

10%

Chemical Energetics

Session 2

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Learning Objectives

Enthalpy (H)

- *Definition*
- *Change in Enthalpy*
- *Energy Diagram*

Definition

Enthalpy (H)

Energy that can be converted to heat

H_R & H_P

Enthalpy (H)



Reactants

Products

H_R

Enthalpy of the Reactants

H_P

Enthalpy of the Products

ΔH

Change in Enthalpy (ΔH)

$$\Delta H = H_P - H_R$$

**Change in
Enthalpy**

=

**Enthalpy
of Products**

-

**Enthalpy
of Reactants**

Change in Enthalpy (ΔH)

$$\Delta H = H_P - H_R$$

Example:



$H_R = \text{Less}$

$H_P = \text{More}$

Energy is absorbed

According to the above formula,

$$\Delta H = H_P - H_R$$

$$\Delta H = \text{More} - \text{Less}$$

$$\Delta H = \text{POSITIVE}$$

$$\Delta H = \text{Positive}$$

$$H_P > H_R$$



Change in Enthalpy (ΔH)

$$\Delta H = H_p - H_R$$

Example:

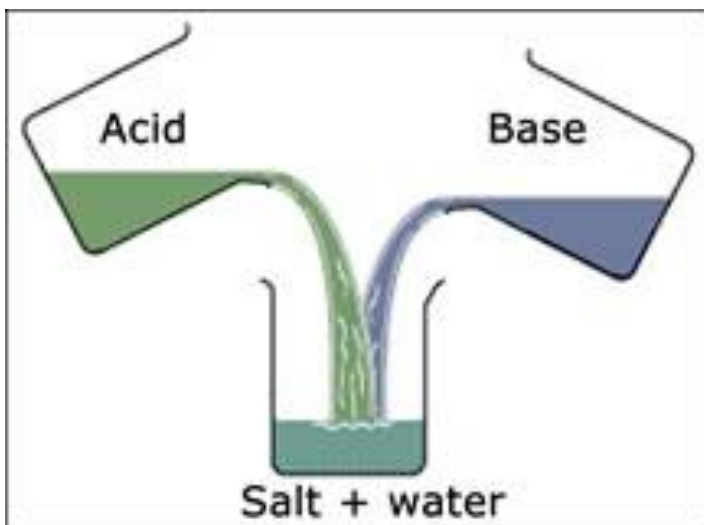


$H_R = \text{More}$

$H_p = \text{Less}$

Energy is released

According to the above formula,



$$\Delta H = H_p - H_R$$

$$\Delta H = \text{Less} - \text{More}$$

$$\Delta H = \text{NEGATIVE}$$

$$\Delta H = \text{Negative}$$

$$H_p < H_R$$

Change in Enthalpy (ΔH)

- Endothermic Reaction

$$\Delta H = \text{Positive}$$

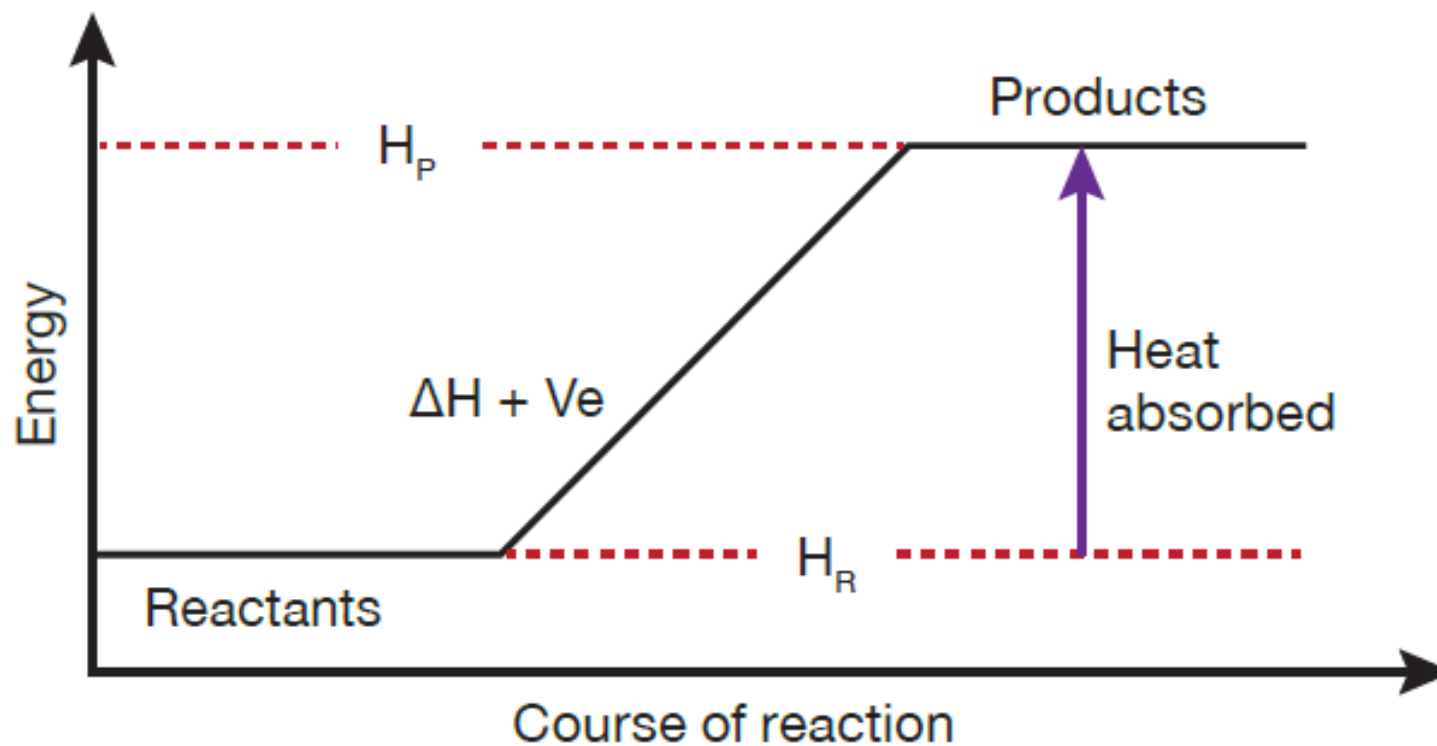
$$H_P > H_R$$

- Exothermic Reaction

$$\Delta H = \text{Negative}$$

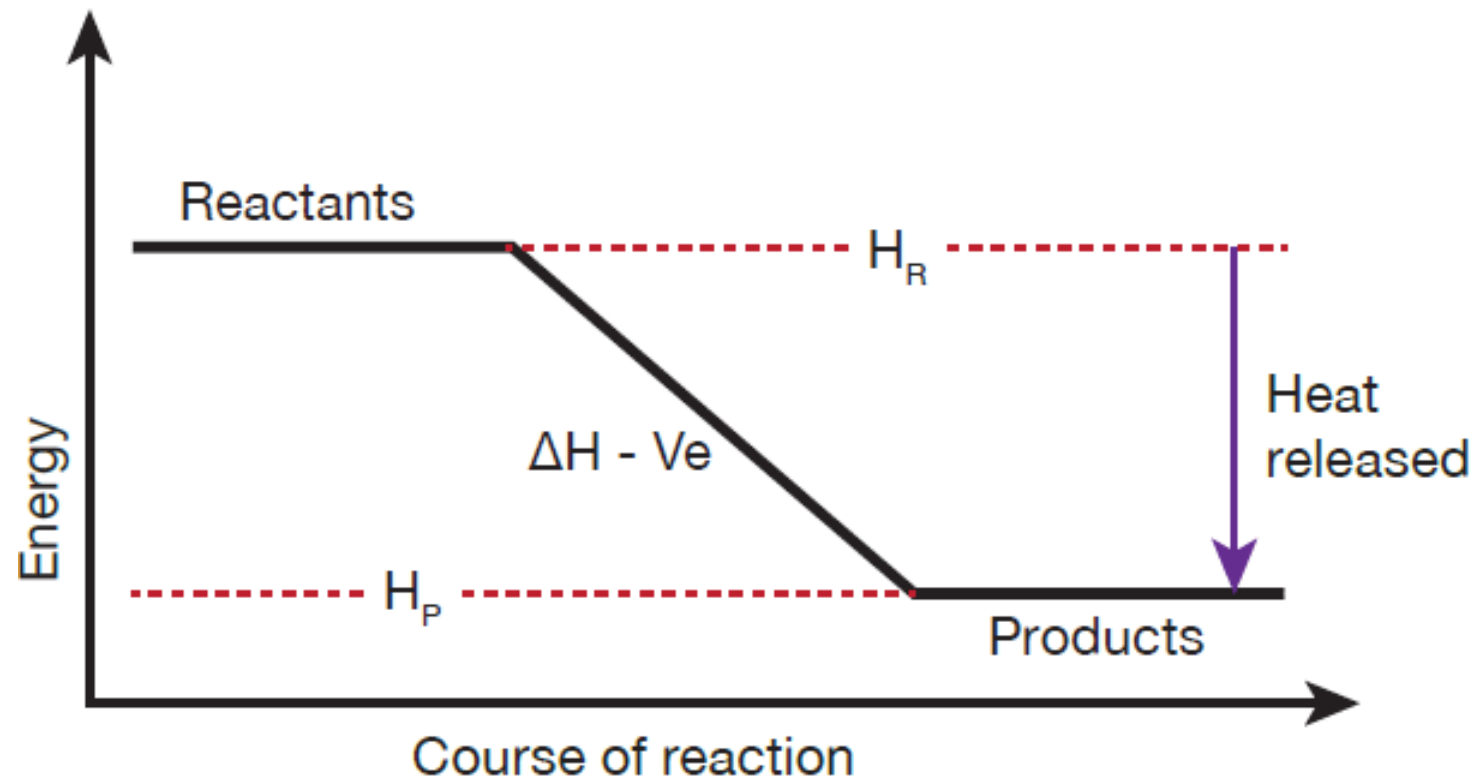
$$H_P < H_R$$

Endothermic Reaction ($\Delta H = \text{Positive}$)



$$H_P > H_R$$

Exothermic Reaction ($\Delta H = \text{Negative}$)



$$H_P < H_R$$

Activity

Q1.

Study the given thermochemical equation and identify the type of reaction.



- A. Endothermic reaction**
- B. Irreversible reaction**
- C. Exothermic reaction**
- D. Reversible reaction**

Q2.

What does the negative value of ΔH indicate in chemical reaction?

- A. release of heat energy**
- B. absorption of heat energy**
- C. zero absorption of heat energy**
- D. zero release of heat energy**

Q3.

A Chemistry teacher asked one of the students to dissolve sodium hydroxide pellets in cold water.

In due course of stirring the mixture, the student felt the production of heat.

What can you conclude from the above experiment?

- A. It is due to heat of neutralization**
- B. It is due to endothermic reaction**
- C. It is due to exothermic reaction**
- D. It is due to stirring of the mixture**

Answer

Q1. A. Endothermic reaction

Q2. A. release of heat energy

Q3. C. It is due to exothermic reaction

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