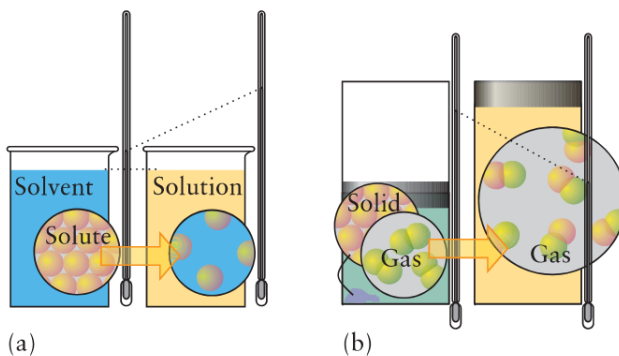
Worksheet 1

January 5, 2022

Weekly homework assignments are posted approximately one week prior to the due date. Collaborations are encouraged and students must report all collaborators in writing on each assignment. All external sources (websites, books) must be properly cited. Additional problems are listed at the end of each assignment. This week's assignment is due *Tuesday, Jan 18th at 10:00am*.

First Law of Thermodynamics

1. (3 pts) Below there are pictures showing a molecular view of a system undergoing a change at constant temperature. In each case, predict the signs of q and w for each process. Explain what is happening to the system.

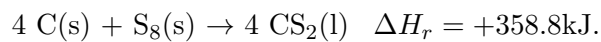


2. (4 pts) Calculate the work for each of the following processes beginning with a gas sample in a piston assembly with $T = 305\text{K}$, $P = 1.79\text{atm}$, and $V = 52.9\text{L}$ by two different pathways.

- (a) Isothermal, reversible expansion to a final volume of 6.52L .
- (b) Irreversible expansion against a constant external pressure of 1.00atm to a final volume of 6.52L .

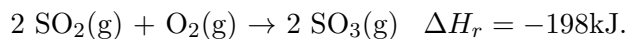
Enthalpy ΔH

3. Carbon disulfide can be prepared from coke (an impure form of carbon) and elemental sulfur



- (a) How much heat is absorbed in the reaction of 1.25mol S₈?
- (b) Calculate the heat absorbed in the reaction of 197g of carbon with an excess of sulfur.
- (c) If the heat absorbed in the reaction was 415kJ, how much of CS₂ was produced?

4. Calculate the heat generated by a reaction mixture of 13.4L of SO₂ at 1.00atm and 273K and 15.0g of oxygen in the reaction



Additional Problems: Ch. 9 - odd problems