

**Definition of Enthalpy****Enthalpy at constant pressure**

**How to calculate the enthalpy of a reaction from the energy of products and energy of reactants**

**4 WAYS TO CALCULATE CHANGE IN ENTHALPY**

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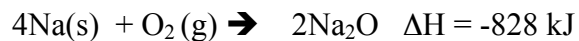
**Using stoichiometry (molar relationships) to calculate enthalpy for an experimental reaction**

**Sample Problem:** Consider the combustion of propane ( $\text{C}_3\text{H}_8$ ):



Assume that all of the heat comes from the combustion of the propane. Calculate  $\Delta H$  for a reaction where 5.00 g of propane is burned in excess oxygen at constant pressure.

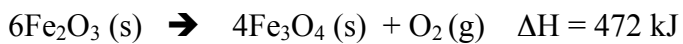
**Sample Problem 2:** The enthalpy for the formation of  $\text{Na}_2\text{O}$  is shown below with the synthesis reaction:



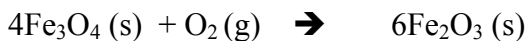
What is the amount of heat released when 1 mole of  $\text{Na}_2\text{O}$  is formed?

**Sample Problem 3:**

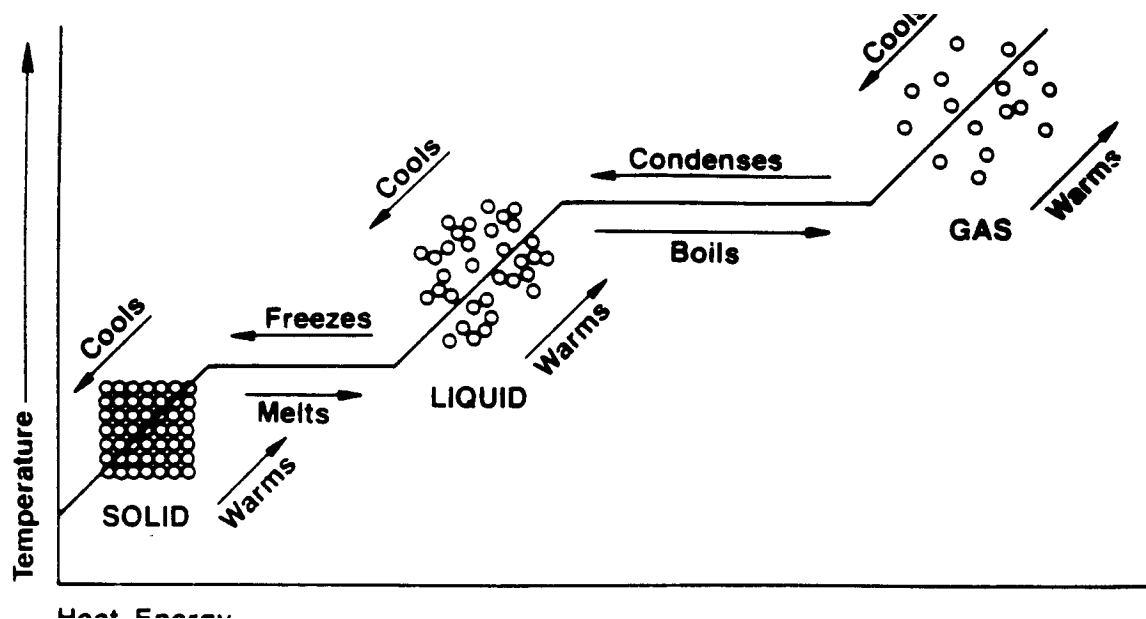
The enthalpy and balanced reaction for the decomposition of  $\text{Fe}_2\text{O}_3$  is shown below:



What is the enthalpy change for the following reaction:



**Definition of a phase change:**



Calculating the enthalpy of a phase change

Calculating the heat of an increase (or decrease) in temperature: Calorimetry  
Definition

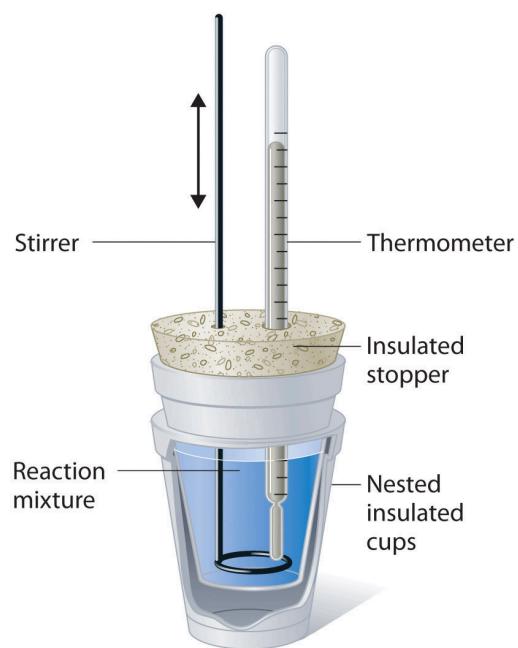
Specific Heat Equation:

Calculating  $\Delta T$

**Sample Calorimetry Problem:** How much heat must be added to change the temperature of 250g of water from 25° C to 60 ° C?

**Enthalpy and Calorimetry:**

**Coffee Cup Calorimeter**



**Sample Problem:** A 100.0 g sample of water at 90°C is added to a 500.0 g sample of water at 10°C. Calculate the final temperature of the water.