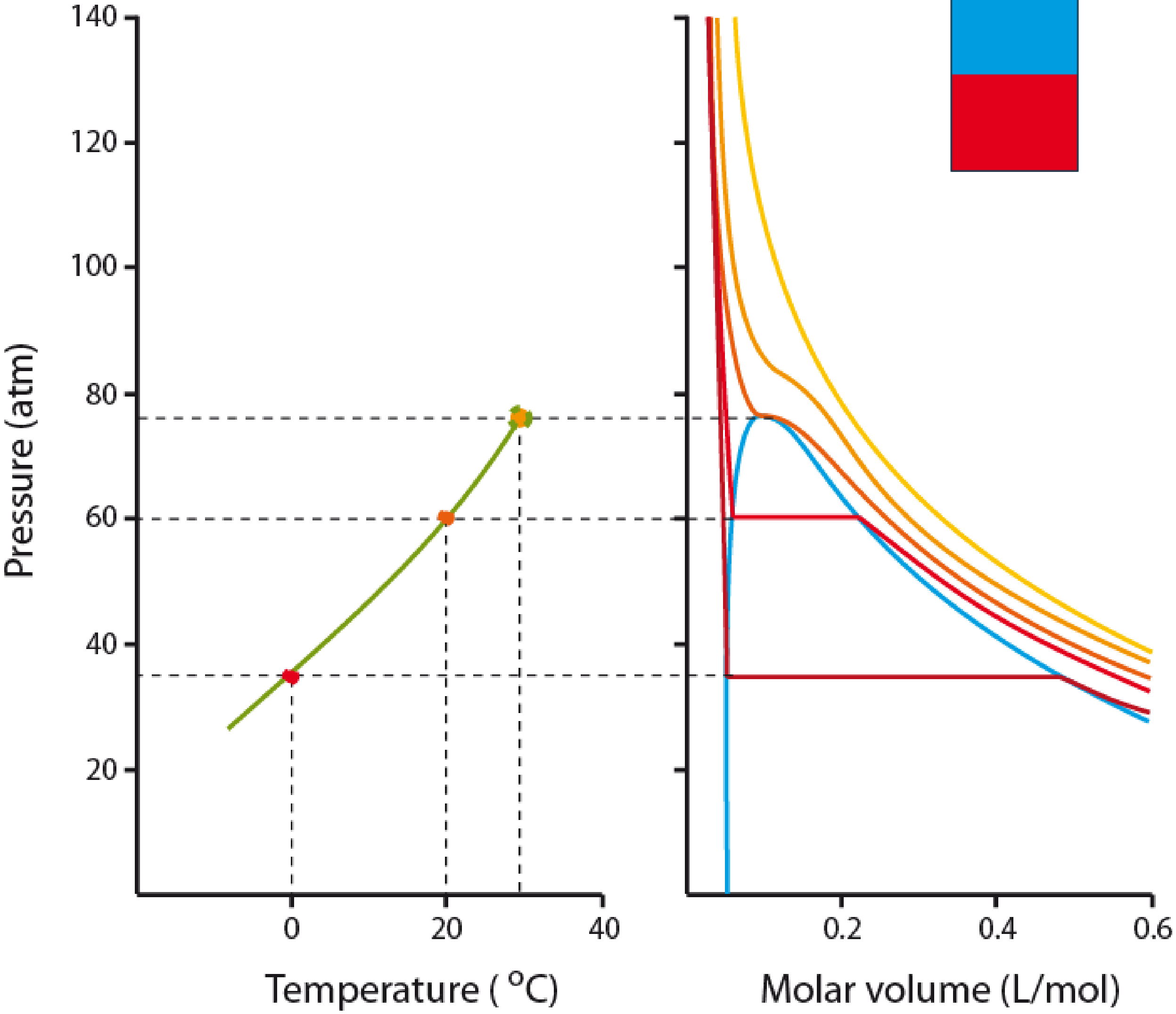
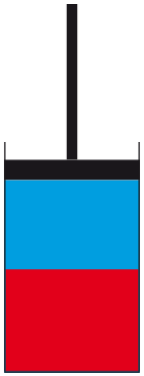
Fasenevenwichten van mengsels

Vloeistof-dampevenwichten

Zuivere stoffen

- dampspanning
- extensieve variabele
  - 2-fasengebied
- “hefboom”-regel

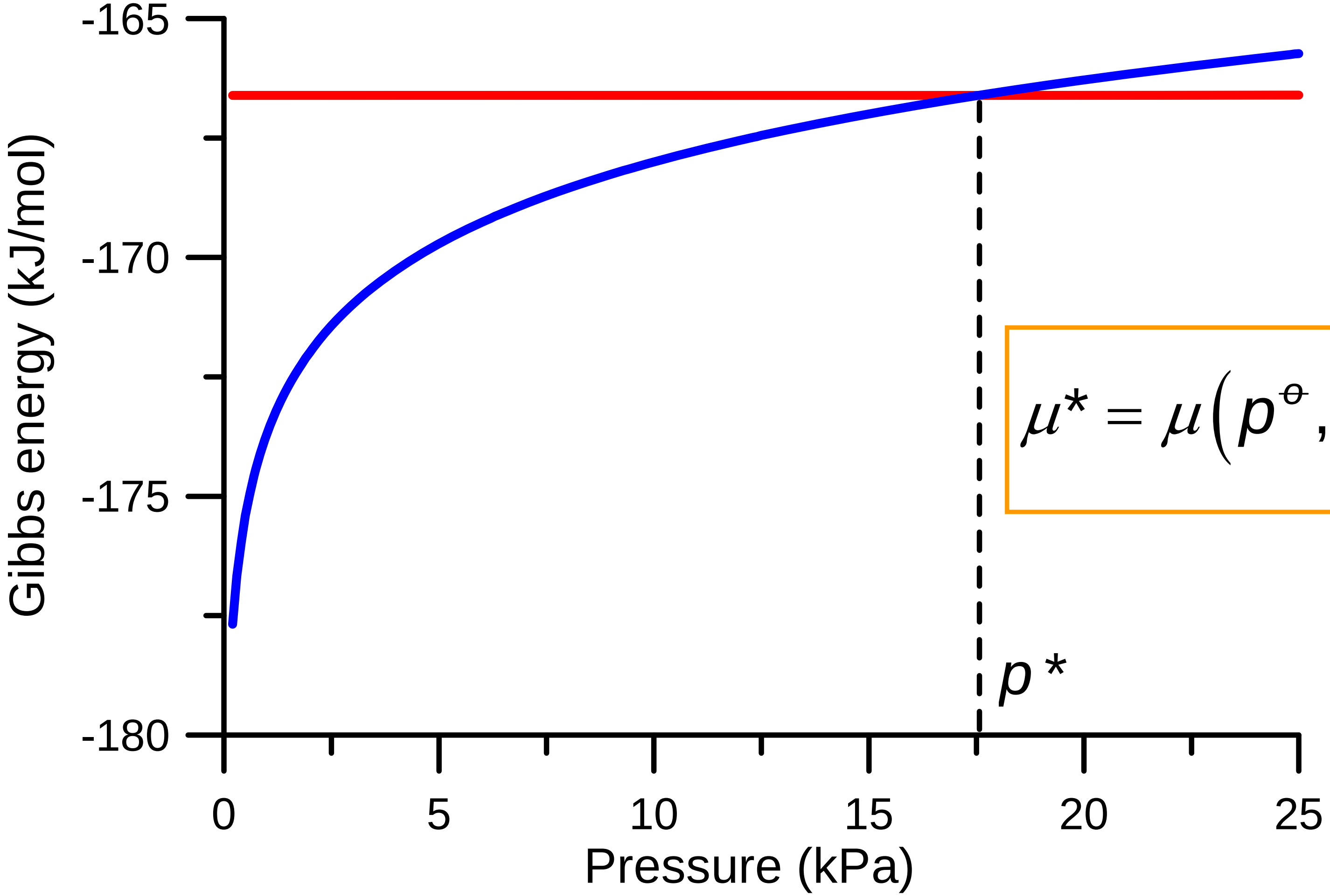




Vloeistof-dampevenwichten

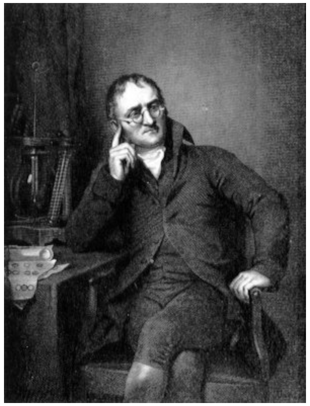
Dampspanning (voorbeeld methanol)

Form	$\Delta_f G^{\ominus}$ (kJ/mol)	$S^{\ominus}$ (J/(K mol))	V_m (cm^3/mol)
liquid	-166.6	126.8	40.5
vapor	-162.3	239.9	—



$$\mu^* = \mu\left(p^{\ominus}, T\right) + RT \ln \frac{p^*}{p^{\ominus}}$$

Vloeistof-dampevenwichten



John Dalton (1766 – 1844)

Dampmengsels

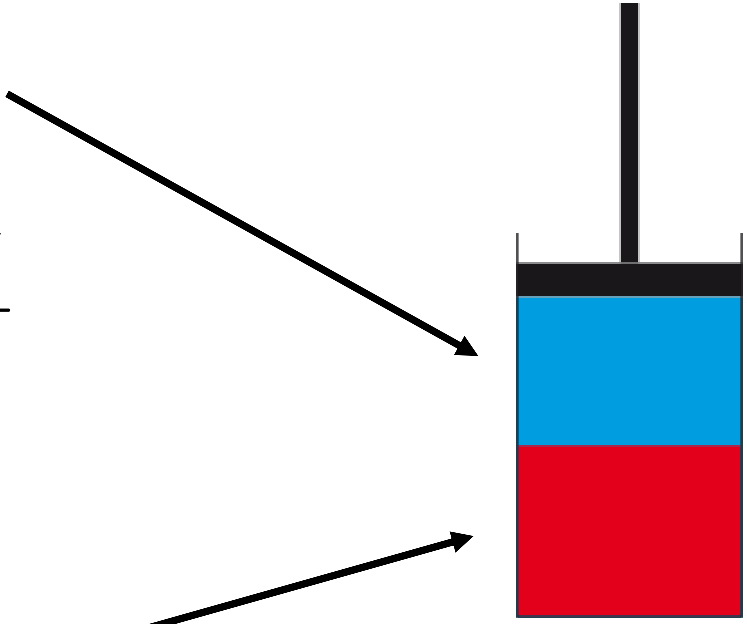
Wet van Dalton $p_j = y_j p$

Molfractie $y_j = \frac{n_j}{n}$

Partiële druk $p_j = \frac{n_j RT}{V}$

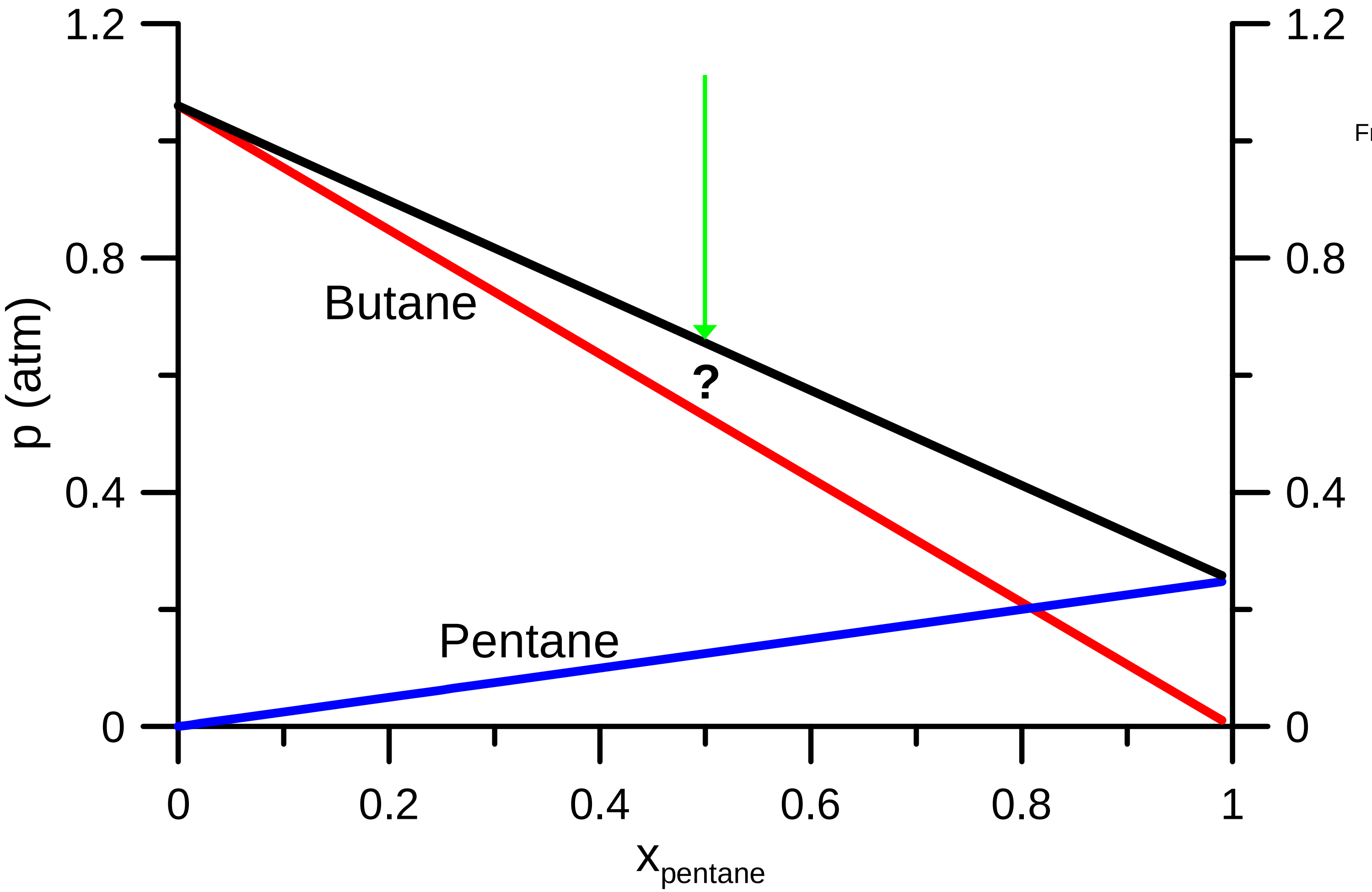
Vloeistofmengsels

Molfractie $x_j = \frac{n_j}{n}$



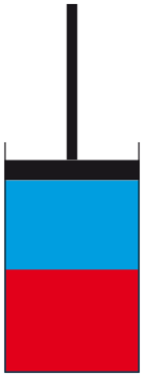
Vloeistof-dampevenwichten

Kooklijn: wet van Raoult $p_j = x_j p_j^*$

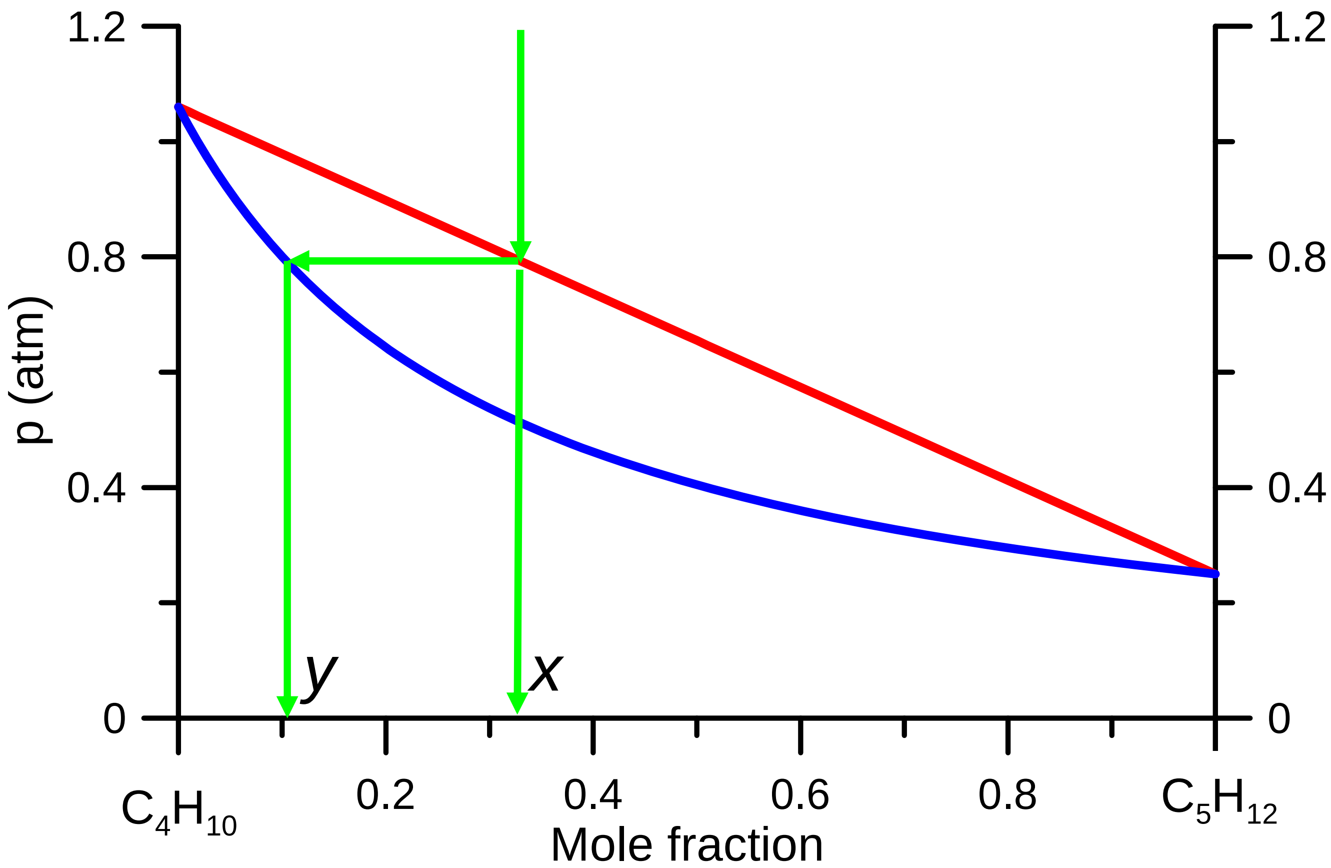


François Raoult (1830 – 1901)

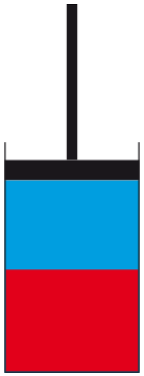
Vloeistof-dampevenwichten



Damplijn $$y_j = \frac{x_j p_j^*}{x_A p_A^* + x_B p_B^*}$$

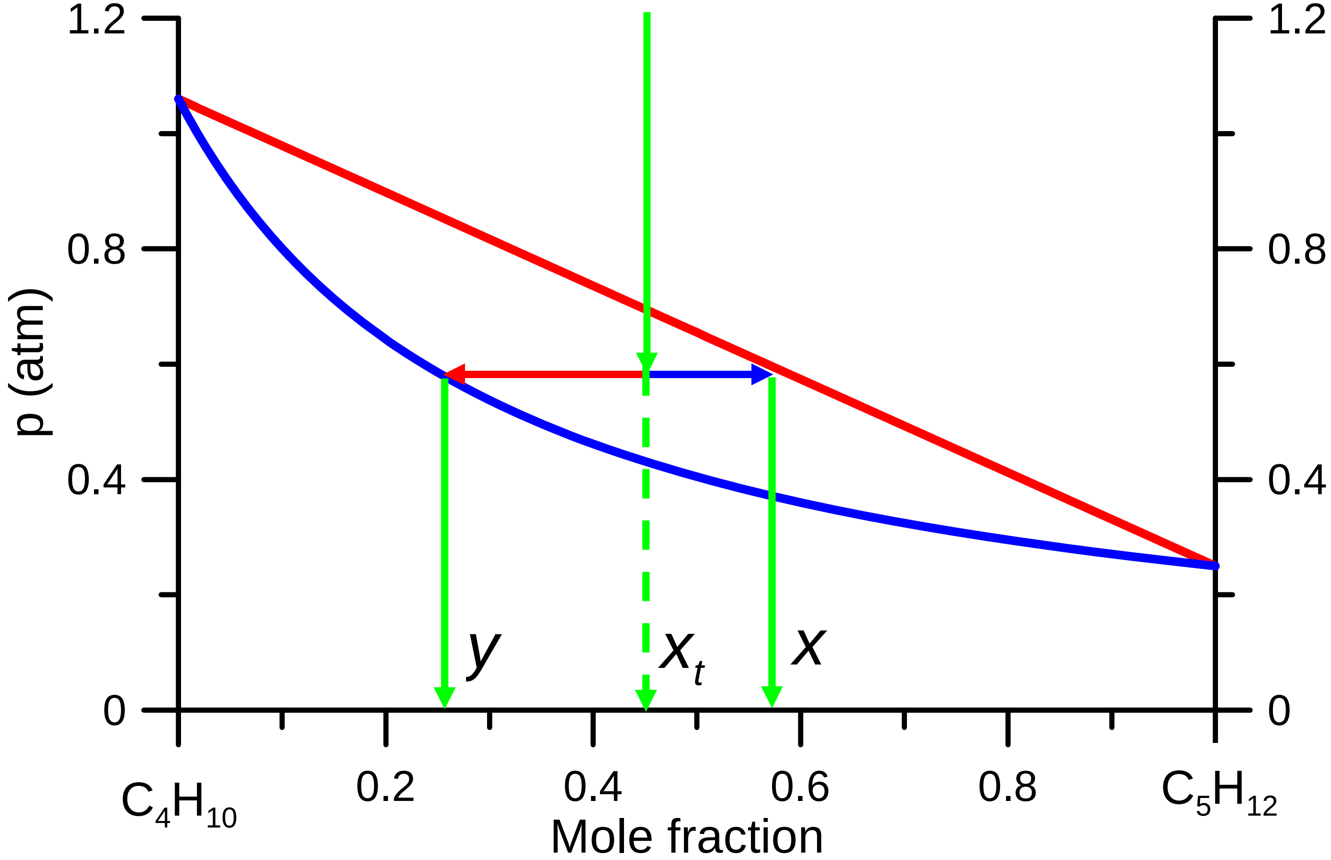


Vloeistof-dampevenwichten

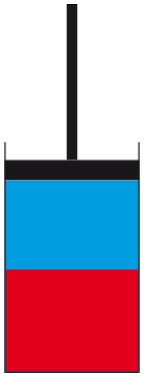


Hefboomregel (lever rule)

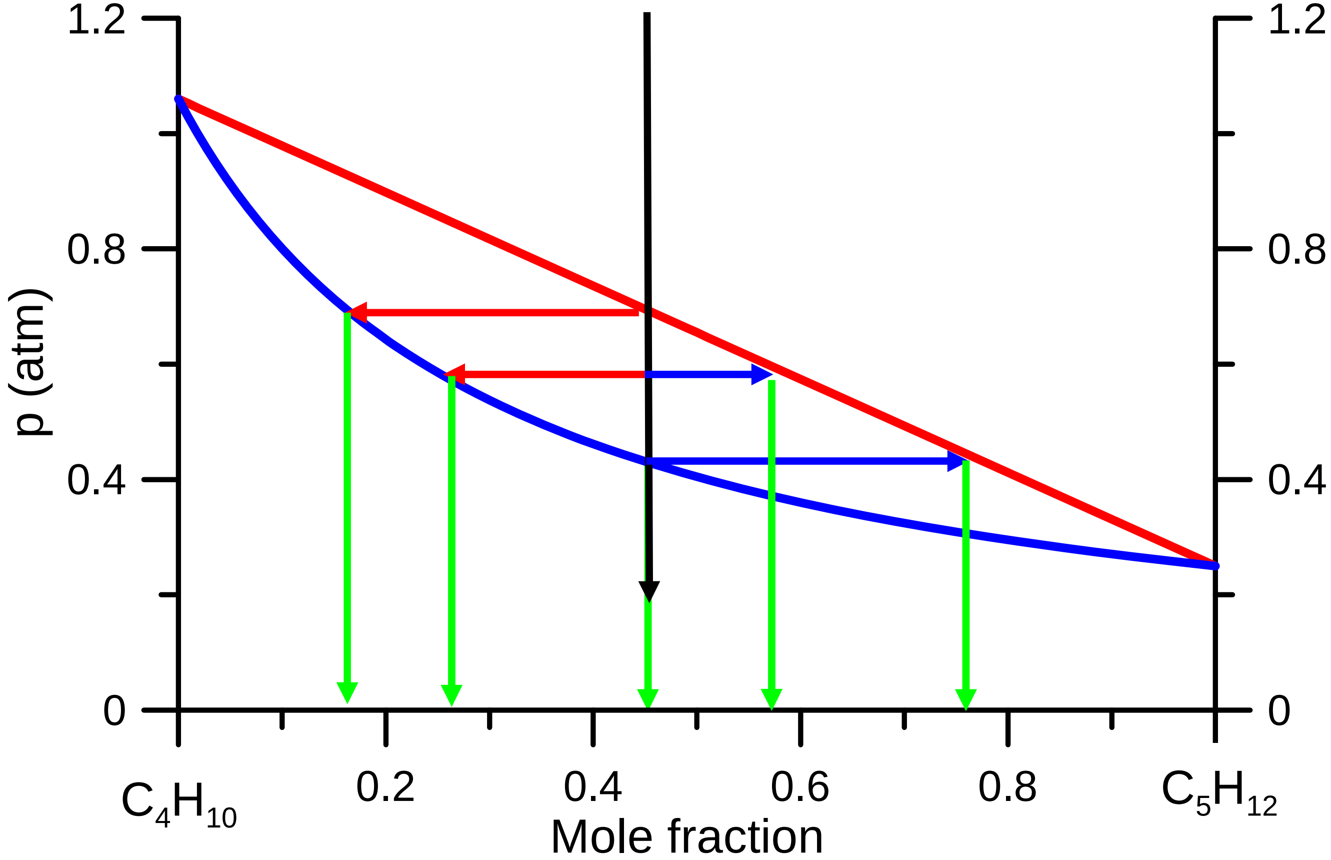
$$\frac{n_v}{n_l} = \frac{x_t - x}{y - x_t}$$



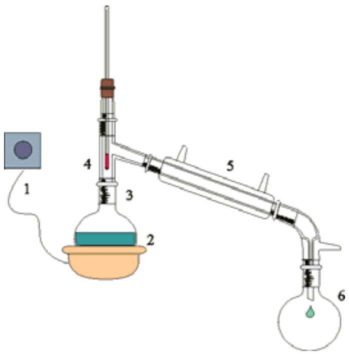
Vloeistof-dampevenwichten



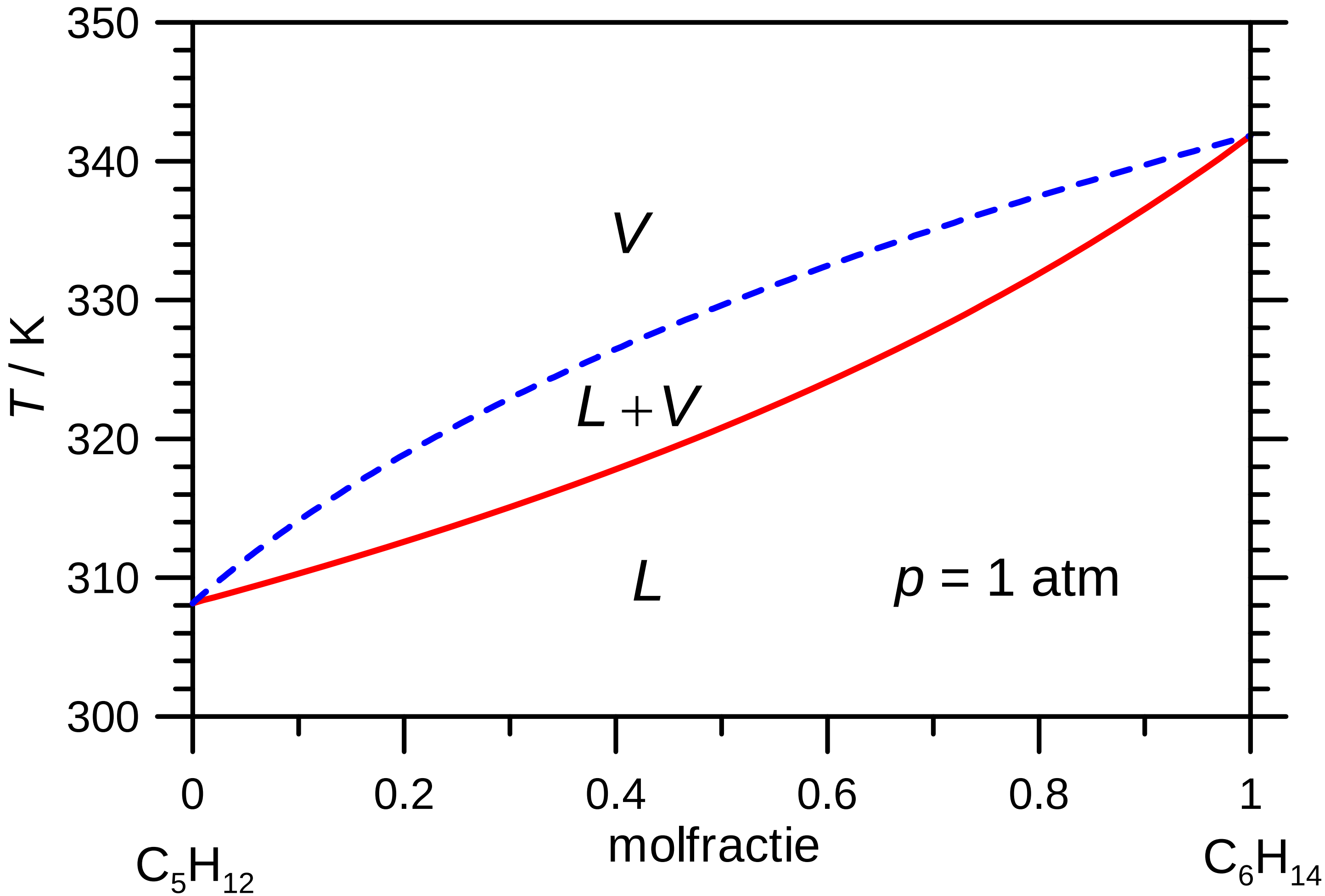
Verdamping door decompressie: interpretatie P-x-diagram



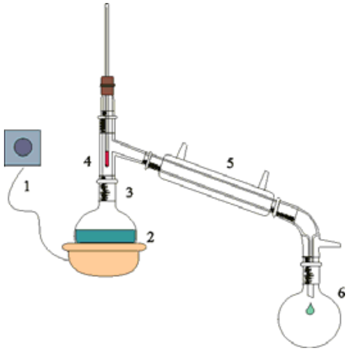
Vloeistof-dampevenwichten



Interpretatie T-x-diagram: fasengebieden

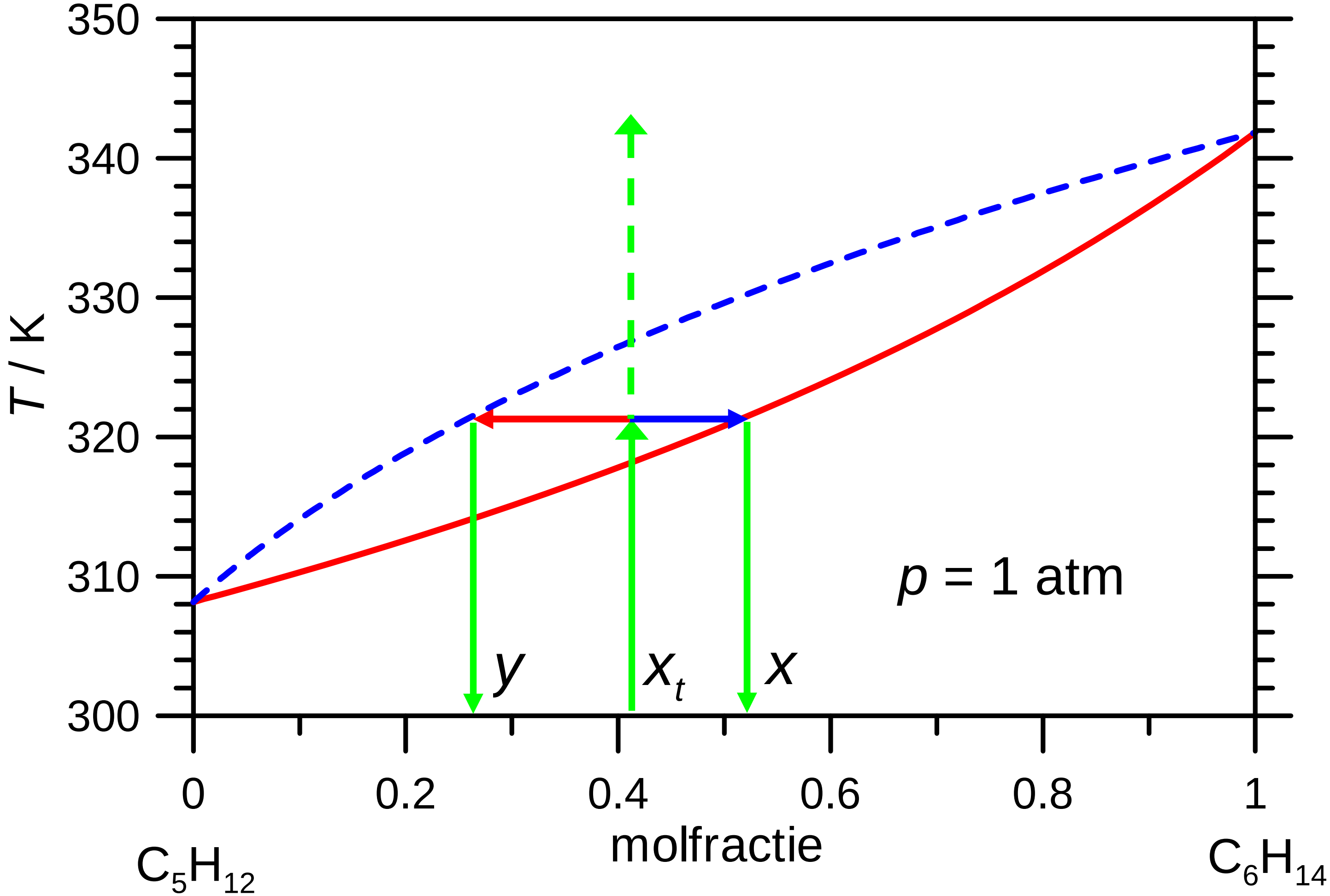


Vloeistof-dampevenwichten

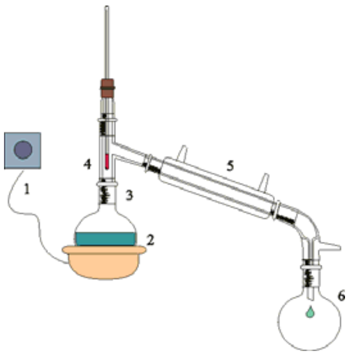


Interpretatie T-x-diagram: hefboomregel

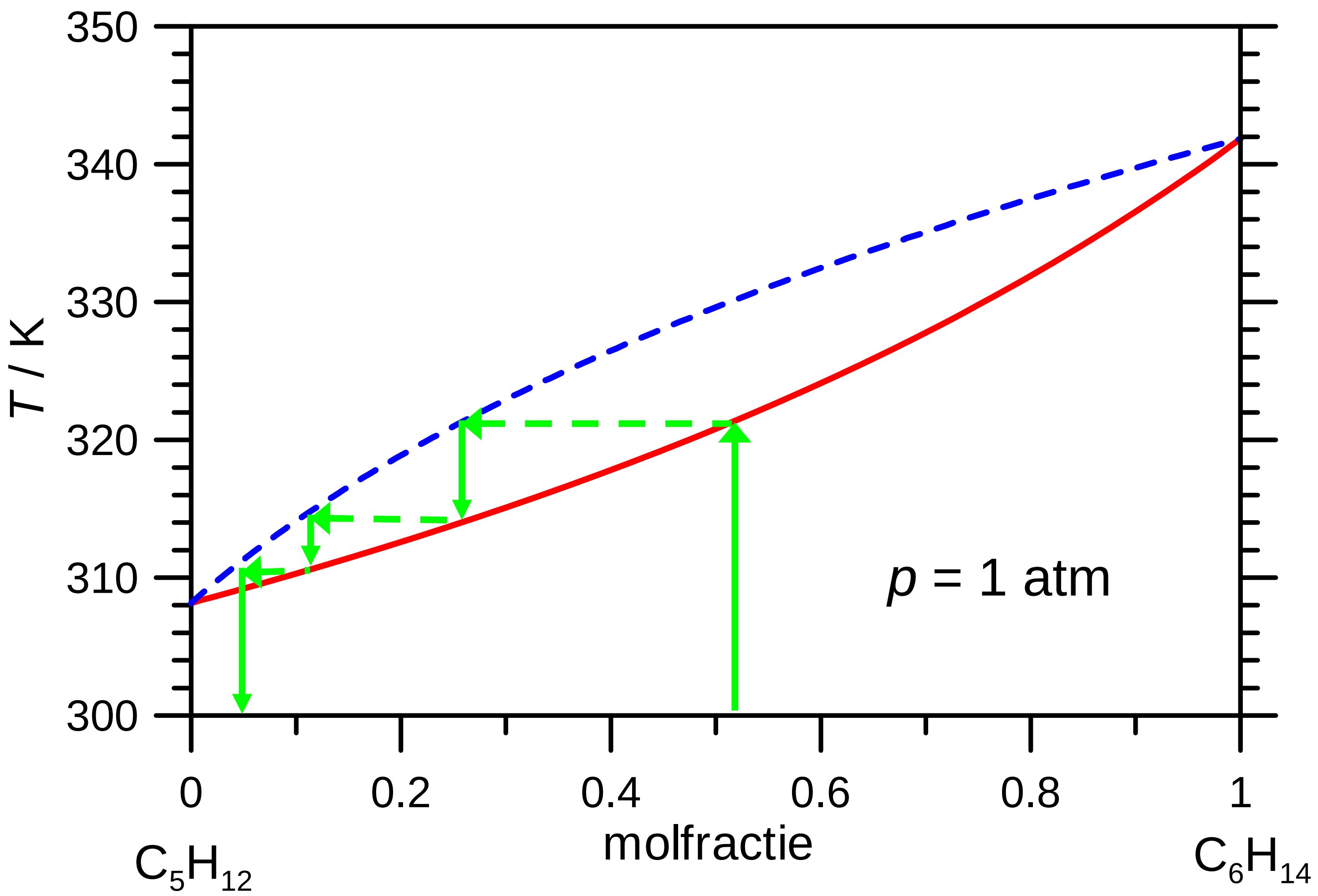
$$\frac{n_v}{n_l} = \frac{x_t - x}{y - x_t}$$



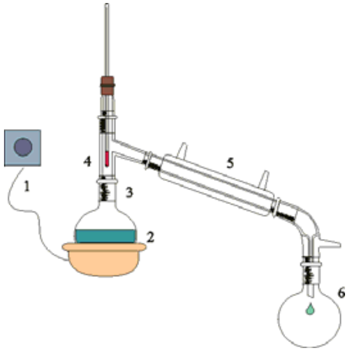
Vloeistof-dampevenwichten



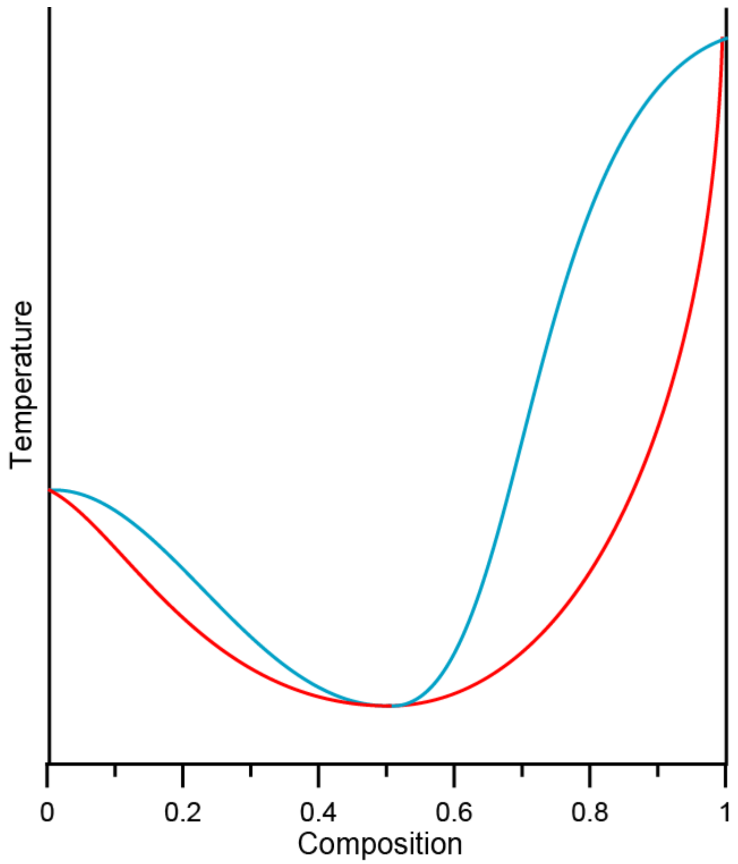
Interpretatie T-x-diagram: destillatie

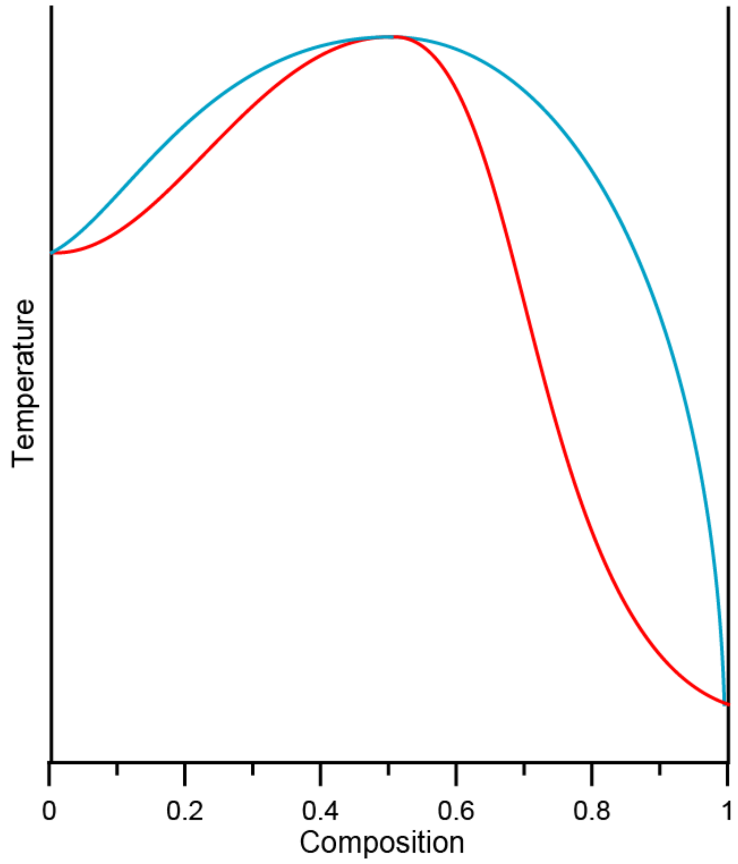


Vloeistof-dampevenwichten



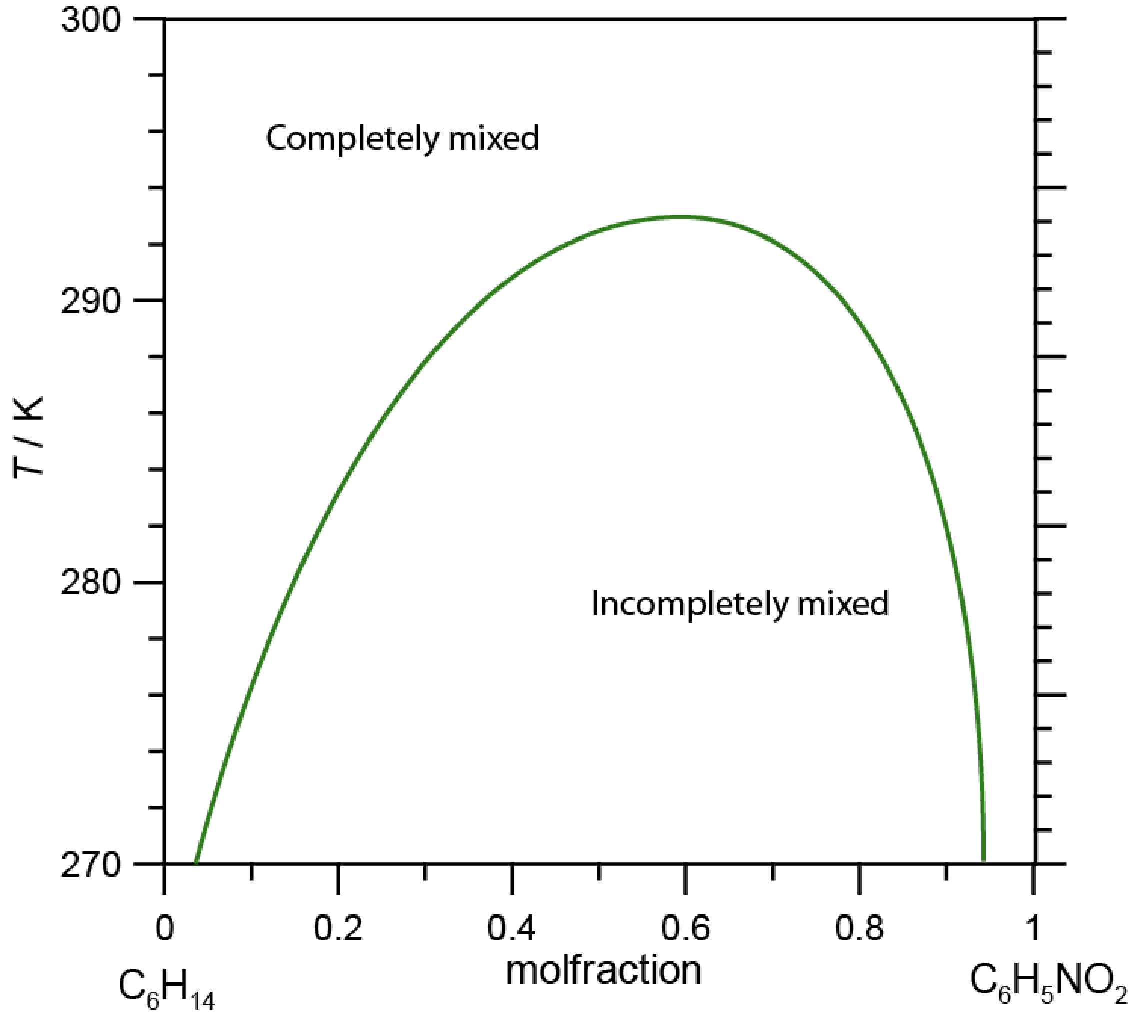
Niet-lineariteiten: azeotropie





Vloeistof-vloeistof-evenwichten

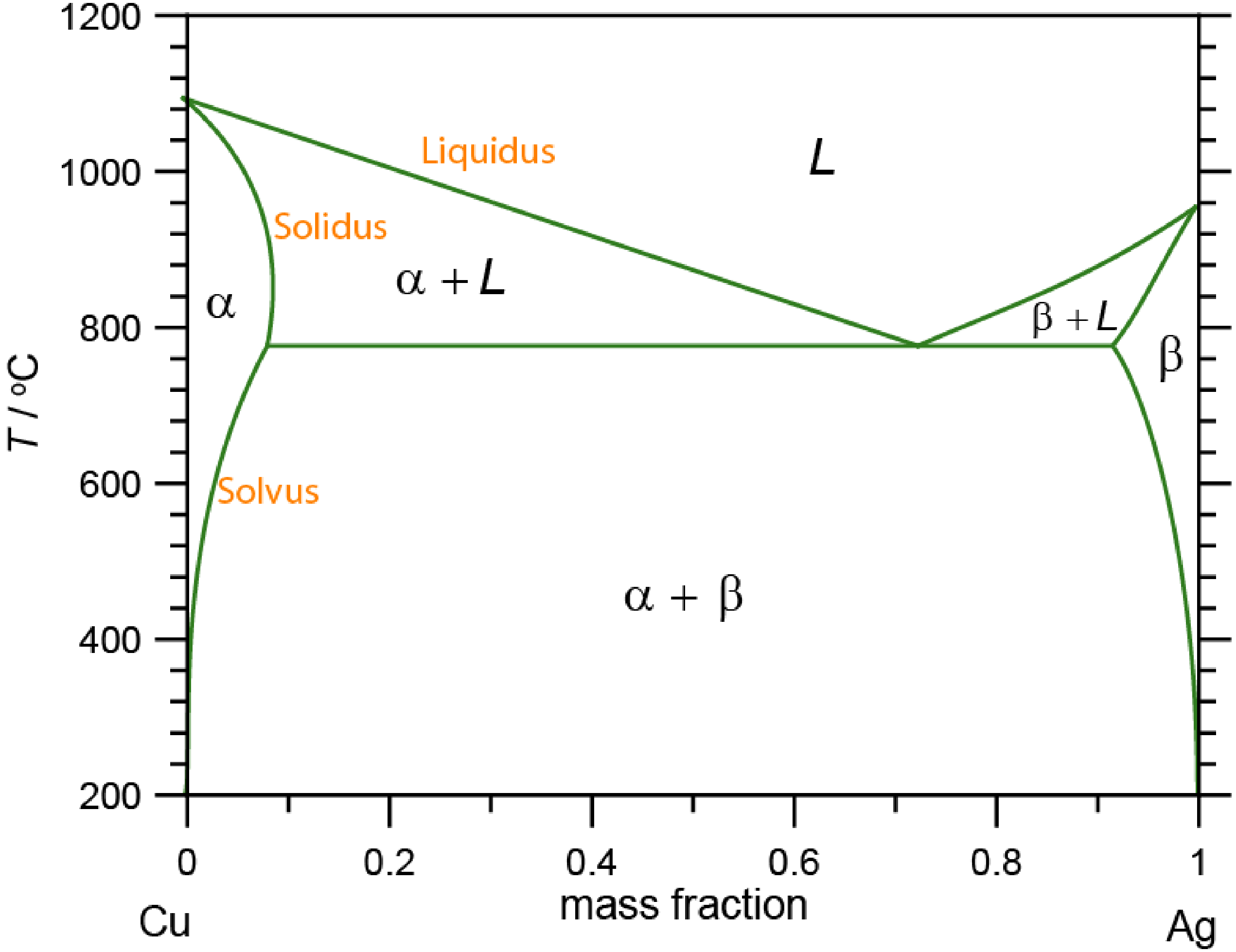
Gedeeltelijke mengbaarheid (nitrobenzeen in hexaan)



Vloeistof-vast-evenwichten

Kenmerken

- Eutectisch punt
- oplosbaarheid



Vloeistof-vast-evenwichten

Kenmerken

- Verbinding
- Eutecticum