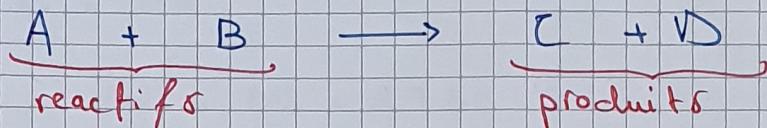


thermochimie



Loi de Hess.

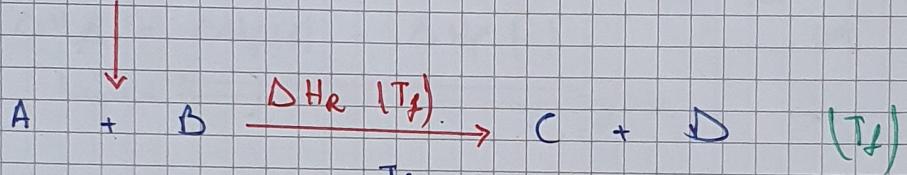
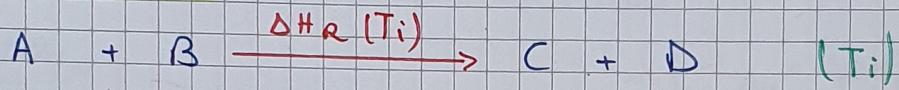
condition standard

$$\left\{ \begin{array}{l} T_0 = 298 \text{ K} \quad (25^\circ\text{C}) \\ P = 1 \text{ atm} \end{array} \right.$$

$$\Delta H_R^\circ = \sum n \Delta H_f^\circ_{\text{produits}} - \sum n \Delta H_f^\circ_{\text{réactifs}}$$

$$\Delta H_f^\circ (\text{corps simple}) = 0 \quad (\text{O}_2, \text{N}_2, \text{Cl}, \dots)$$

Loi de Kirchhoff



$$\Delta H_R(T_f) = \Delta H_R(T_i) + \int_{T_i}^{T_f} \Delta C_p dT$$

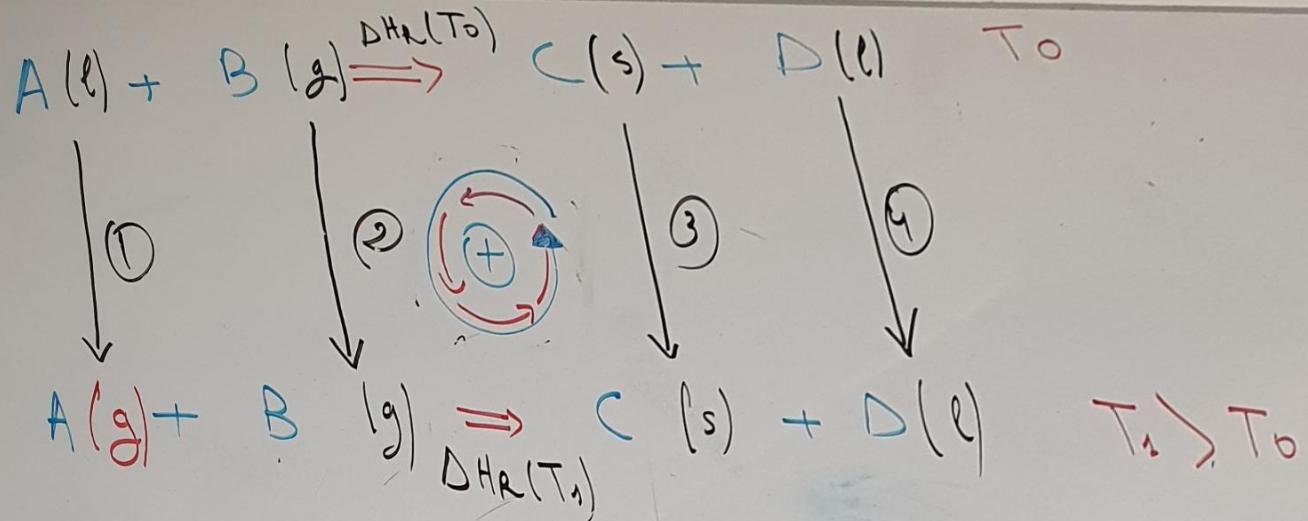
$$\Delta H_R(T_f) = \Delta H_R(T_i) + \Delta C_p \Delta T$$

avec : $\Delta C_p = \sum n C_p_{\text{produits}} - \sum n C_p_{\text{réactifs}}$

400

400

min



$$① + ② + \underbrace{\Delta H_R(T_1)}_{\text{Red}} - ③ - ④ - \Delta H_R(T_0) = 0$$

Relation entre Q_v et Q_p

$$Q_v = \Delta U$$

$$Q_p = \Delta H$$

$$\Delta H = \Delta U + RT \Delta \eta$$

$$Q_p = Q_v + RT \Delta \eta$$

avec :

$$\Delta \eta = E_{\text{prod}}(\text{g}) - E_{\text{reactif}}(\text{g})$$

Energie de liaison



$$\Delta H_l = -\Delta H_d$$

Changement de phase



$$L_{\text{fus}} = \Delta H_{\text{fus}}$$

$$L_{\text{sol}} = -L_{\text{fus}} = -\Delta H_{\text{fus}}$$

$$\Delta H_{\text{fus}} = \Delta H_f(\text{l}) - \Delta H_f(\text{s})$$



$$L_{\text{vap}} = \Delta H_{\text{vap}}$$

$$L_{\text{liq}} = -L_{\text{vap}} = -\Delta H_{\text{vap}}$$

$$\Delta H_{\text{vap}} = \Delta H_f(\text{g}) - \Delta H_f(\text{l})$$

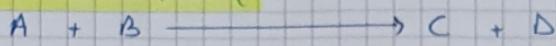


$$L_{\text{sub}} = \Delta H_{\text{sub}}$$

$$L_{\text{con}} = -L_{\text{sub}} = -\Delta H_{\text{sub}}$$

$$\Delta H_{\text{sub}} = \Delta H_f(\text{g}) - \Delta H_f(\text{s})$$

Température de la flamme



$$\sum Q_i = 0$$

$$Q_s + Q_m = 0$$

$$\Delta H_R(T_1) + \int_{T_1}^{T_m} \sum_{\text{products}} C_p dT = 0$$

$$\Delta H_R(T_1) + \sum_{\text{products}} C_p \Big|_{T_1}^{T_m} = 0$$

$$\Delta H_R(T_1) + \sum_{\text{products}} C_p (T_m - T_1) = 0$$

$$\sum_{\text{products}} C_p (T_m - T_1) = - \Delta H_R(T_1)$$

$$T_m - T_1 = - \frac{\Delta H_R(T_1)}{\sum_{\text{products}} C_p}$$

$$T_m = T_1 - \frac{\Delta H_R(T_1)}{\sum_{\text{products}} C_p}$$

ΔH de la réaction chimique.

$\Delta H < 0$: exothermique

$\Delta H > 0$: endothermique