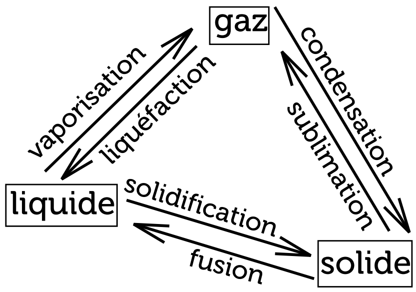
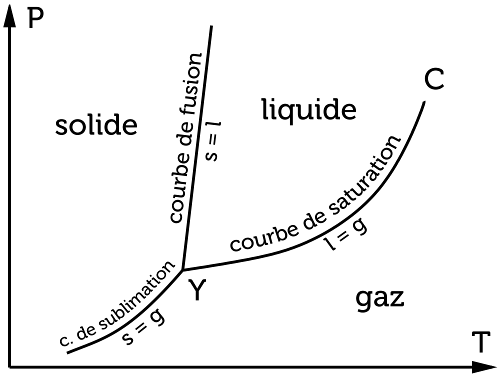
Equilibre d'un corps pur sous plusieurs phases

T1 – Chapitre 3

I. Les changements de phases



II. Diagramme (P, T)



III. Equilibres de phases d'un corps pur

	1 phase	2 phases	3 phases
Equilibres		$X(\alpha) = X(\beta)$ α plus condensé que β	$X(s) = X(l)$ $X(s) = X(g)$ $X(l) = X(g)$
Relations		$g_\alpha(T,P) = g_\beta(T,P)$	$g_s = g_l \quad g_s = g_g \quad g_l = g_g$
Equilibré décrit par	Plan $g(T,P)$	Courbe de saturation $P_{\alpha\beta}(T)$	Point triple Y

IV. Transitions de première espèce

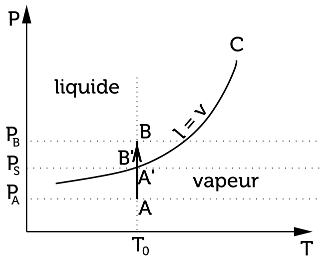
1. Formules

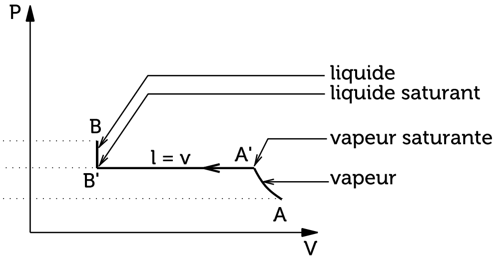
Enthalpie de transition : $\boxed{l_{1\to2} = \Delta h_{1\to2}}$ $\quad l_{1\to2} = -l_{2\to1} \quad s_2 - s_1 = \dfrac{l_{1\to2}(T_0)}{T_0}$ à $T = T_0$

Relation de Clapeyron : $\boxed{l_{1\to2} = T(v_2 - v_1)\dfrac{dP_{12}}{dT}}$ $\quad \dfrac{dP_{12}}{dT}$: pente de la courbe de transition de phases

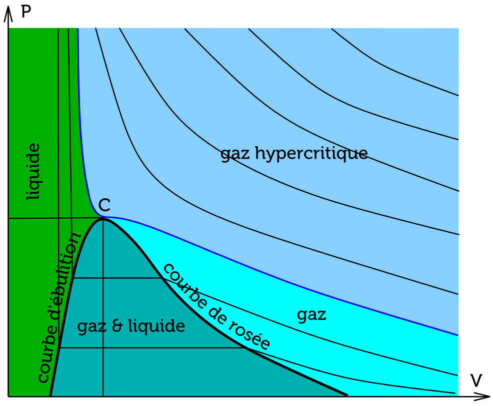
Propriétés du point triple : $\boxed{l_f(T_Y) + l_v(T_Y) - l_s(T_Y) = 0}$ et $\left(\dfrac{dP_s}{dT}\right)_Y > \left(\dfrac{dP_v}{dT}\right)_Y$

2. Compression isotherme à $T = T_0$





4. Diagramme (P, V)



$$x = x_g = \frac{m_g}{m_g + m_l}$$

$$v = x v_g + (1-x) v_l$$

3. Echauffement isobare à $P = P_0$