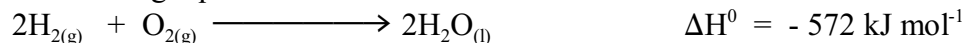


EQUATIONS USING HEATS OF REACTION

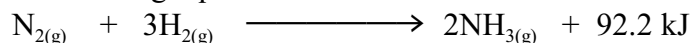
1. Given the following equation:



What is the enthalpy change for the following reactions:

- a) $\text{H}_2\text{O}_{(\text{l})} \longrightarrow \text{H}_{2(\text{g})} + 1/2 \text{O}_{2(\text{g})} \quad \Delta\text{H}^0 = ?$
b) What is the enthalpy change for the decomposition of 9g of water?
c) The enthalpy change for the formation of 1kg of hydrogen gas?

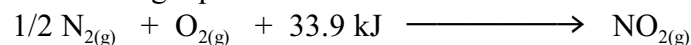
2. Given the following equation:



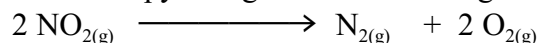
What is the enthalpy change for the following reactions:

- a) $3\text{N}_{2(\text{g})} + 9\text{H}_{2(\text{g})} \longrightarrow 6\text{NH}_{3(\text{g})} \quad \Delta\text{H}^0 = ?$
b) $1/2 \text{N}_{2(\text{g})} + 3/2\text{H}_{2(\text{g})} \longrightarrow \text{NH}_{3(\text{g})} \quad \Delta\text{H}^0 = ?$

3. Given the following equation:



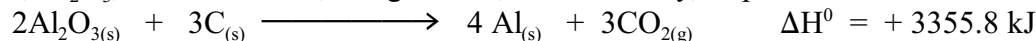
What is the enthalpy change for the following reaction:



4. 3.20 g of methanol, CH_3OH , burns in excess air to produce carbon dioxide gas and liquid water, with the release of 715.0 kJ of energy.

- a) Write a balanced equation for this reaction, showing the heat of reaction for one mole of methanol.
b) Write a thermo-chemical equation for the combustion of 6.60 g of methanol.
c) Sketch a potential energy diagram showing the combustion of one mole of methanol.

5. Alumina, Al_2O_3 , can be reduced, using carbon, with difficulty, to produce aluminium:



- a) Calculate the enthalpy change for 1.00 mol of Al formed.
b) Calculate the enthalpy change when 5.60 g of $\text{Al}_2\text{O}_{3(\text{s})}$ undergo reduction.
c) Calculate the enthalpy change when 2.71 g of $\text{Al}_{(\text{s})}$ are formed.