

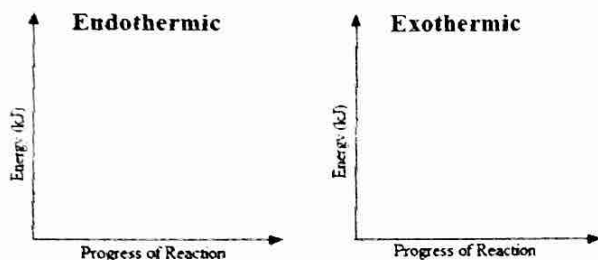
(1) An endothermic reaction _____ heat and has a _____ ΔH value.

In a reaction, the heat is written as a _____.

(2) An exothermic reaction _____ heat and has a _____ ΔH value.

In a reaction, the heat is written as a _____.

(3) Sketch a potential energy diagram for each of the following types of reactions.



(4) (a) (i) Complete the mathematical equation for the following reaction: $2\text{PCl}_5(\text{s}) \rightarrow 2\text{P}(\text{s}) + 5\text{Cl}_2(\text{g}); \Delta H = +886 \text{ kJ/mol}$

$$\Delta H = \frac{\text{kJ}}{\text{mol PCl}_5} \text{ or } \frac{\text{kJ}}{\text{mol P}} \text{ or } \frac{\text{kJ}}{\text{mol Cl}_2}$$

(ii) Rewrite the reaction to include the heat term.

(b) Complete the mathematical equation for the following reaction: $4\text{Fe}(\text{s}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{Fe}_2\text{O}_3(\text{s}); \Delta H = -1648.4 \text{ kJ/mol}$

$$\Delta H = \frac{\text{kJ}}{\text{mol Fe}} \text{ or } \frac{\text{kJ}}{\text{mol O}_2} \text{ or } \frac{\text{kJ}}{\text{mol Fe}_2\text{O}_3}$$

(ii) Rewrite the reaction to include the heat term.

(5) Consider the following reaction: $2\text{HCl}(\text{g}) \rightarrow \text{H}_2(\text{g}) + \text{Cl}_2(\text{g}); \Delta H = +185 \text{ kJ/mol}$

How much heat is required for each of the following quantities?

(a) 4.00 mol H_2

(b) 14.18 g Cl_2

(c) 1.60 mol HCl

(d) 90.0 g HCl

(6) Consider the following reaction: $2\text{S}(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{SO}_3(\text{g}); \Delta H = -791.4 \text{ kJ/mol}$

How much heat is released for each of the following quantities?

(a) 0.500 mol S

(b) 1.20 mol O_2

(c) 80.00 g O_2

(d) 16 g SO_3

(7) Consider the following reaction: $2\text{Hg}(\text{l}) + \text{O}_2(\text{g}) \rightarrow 2\text{HgO}(\text{s}) + 180 \text{ kJ/mol}$

(a) How many moles of O_2 are required to produce 90 kJ of heat energy?

(b) How many moles of Hg are required to produce 360 kJ of heat energy?

(c) What mass of O_2 is required to produce 54 kJ of heat energy?

(d) What mass of Hg is required to produce 12.6 kJ of heat energy?

(8) Consider the following reaction: $2\text{C}(\text{s}) + 3\text{H}_2(\text{g}) \rightarrow \text{C}_2\text{H}_6(\text{l}) + 83.8 \text{ kJ/mol}$

If 2.50 g of carbon are combined with 0.665 g of hydrogen, which reactant is limiting and which is excess?

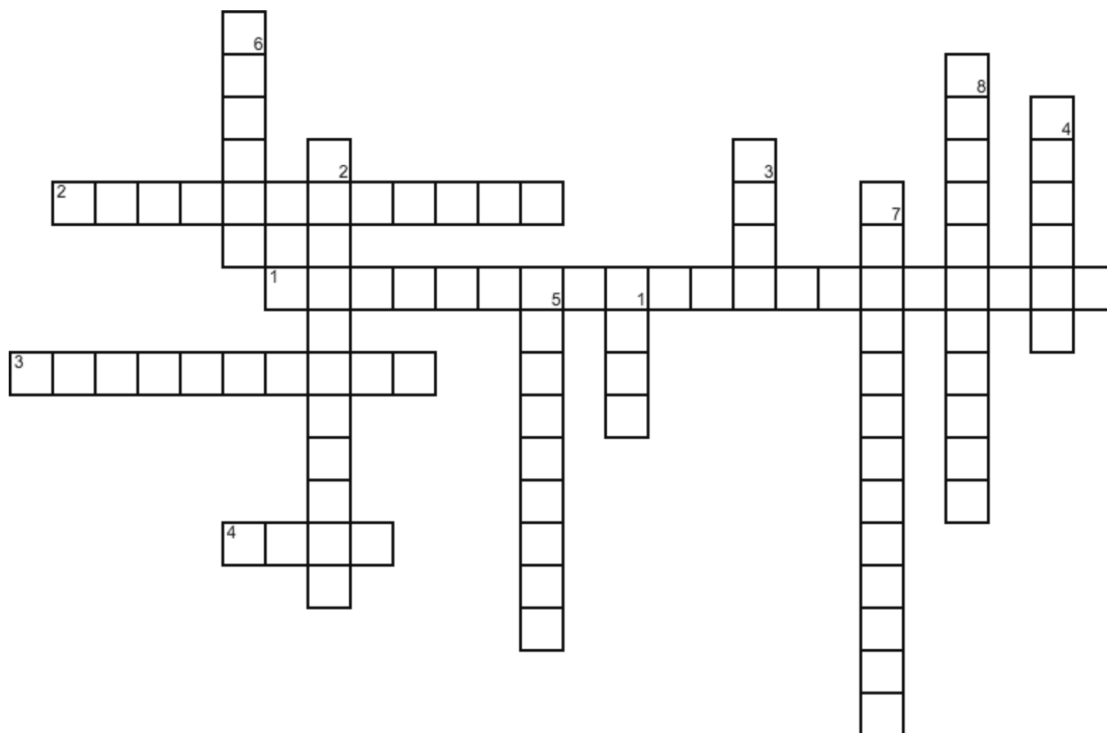
How much heat will be produced by the reaction?

What mass of C_2H_6 will be produced by the reaction?

Name:

Date:

Thermochemistry Crossword



Across

1. the energy required to increase the temperature of one gram of a substance by 1 degree Celsius
2. a bond between the H and the O of two water molecules
3. the percentage of hydrogen bonds in the solid phase
4. the percentage of hydrogen bonds in the gas phase

Down

1. a measure of speed and quantity of particles
2. a measure of the average speed of particles
3. the shape of water due to its polarity
4. the percentage of hydrogen bonds in the liquid phase
5. As temperature _____ speed increases
6. Heat of _____ is the energy required to melt one gram of a substance
7. Heat of _____ is the energy required to boil one gram of one substance
8. Temperature will remain constant during a _____.