

Name _____ Period _____
LTHS: Chemistry

Thermochemical Equations Worksheet

Answer the following questions. Show all your work using dimensional analysis. Be sure to use significant figures and watch your units.

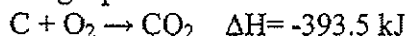
1. How much heat will be released when 6.44 g of sulfur reacts with excess O₂ according to the following equation?



$$6.44 \text{ g S} \times \frac{1 \text{ mol}}{32.07 \text{ g}} \times \frac{-791.4 \text{ kJ}}{2 \text{ mol}} = -79.5 \text{ kJ}$$

79.5 kJ released

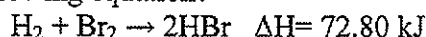
2. How much heat will be released when 4.72 g of carbon reacts with excess O₂ according to the following equation?



$$4.72 \text{ g C} \times \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times \frac{-393.5 \text{ kJ}}{1 \text{ mol C}} = -155 \text{ kJ}$$

155 kJ released

3. How much heat will be absorbed when 38.2 g of bromine reacts with excess H₂ according to the following equation?



$$38.2 \text{ g Br}_2 \times \frac{1 \text{ mol Br}_2}{159.8 \text{ g Br}_2} \times \frac{72.80 \text{ kJ}}{1 \text{ mol Br}_2} = 17.4 \text{ kJ}$$

17.4 kJ absorbed

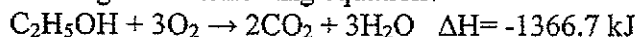
4. How much heat will be released when 1.48 g of chlorine reacts with excess phosphorus according to the following equation?



$$1.48 \text{ g Cl}_2 \times \frac{1 \text{ mol Cl}_2}{70.90 \text{ g Cl}_2} \times \frac{-886 \text{ kJ}}{5 \text{ mol Cl}_2} = -3.70 \text{ kJ}$$

3.70 kJ released

5. How much heat will be released when 4.77 g of ethanol (C₂H₅OH) reacts with excess O₂ according to the following equation?



$$4.77 \text{ g C}_2\text{H}_5\text{OH} \times \frac{1 \text{ mol C}_2\text{H}_5\text{OH}}{46.08 \text{ g C}_2\text{H}_5\text{OH}} \times \frac{-1366.7 \text{ kJ}}{1 \text{ mol C}_2\text{H}_5\text{OH}} = -141 \text{ kJ}$$

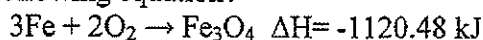
141 kJ released

6. How much heat will be absorbed when 13.7 g of nitrogen reacts with excess O₂ according to the following equation?



$$13.7 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g}} \times \frac{180 \text{ kJ}}{1 \text{ mol N}_2} = 88.0 \text{ kJ}$$

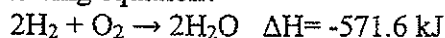
7. How much heat will be released when 11.8 g of iron reacts with excess O₂ according to the following equation?



$$11.8 \text{ g Fe} \times \frac{1 \text{ mol Fe}}{55.85 \text{ g Fe}} \times \frac{-1120.48 \text{ kJ}}{3 \text{ mol Fe}} = -78.9 \text{ kJ}$$

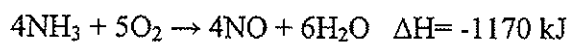
78.9 kJ released

8. How much heat will be released when 18.6 g of hydrogen reacts with excess O₂ according to the following equation?



$$18.6 \text{ g H}_2 \times \frac{1 \text{ mol H}_2}{2.02 \text{ g H}_2} \times \frac{-571.6 \text{ kJ}}{2 \text{ mol H}_2} = -2630 \text{ kJ}$$

9. How much heat will be transferred when 14.9 g of ammonia (NH₃) reacts with excess O₂ according to the following equation? Is this reaction endothermic or exothermic?

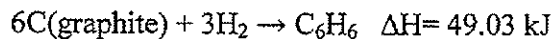


exothermic

$$14.9 \text{ g NH}_3 \times \frac{1 \text{ mol NH}_3}{17.04 \text{ g NH}_3} \times \frac{-1170 \text{ kJ}}{4 \text{ mol NH}_3} = -256 \text{ kJ}$$

256 kJ released

10. How much heat will be transferred when 5.81 g of graphite reacts with excess H₂ according to the following equation? Is this reaction endothermic or exothermic?



endothermic

$$5.81 \text{ g C} \times \frac{1 \text{ mol}}{12.01 \text{ g}} \times \frac{49.03 \text{ kJ}}{6 \text{ mol C}} = 3.95 \text{ kJ}$$