Name _____ Date _____ Class _____

12–3 Practice Problems

1. From the following enthalpy changes,

$C(s) + \frac{1}{2}O_2(g) \rightarrow CO(g)$ $\Delta H° = -110.5$ kJ

$CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g)$ $\Delta H° = -283.0$ 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,

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

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

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

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,

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

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

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

7. From the following enthalpy changes,

$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$ $\Delta H° = -1170$ 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,

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

$2Fe(s) + \frac{3}{2}O_2(g) \rightarrow Fe_2O_3(s)$ $\Delta H° = -821$ 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,

$H_2O_2(l) \rightarrow H_2O(l) + \frac{1}{2}O_2(g)$ $\Delta H° = -94.6$ kJ

$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l)$ $\Delta H° = -286.0$ 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

$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l)$ $\Delta H° = -285.8$ 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 $2C(s) + H_2(g) \rightarrow C_2H_2(g)$.

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