

**PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI**

LESSON NOTES

Subject: Chemistry

Year/Level: 12

Week 14

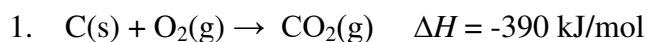
Strand	3 Quantitative Chemistry
Sub Strand	3. 3 Physical Chemistry
Content Learning Outcome	To define enthalpy change and calculate change in enthalpy for any given reaction.

Enthalpy Change

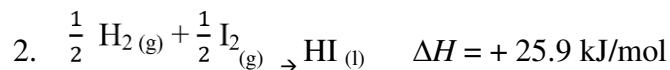
The **enthalpy change** is the energy change occurring during a reaction.

This unit of measurement is useful for calculating the **amount of energy per mole either released (- sign is used) or produced (+ sign is used) in a reaction.**

Example



- ✓ The equation shows that 390 kJ of heat energy is **given out** when 1 mole of **carbon** dioxide is formed from its elements.
- ✓ This reaction is **exothermic** since the ΔH is negative.



- ✓ The equation shows that 25.9 kJ of heat energy is **absorbed** from the surrounding when 1 mole of HI is formed from its elements.
- ✓ This reaction is **endothermic** since the ΔH is positive.

Note: the overall energy change during a reaction is known as the enthalpy change (ΔH) and the unit for enthalpy change is KJ/ mol as the unit for energy is KJ.

Worked example for calculating enthalpy changes

Using the given reaction equation, calculate the amount of heat released when 6 g of carbon undergoes combustion.



Solution

The given equation shows that when 12 g (1 mole) of carbon undergoes combustion, 393.5 kJ of heat energy is released.

Thus, 12 g : - 393.5 kJ

6 g : X

$$X = \frac{6 \text{ g} \times -393.5 \text{ kJ}}{12 \text{ g}}$$
$$= -196.75 \text{ kJ}$$

Therefore, the ΔH when 6 g of carbon undergoes combustion is **-196.75 kJ**.

Activity

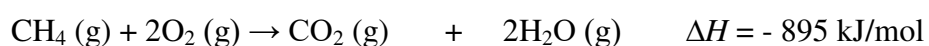
1. Consider the reaction given below and answer the question Consider the reaction given below and answer the questions that follow.



- i) Is the reaction exothermic or endothermic? Give a reason for your answer.

- ii) Calculate the heat energy released when 65g of Sulphur is burnt.

2. Consider the following equation which represents the burning of methane:



Calculate the amount of energy released when 15g of methane undergoes combustion.
