

Table I Practice

Directions: Answer the following questions in complete sentences using your knowledge of Chemistry.

1. What type of reaction does a positive ΔH value represent?

endothermic

2. What happens in terms of heat energy to a reaction with a positive ΔH ?

heat is absorbed by reactants

3. What type of reaction does a negative ΔH value represent?

exothermic

4. What happens in terms of heat energy to a reaction with a negative ΔH ?

heat is released as a product

5. If you reverse a reaction, what happens to the value of ΔH ? What happens to the sign?

The value of ΔH is the same. The SIGN switches

6. If you double the concentration of the reactants and products, what happens to the value of ΔH ? What happens to the sign?

The VALUE doubles, the SIGN stays the same

7. If you half the concentration of the reactants and products, what happens to the value of ΔH ? What happens to the sign?

The value is cut in half the SIGN remains the same

8. If you reverse the reaction, what happens to the sign of ΔH ? What happens to the value?

The value stays the same, the SIGN switches

9. If a given reaction is exothermic, will heat be found on the reactants side of the equation or the products side?

product b/c it is released

10. If a given reaction is endothermic, will heat be found on the reactants side of the equation or the products side?

reactant b/c it is absorbed

11. If the ΔH for a given forward reaction is positive, will the reverse reaction be endothermic or exothermic? Explain.

$\Delta H \rightarrow + = \text{endo}$
 reverse = $-\Delta H = \text{exothermic}$

12. If a given reaction is endothermic, what will be the sign for ΔH for the reverse reaction? Explain.

reverse = $-\Delta H$ sign switches when rxn is reversed

13. If the reverse reaction is endothermic, what is the sign of ΔH of the forward reaction? Explain.

forward = $-\Delta H$ - when rxn reverses, the sign switches

14. If the original equation has a ΔH value of 50.0 kJ, what is the ΔH of the same reaction if you reverse it and double the concentration on reactants and products. Explain.

$\Delta H = -100.0 \text{ kJ}$ reverse rxn = change sign
 double amount = double value

15. If the original equation has a ΔH value of 50.0 kJ, what is the ΔH of the same reaction if you reverse it and half the concentration on reactants and products. Explain

Unit 9: Kinetics & Equilibrium $\Delta H = -25.0 \text{ kJ}$ reverse rxn = change sign
 $1/2$ amount = $1/2$ value

Name: KEY Official Class: _____ Date: _____
 Teacher: _____ Period: _____ Class: _____

Directions: Using Table I, determine the heat of reaction and whether the reaction is endothermic or exothermic

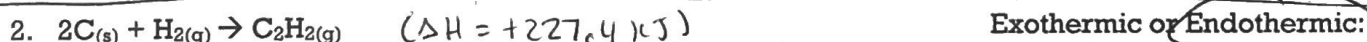
Reaction	ΔH (kJ/mol)	Endothermic or Exothermic (how do you know?)
$\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$	-890.4	Exothermic b/c $-\Delta H$ means heat is released
$2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$	-483.6	Exo - ΔH means heat released
$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$	-91.8	Exo - ΔH means heat released.
$4\text{NH}_3(\text{g}) \rightarrow 2\text{N}_2(\text{g}) + 6\text{H}_2(\text{g})$ ★ doubled & reversed	+183.6	Endo + ΔH means heat absorbed
$\text{CO}(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$ ★ halved	-278.0	Exo - ΔH heat released.
$4\text{NO}(\text{g}) \rightarrow 2\text{N}_2(\text{g}) + 2\text{O}_2(\text{g})$ ★ reversed & doubled	-365.2	Exo - ΔH heat released.

YOU HAVE TO LOOK AT TABLE I - that is "normal"

Directions: Rewrite the equation with the heat written in the proper location. Determine if the reaction is endothermic or exothermic. Explain your reasoning.



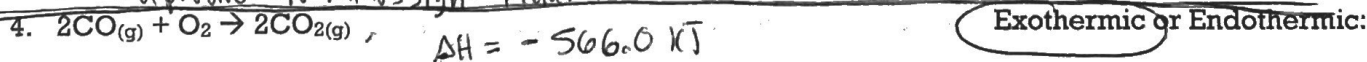
- Explanation: Endothermic because ΔH is positive (heat added); if heat is absorbed it is endothermic.



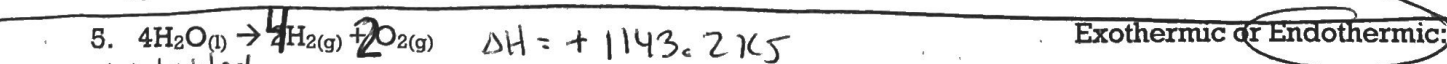
- Explanation: $2\text{C}(\text{s}) + \text{H}_2(\text{g}) + 227.4 \text{ kJ} \rightarrow \text{C}_2\text{H}_2(\text{g})$
positive ΔH means it is a reactant - rxn matches Table I exactly - no modifications needed.



- Explanation: $\text{C}_2\text{H}_2(\text{g}) \rightarrow 2\text{C}(\text{s}) + \text{H}_2(\text{g}) + 227.4 \text{ kJ}$
The rxn is reversed from Table I so ΔH 's sign gets switched. A $-\Delta H$ value is written as a product w/o minus sign - placement tells reader if it's released - exothermic.



- Explanation: $2\text{CO}(\text{g}) + \text{O}_2 \rightarrow 2\text{CO}_2(\text{g}) + 566.0 \text{ kJ}$
 $-\Delta H$ values are written as products (after the arrow) - NEVER put a (-) in a rxn. energy as a product means it is released - so exothermic



- Explanation: $4\text{H}_2\text{O}(\text{l}) + 1143.2 \text{ kJ} \rightarrow 4\text{H}_2(\text{g}) + 2\text{O}_2(\text{g})$
This was doubled & reversed. + ΔH values are written as reactants to show heat absorbed = endothermic