**Enthalpy of Reaction Practice Problems**

**1.** For the decomposition of hydrogen peroxide, it is known that:

H2O2(l) → H2O(l) + ½ O2(g); ΔH = -98.2 kJ

Using this information, determine ΔH for the reaction:

2 H2O(l) + O2(g) → 2 H2O2(l)

**2.** From the following enthalpy changes,

C (s) + ½ O2 (g) 🡪 CO (g) ΔH = -110.5 kJ

CO (g) + ½ O2 (g) 🡪 CO2 (g) ΔH = -283.0 kJ

Calculate the value of ΔH for the reaction

C (s) + O2 (g) 🡪 CO2 (g)

**3.** From the following enthalpy changes,

C2H5OH (**l**) + 3 O2 (g) 🡪 2 CO2 (g) + 3 H2O (g) ΔH = -1234.7 kJ

CH3OCH3 (**l**) + 3 O2 (g) 🡪 2 CO2 (g) + 3 H2O (g) ΔH = -1328.3 kJ

Calculate the value of ΔH for the reaction

C2H5OH (**l**) 🡪 CH3OCH3 (**l**)

**4.** From the following enthalpy changes,

Cu (s) + Cl2 (g) 🡪 CuCl2 (s) ΔH = -206 kJ

2 Cu (s) + Cl2 (g) 🡪 2 CuCl (s) ΔH = -136 kJ

Calculate the value of ΔH for the reaction

CuCl2 (s) + Cu (s) 🡪 2 CuCl (s)

**5.** From the following enthalpy changes,

H2 (g) + F2 (g) 🡪 2 HF (g) ΔH = -542.2 kJ

2 H2 (g) + O2 (g) 🡪 2 H2O (**l**) ΔH = -571.6 kJ

Calculate the value of ΔH for the reaction

2 F2 (g) + 2 H2O (**l**) 🡪 4 HF (g) + O2 (g)

**6.** From the following enthalpy changes,

Xe (g) + F2 (g) 🡪 XeF2 (s) ΔH = -123 kJ

Xe (g) + 2 F2 (g) 🡪 XeF4 (s) ΔH = -262 kJ

Calculate the value of ΔH for the reaction

XeF2 (s) + F2 (g) 🡪 XeF4 (s)

**7.** From the following enthalpy changes,

2 Al (s) + ½ O2 (g) 🡪 Al2O3 (s) ΔH = -1601 kJ

2 Fe (s) + ½ O2 (g) 🡪 Fe2O3 (s) ΔH = -821 kJ

Calculate the value of ΔH for the reaction

2 Al (s) + Fe2O3 (s) 🡪 2 Fe (s) + Al2O3 (s)

**8.** From the following enthalpy changes,

H2O2 (**l**) 🡪 H2O (**l**) + ½ O2 (g) ΔH = -94.6 kJ

H2 (g) + ½ O2 (g) 🡪 H2O (**l**) ΔH = -286.0 kJ

Calculate the value of ΔH for the reaction

H2 (g) + H2O2 (**l**) 🡪 2 H2O (**l**)

**9.** What is the value for ΔH for the following reaction?

CS2(l) + 3 O2(g) → CO2(g) + 2 SO2(g)

Given:
C(s) + O2(g) → CO2(g); ΔHf = -393.5 kJ
S(s) + O2(g) → SO2(g); ΔHf = -296.8 kJ
C(s) + 2 S(s) → CS2(l); ΔHf = +87.9 kJ

**10.** From the following enthalpy changes,

2 P (s) + 3 Cl2 (g) 🡪 2 PCl3 (**l**) ΔH = -640. kJ

2 P (s) + 5 Cl2 (g) 🡪 2 PCl5 (s) ΔH = -886 kJ

Calculate the value of ΔH for the reaction

PCl3 (**l**) + Cl2 (g) 🡪 PCl5 (s)

**11.** From the following enthalpy changes,

4 NH3 (g) + 5 O2 (g) 🡪 4 NO (g) + 6 H2O (**l**) ΔH = -1170 kJ

4 NH3 (g) + 3 O2 (g) 🡪 2 N2 (g) + 6 H2O (**l**) ΔH = -1530 kJ

Calculate the value of ΔH for the reaction

N2 (g) + O2 (g) 🡪 2 NO (g)

**12.** From the following enthalpy changes,

C (s) + O2 (g) 🡪 CO2 (g) ΔH = -393.5 kJ

H2 (g) + ½ O2 (g) 🡪 H2O (**l**) ΔH = -285.8 kJ

2 C2H2 (g) + 5 O2 (g) 🡪 4 CO2 (g) + 2 H2O (**l**) ΔH = -2598.8 kJ

Calculate the value of ΔH for the reaction

2 C (s) + H2 (g) 🡪 C2H2 (g)

**Answers (in random order):** -1075.0 kJ -780 kJ -512.8 kJ -393.5 kJ -380.6 kJ -139 kJ

-123 kJ + 70. kJ +93.6 kJ +180 kJ +196.4 kJ +226.6 kJ