Hess's Law

Chem Worksheet 16-5

Name _____

1. From the following enthalpy changes,

$C (s) + ½ O_2 (g) \rightarrow CO (g)$ $\Delta H° = -110.5$ kJ

$CO (g) + ½ O_2 (g) \rightarrow CO_2 (g)$ $\Delta H° = -283.0$ kJ

calculate the value of $\Delta H°$ for the reaction $C(s) + O_2 (g) \rightarrow CO_2 (g)$.

2. From the following enthalpy changes,

$Xe (g) + F_2 (g) \rightarrow XeF_2 (s)$ $\Delta H° = -123$ kJ

$Xe (g) + 2F_2 (g) \rightarrow XeF_4 (s)$ $\Delta H° = -262$ kJ

calculate the value of $\Delta H°$ for the reaction $XeF_2 (s) + F_2 (g) \rightarrow XeF_4 (s)$.

3. From the following enthalpy changes,

$C_2H_5OH (l) + 3O_2 (g) \rightarrow 2CO_2 (g) + 3H_2O (g)$

$\Delta H° = -1234.7$ kJ

$CH_3OCH_3 (l) + 3O_2 (g) \rightarrow 2CO_2 (g) + 3H_2O (g) \Delta H° = -1328.3$ kJ

calculate the value of $\Delta H°$ for the reaction $C_2H_5OH (l) \rightarrow CH_3OCH_3 (l)$.

4. From the following enthalpy changes,

$Cu (s) + Cl_2 (g) \rightarrow CuCl_2 (s)$ $\Delta H° = -206$ kJ

$2Cu (s) + Cl_2 (g) \rightarrow 2CuCl (s)$ $\Delta H° = -136$ kJ

calculate the value of $\Delta H°$ for the reaction $CuCl_2 (s) + Cu (s) \rightarrow 2CuCl (s)$.

5. From the following enthalpy changes,

$H_2 (g) + F_2 (g) \rightarrow 2HF (g)$ $\Delta H° = -542.2$ kJ

$2H_2 (g) + O_2 (g) \rightarrow 2H_2O (l)$ $\Delta H° = -571.6$ kJ

calculate the value of $\Delta H°$ for the reaction $2F_2 (g) + 2H_2O (l) \rightarrow 4HF (g) + O_2 (g)$

6. From the following enthalpy changes,

$2P (s) + 3Cl_2 (g) \rightarrow 2PCl_3 (l)$ $\Delta H° = -640$ kJ

$2P (s) + 5Cl_2 (g) \rightarrow 2 PCl_5 (s)$ $\Delta H° = -886$ kJ

calculate the value of $\Delta H°$ for the reaction $PCl_3 (l) + Cl_2 (g) \rightarrow PCl_5 (s)$.

7. From the following enthalpy changes,

$4NH_3 (g) + 5O_2 (g) \rightarrow 4 NO (g) + 6H_2O (l)$

$\Delta H° = -1170$ kJ

$4NH_3 (g) + 3O_2 (g) \rightarrow 2N_2 (g) + 6H_2O (l)$

$\Delta H° = -1530$kJ

calculate the value of $\Delta H°$ for the reaction $N_2 (g) + O_2 (g) \rightarrow 2NO (g)$.

8. From the following enthalpy changes,

$2Al (s) + 3/2 O_2 (g) \rightarrow Al_2O_3 (s)$ $\Delta H° = -1601$ kJ

$2Fe (s) + 3/2 O_2 (g) \rightarrow Fe_2O_3 (s)$ $\Delta H° = -821$ kJ

calculate the value of $\Delta H°$ for the reaction $2Al(s) + Fe_2O_3(s) \rightarrow 2Fe(s) + Al_2O_3(s)$.

9. From the following enthalpy changes,

$H_2O_2 (l) \rightarrow H_2O (l) + ½ O_2 (g)$ $\Delta H° = -94.6$ kJ

$H_2 (g) + ½ O_2 (g) \rightarrow H_2O (l)$ $\Delta H° = -286.0$ kJ

calculate the value of $\Delta H°$ for the reaction $H_2 (g) + H_2O_2 (l) \rightarrow 2H_2O (l)$.

10. From the following enthalpy changes,

$C (s) + O_2 (g) \rightarrow CO_2 (g)$ $\Delta H° = -393.5$ kJ

$H_2 (g) + ½ O_2 (g) \rightarrow H_2O (l)$ $\Delta H° = -285.8$ kJ

$2C_2H_2(g) + 5O_2(g) \rightarrow 4CO_2(g) + 2H_2O(l)$ $\Delta H°=-2598.8$kJ

calculate the value of $\Delta H°$ for the reaction $2C(s) + H_2 (g) \rightarrow C_2H_2 (g)$.