

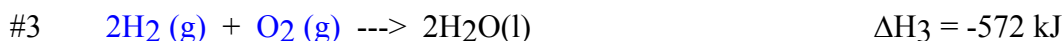
Solution Key :PS#3 CHEM 113 -Energy Concepts II (Hess's Law) (Revised 1/2004)

Text:Zumdahl-Chapter 6 (6.3 -6.6)

Problems: 13,15,29,31,33,35,47,51,53,55,57,59,61,63*,65,67,75*,87.

Additional Problems:

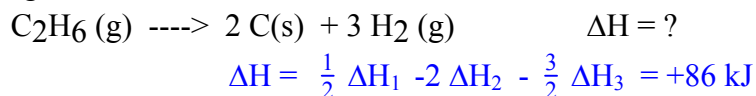
For questions 1 and 2 use the following reactions:



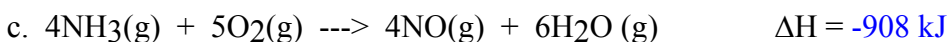
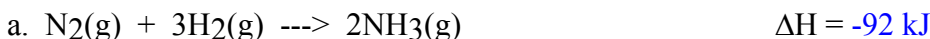
1. At constant pressure, in which of the changes above is work done by the system on the surroundings? By the surroundings on the system? Is no work done at all?

Gases in Blue! #1 $\Delta n_g = 4-9 = -5$ $w = -\Delta n_g RT = +5RT$, work on system
#2 $\Delta n_g = 1-1 = 0$ $w = 0$ no work done
#3 $\Delta n_g = 0-3 = -3$ $w = +3RT$ work on system

2. Using the reactions and enthalpies provided above, calculate the enthalpy change for the following reaction:



3. Using Appendix 4 in your textbook, calculate the standard enthalpy changes for each of the following reactions : (values may differ +/- 1 in the ones place)



4. How much energy enters the surroundings when 40.0 grams of $\text{H}_3\text{PO}_4(\text{aq})$ is formed using reaction (d) above?

46.1 kJ