

ENTHALPY CALCULATIONS

A T A G L A N C E

PROCEDURE

- ① See what value you have to find
- ② Write the correct equation for the change
- ③ See what data is provided
- ④ Select the method of calculation **which uses the data** and apply Hess's Law
- ⑤ Check the sign and units for ΔH

- DEFINITIONS -

Hess's Law

The enthalpy change is independent of the path taken.

Bond Enthalpy

The energy required to break ONE MOLE of gaseous bonds to form gaseous atoms.

Standard Enthalpy of Combustion (ΔH°_c)

The enthalpy change when ONE MOLE of a substance undergoes complete combustion in its standard state.

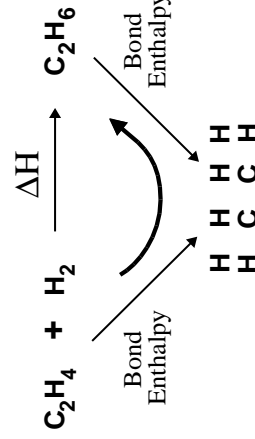
Standard Enthalpy of Formation (ΔH°_f)

The enthalpy change when ONE MOLE of a compound is formed in its standard state from its elements in their standard states.

----- Elements have ZERO enthalpy of formation -----

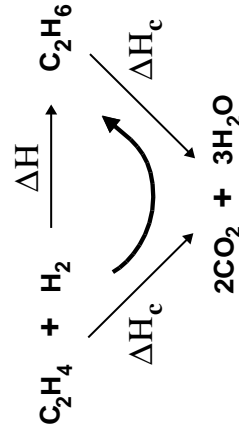
METHODS FOR CALCULATING VALUES

Bond enthalpy



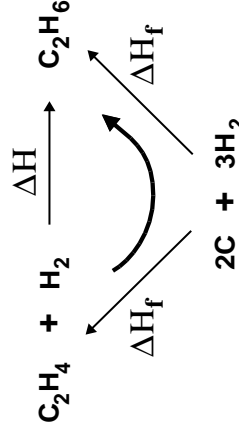
$$\Delta H_f = \sum \text{BOND ENTHALPIES OF REACTANTS} - \sum \text{BOND ENTHALPIES OF PRODUCTS}$$

Enthalpy of combustion



$$\Delta H_f = \sum \Delta H_{c(\text{REACT})} - \sum \Delta H_{c(\text{PROD})}$$

Enthalpy of formation



$$\Delta H_f = \sum \Delta H_{f(\text{PROD})} - \sum \Delta H_{f(\text{REACT})}$$