

Enthalpy Stoichiometry

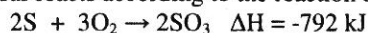
Chem Worksheet 16-3

Name _____

The **molar enthalpy of reaction** (ΔH_{rxn}) is the amount of heat transferred during a reaction. It is reported in kilojoules per mole of reactant. A reaction that produces heat is **exothermic** and has a negative ΔH_{rxn} . A reaction that absorbs heat is **endothermic** and has a positive ΔH_{rxn} .

Example

How much heat is produced when 85 g of sulfur reacts according to the reaction below?



- the ΔH value given in the equation is the amount of heat transferred when **2 moles** of sulfur and **3 moles** of oxygen react.

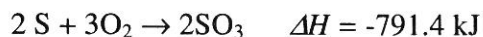
- write the 'given' and 'unknown' units: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = \text{kJ}$

- fill in factors: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = \text{kJ}$

- solve: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = -1050 \text{ kJ}$

Answer the following questions. Show all work and report answers with units.

1. How much heat will be released when 6.44 g of sulfur reacts with excess O_2 according to the following equation?



2. How much heat will be released when 4.72 g of carbon reacts with excess O_2 according to the following equation?



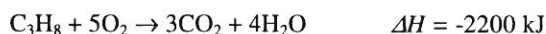
3. How much heat will be absorbed when 38.2 g of bromine reacts with excess H_2 according to the following equation?



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



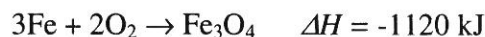
5. What mass of propane, C_3H_8 must be burned in order to produce 76,000 kJ of energy?



6. How much heat will be absorbed when 13.7 g of nitrogen reacts with excess O_2 according to the following equation?



7. What mass of iron must react to produce 3600 kJ of energy?



8. How much heat will be released when 12.0 g of H_2 reacts with 76.0 g of O_2 according to the following equation? (when one reactant runs out the reaction stops)

