Participation Assignment CHEM 1090-General Chemistry I

Name: #13

Section: 31, MWF Due Date: Monday 8/14/2017

1. The first reaction in the steam reforming process for the production of hydrogen gas using methane is as follows:

$$CH_4(g) + H_2O(g) \rightarrow CO(g) + 3 H_2(g)$$
 $\Delta H^0 = +206.0 \text{ kJ}$

Write the chemical equation and the standard enthalpy value for the reaction of 2 moles of methane, CH₄.

2. The reverse of the reaction in #1 is sometimes called a methanation reaction. Write the chemical equation for the reverse reaction and also the standard enthalpy value for the production of 1 mole of methane.

3. Calculate the standard enthalpy of reaction for the following reaction:

$$2 C(s) + H_2(g) \rightarrow C_2H_2(g)$$

$$\Delta H^{\circ} = ? kJ$$

Using only the following information:

$$2~\mathrm{C_2H_2}(g)~+~5~\mathrm{O_2}(g)~\rightarrow~4~\mathrm{CO_2}(g)~+~2~\mathrm{H_2O}(h)~~\Delta\mathrm{H^\circ} = -2598.8~\mathrm{kJ}$$

$$C(s) + O_2(g) \rightarrow CO_2(g)$$

$$\Delta H^{\circ} = -393.5 \text{ kJ}$$

$$2 H_2(g) + O_2(g) \rightarrow 2 H_2O(l)$$
 $\Delta H^{\circ} = -571.6 \text{ kJ}$

$$\Delta H^{\circ} = -571.6 \text{ k}$$