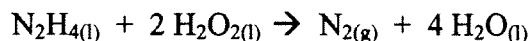
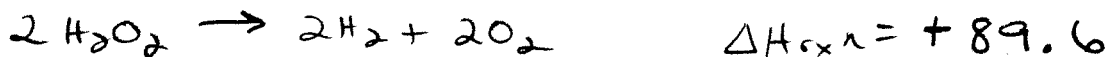
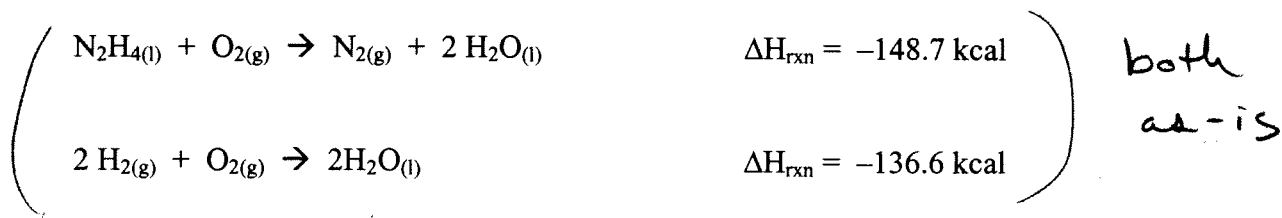


Thermochemistry 3

Calculate ΔH for the following reaction based on the thermochemical information given:



The following information is available:

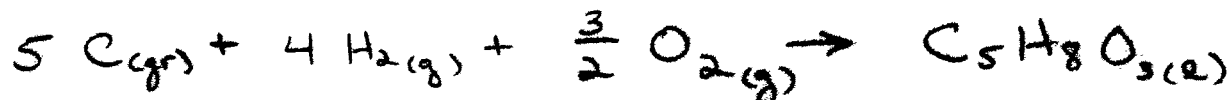


$$\Delta H = (-148.7) + (-136.6) + (89.6) \text{ kcal} = -195.7 \text{ kcal}$$

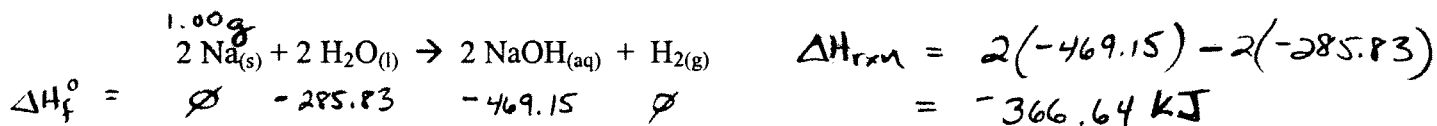
Convert the ΔH values to kJ:

$$\frac{-195.7 \text{ kcal} \times 4.184 \text{ J}}{1 \text{ cal}} = -818.8 \text{ kJ}$$

2. Write the reaction for which the reaction enthalpy is equal to the standard heat of formation for $\text{C}_5\text{H}_8\text{O}_3(\text{l})$.

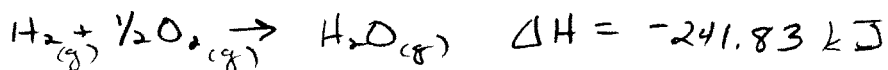


3. A) What quantity of heat is released when 1.00 g of sodium metal reacts with excess water?



$$\frac{1.00\text{g Na} \mid 1\text{mol Na} \mid -366.64\text{kJ}}{22.99\text{g Na} \mid 2\text{mol Na}} = \boxed{-7.97 \text{ kJ}}$$

B) What further quantity of heat is released when the hydrogen gas produced burns with O₂ in the air to form water?



$$\frac{1.00\text{g Na} \mid 1\text{mol Na} \mid 1\text{mol H}_2 \mid -241.83\text{kJ}}{22.99\text{g Na} \mid 2\text{mol Na} \mid 1\text{mol H}_2} = \boxed{-5.26 \text{ kJ}}$$

4. Consider the reaction: $2\text{PH}_3(g) + 3\text{Cl}_2(g) \rightarrow 2\text{PCl}_3(g) + 3\text{H}_2(g)$
 $\Delta H = 22.89 \quad \emptyset \quad -287 \quad \emptyset \quad \text{kJ/mol}$

A) Calculate ΔH for this reaction.

$$\Delta H = 2(-287 \text{ kJ}) - 2(22.89 \text{ kJ}) = \boxed{-620. \text{ kJ}}$$

B) Calculate the heat absorbed or released when 22.0 g of PH₃ reacts.

$$\frac{22.0\text{g PH}_3 \mid 1\text{mol PH}_3 \mid -620. \text{ kJ}}{34.0\text{g} \mid 2\text{mol PH}_3} = \boxed{-201 \text{ kJ}}$$