

# Energetics Knowledge organiser

## 1. Vocabulary

Enthalpy change $\Delta H$	Heat energy change at constant pressure
Standard enthalpy change $\Delta H_{298}^\circ$	Enthalpy change under standard conditions eg 100Kpa and 298K
Standard enthalpy change of formation $\Delta_f H^\circ$	The enthalpy change when one mole of substance is formed from it's elements under standard conditions
Standard enthalpy change of combustion $\Delta_c H^\circ$	The enthalpy change when one mole of substance is completely burnt in oxygen. Reactants and products in their standard states under standard conditions.
Calorimetry	The process of measuring the heat from a chemical reaction
Hess' law	The enthalpy change of a reaction is independent of the route taken
Mean bond enthalpy	The average enthalpy change when one mole of a specific bond is broken in a range of different <b>gaseous</b> compounds

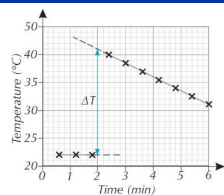
## 2. Calorimetry

$$q = mc\Delta T$$

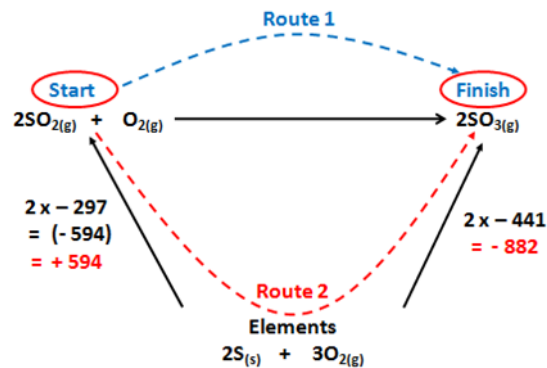
q	Energy / J	c	Specific heat capacity / J/Kg°C
m	mass / g	$\Delta T$	Temperature change / °C

## 3. Temperature change

Extrapolate the line to the point of mixing to establish the maximum temperature change for a reaction

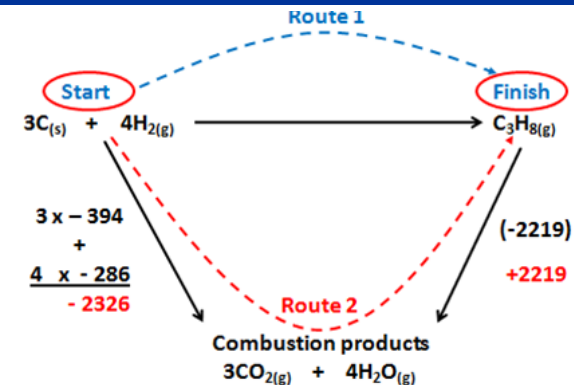


## 4. Enthalpy of formation cycle



Formation: Arrows go up

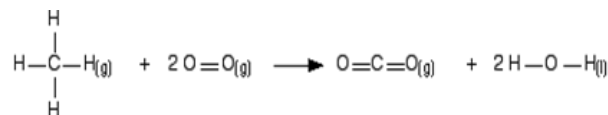
## 5. Enthalpy of combustion cycle



Combustion: Arrows go down

## 6. Bond enthalpies

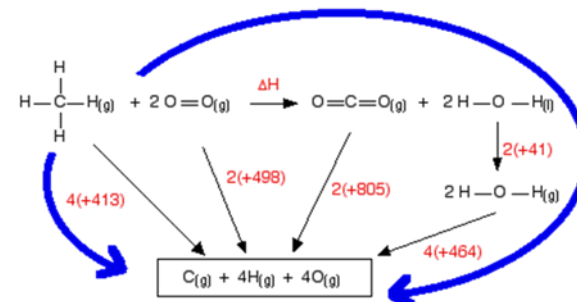
### Shopping list approach



C-H	4x (+413)	C=O	2x (+805)
O=O	2x (+498)	O-H	4x (+464)
	= +2348		= +3466

$$= +2348 - +3466 = -1118\text{kJmol}^{-1}$$

### Cycle approach



$$= +2348 - +3466 = -1118\text{kJmol}^{-1}$$