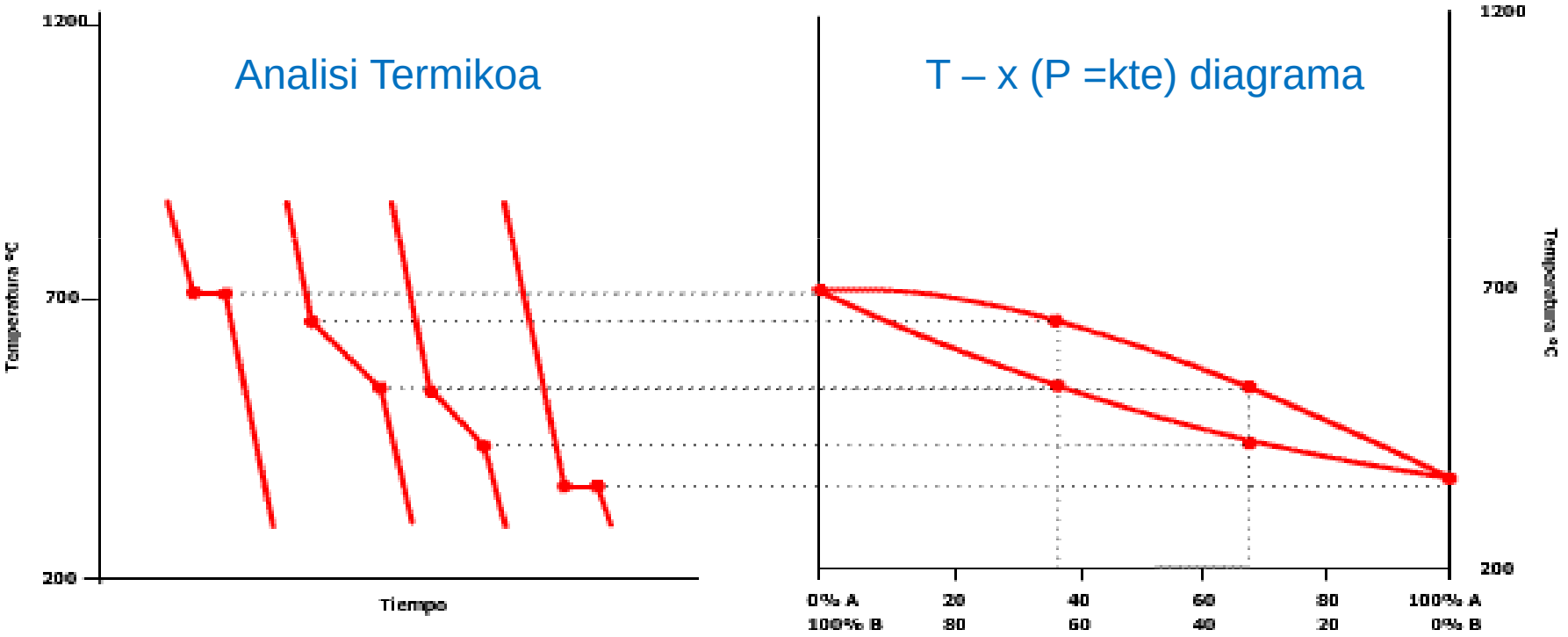
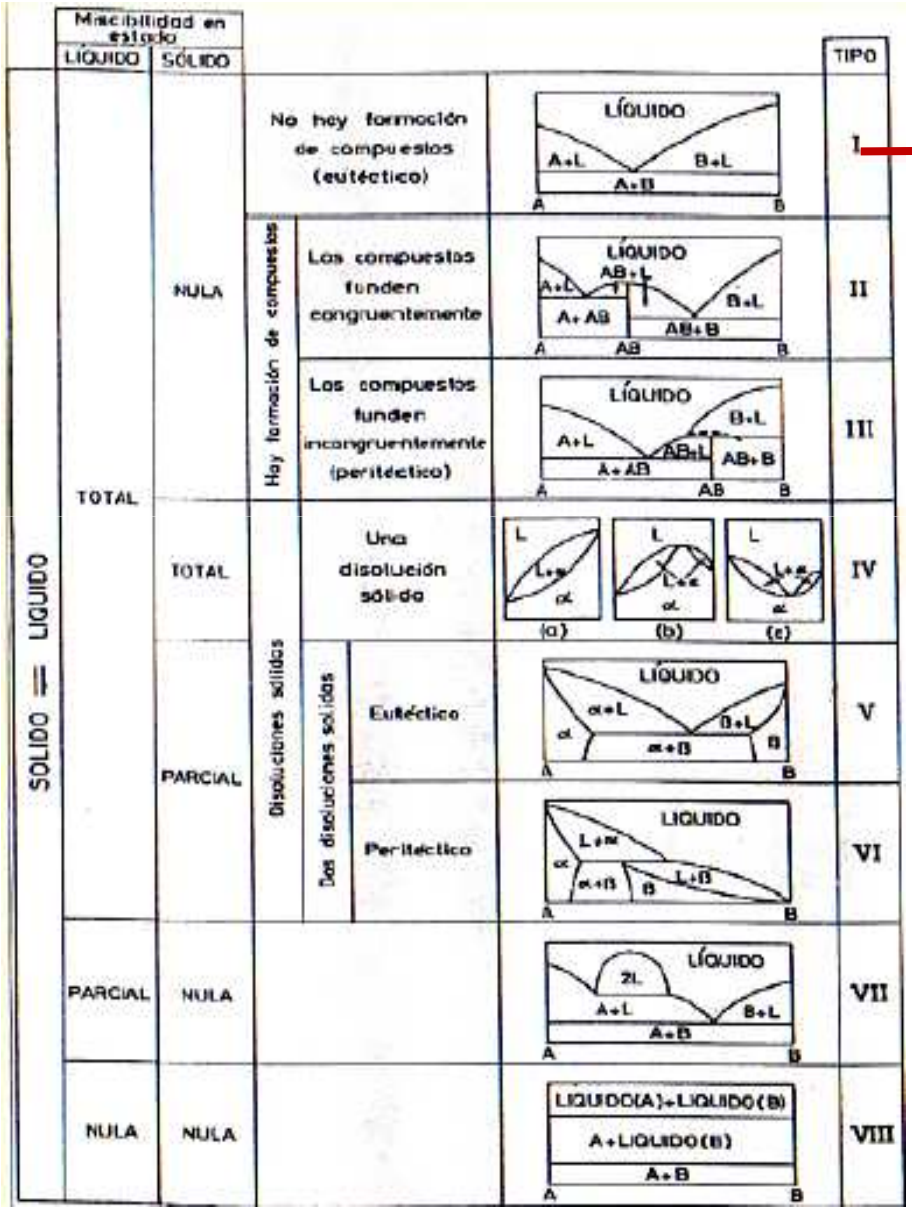
IV. FASEEN ARTEKO OREKA

P6. Sistema Bitarren Solido-Likido Fase-Diagrama



Esperimentazio Kimika Fisikoan
Open Course Ware
http://ocw.ehu.es/course/view.php?id=207

OINARRI TEORIKOA



→ Eutektiko sinplea, baldintzak:

- ✓ Osagaien artean konpostaurik ez eratzea.
- ✓ Guztiz nahaskorrak fase likidoan, baina nahastezinak egoera solidoan.
- ✓ Baldintza estandarretan (P = 1 bar) eta T = 25 °C, biak solidoak.

T – x diagramak (P = kte)
Neurtu hainbat nahastetan fusio T

❖ Termodinaka:

Oreka baldintza:

$$\mu_{i,dis} = \mu_{i,sol} \Rightarrow \mu^*_{i,s} = \mu^*_{i,l} + RT \ln \gamma_i x_i \Rightarrow \ln \gamma_i x_i = -\frac{\Delta G_{fus}(T_f)}{RT_f}$$

d/dT eginez

$$\ln \gamma_i x_i = \int_{T^*_{f,i}}^{T_f} \frac{\Delta H_{fus,i}(T_f)}{RT_f} dT_f \qquad \left(\frac{\partial(\partial G/T)}{\partial T}\right)_P = -\frac{\Delta H}{T^2}$$

Disoluzio ideala:

- Elkarrekintzak:
  A-B ≈ A-A ≈ B-B
- $\gamma_i = 1 \rightarrow a_i = x_i$
- $\Delta H_{fus} \neq f(T)$ eta kte

$$\ln x_A = \frac{\Delta H_{fus,A}}{R}\left(\frac{1}{T^*_{f,A}} - \frac{1}{T_f}\right)$$ A disolbatzaile

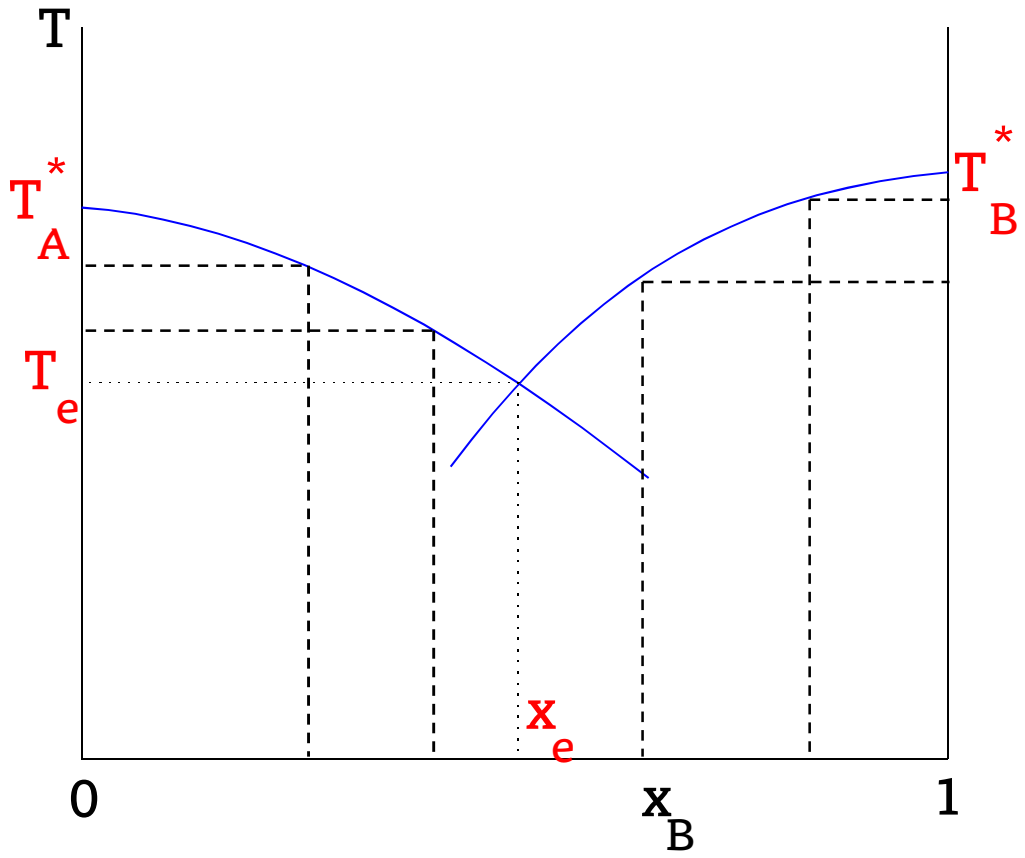
$$\ln x_B = \frac{\Delta H_{fus,B}}{R}\left(\frac{1}{T^*_{f,B}} - \frac{1}{T_f}\right)$$ B disolbatzaile

❖ Diagrama T-x Ideala:

Osagai puruen datuak erabiliz (T_{fus} eta ΔH_{fus}, handbook)
Kalkulatu Tfus konposizio ezberidnetan

$$T_f = T^*_{f,A} + \frac{RT^{*2}_{f,A}}{\Delta H_{f,A}} \ln x_A$$

$$T_f = T^*_{f,B} + \frac{RT^{*2}_{f,B}}{\Delta H_{f,B}} \ln x_B$$

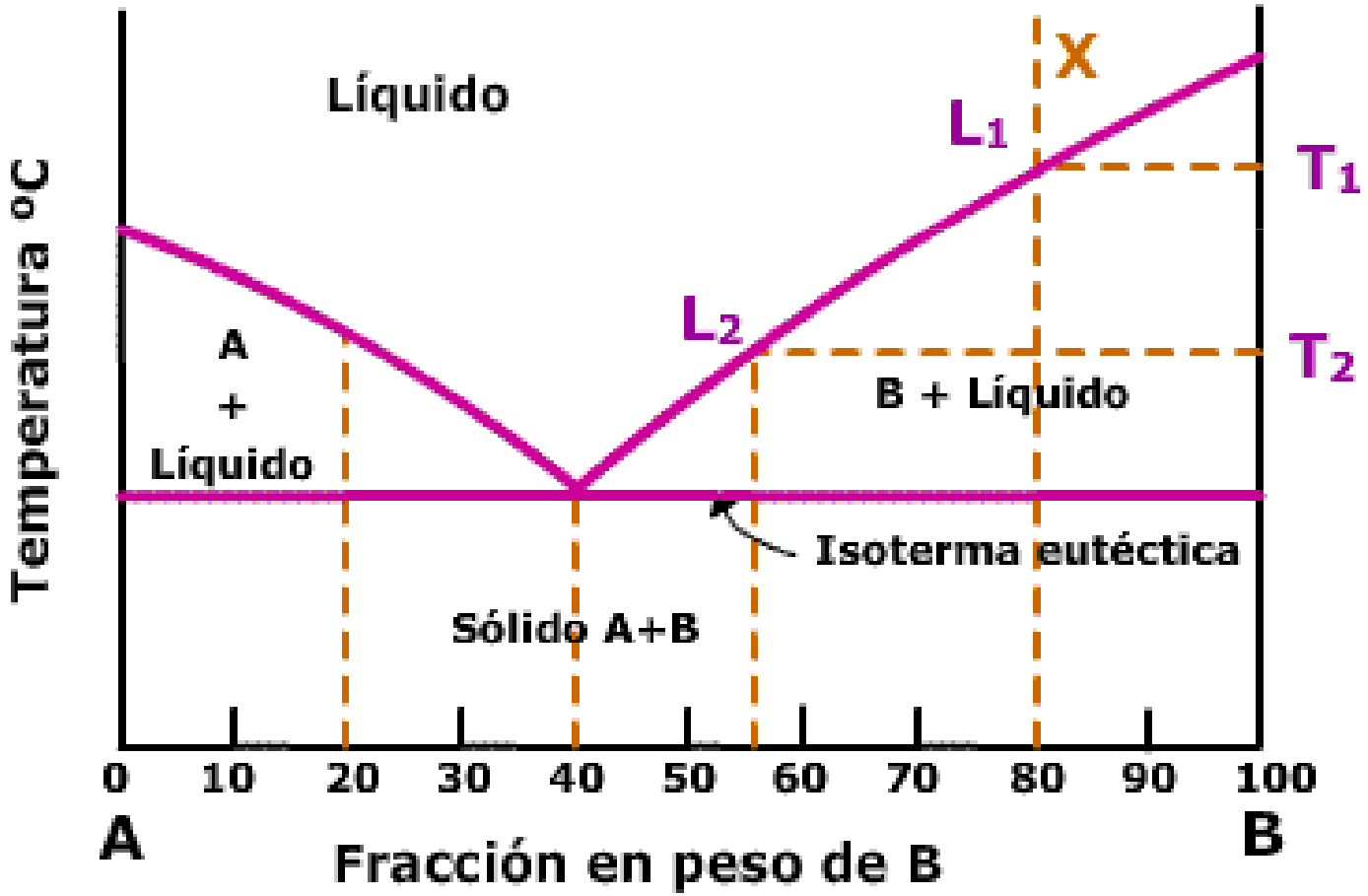


Eutektikoaren T_e eta x_e teorikoak (ez handbookean)

PROZEDURA

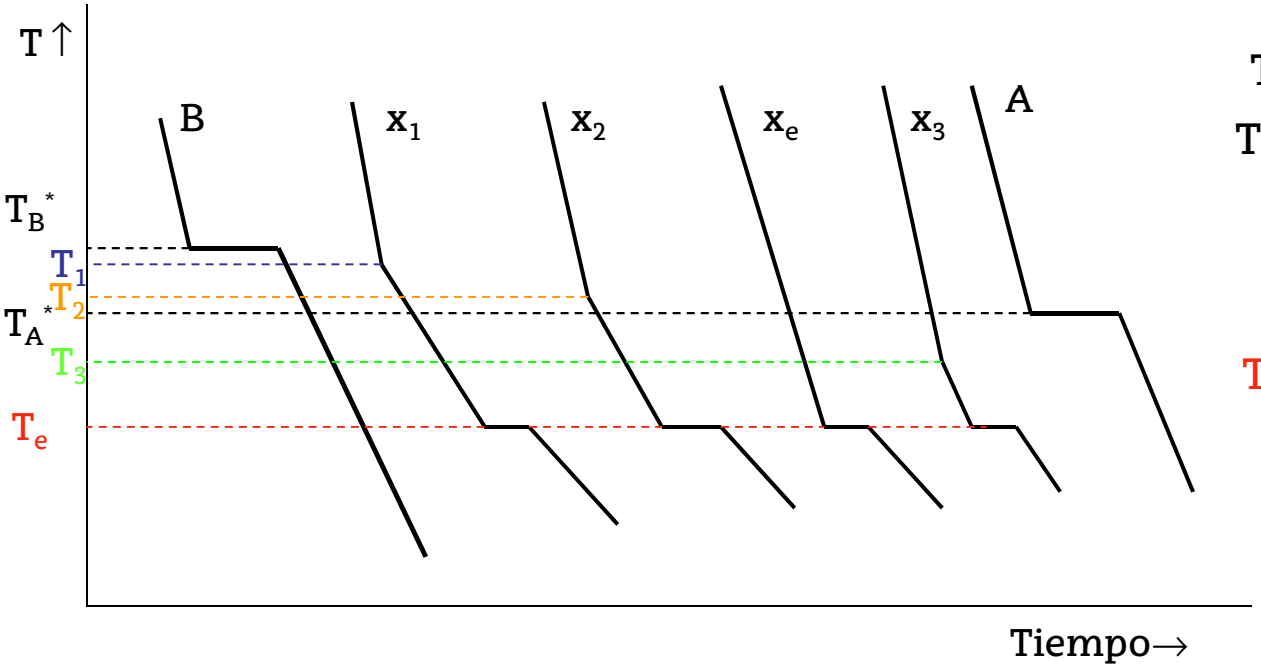
T-x diagrama nahasteen T_{fus} neurtuz. **Analisi termikoa (hozte kurbak)**

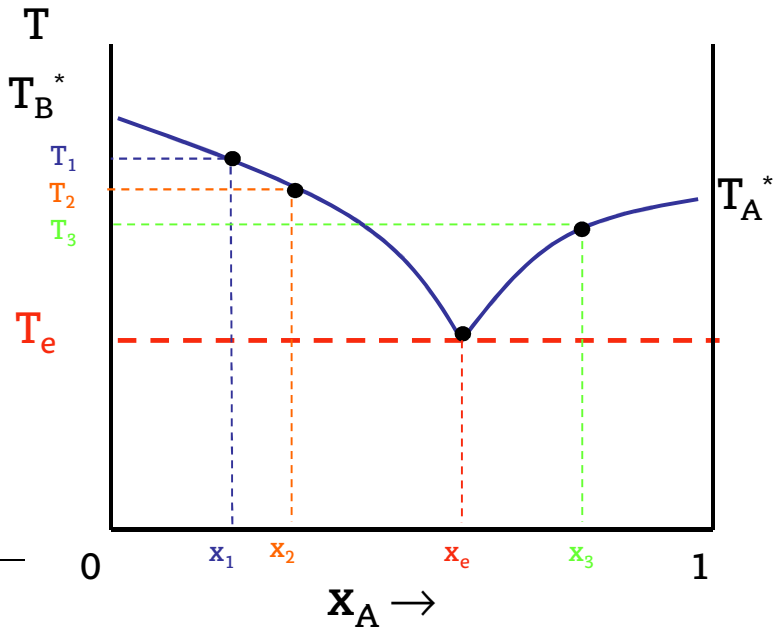
Eutektikoa – disoluzioa eta osagia solidoak aldi berean. Tf^{us} minimoa

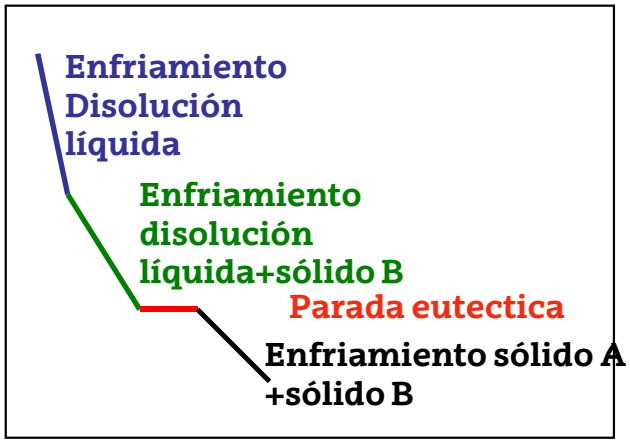


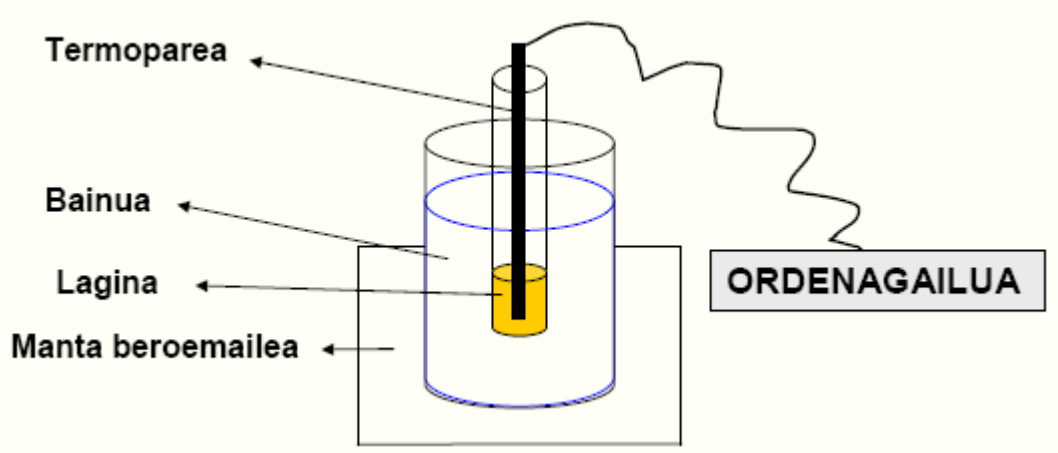
❖ Analisi Termikoa:

Konposizio ezaguneko nahasteen hozte kurbatik T_{fus}









❖ Fusio Entalpiak:

$x > x_{eutec}$

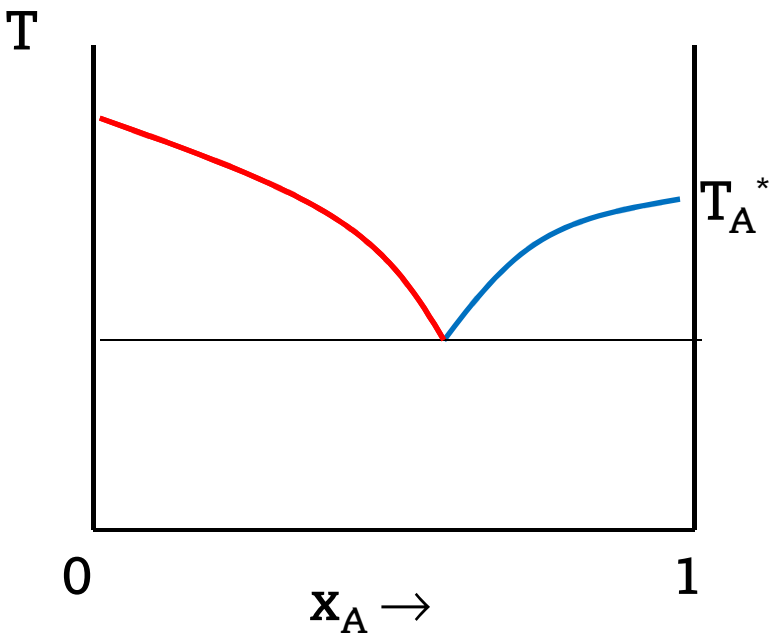
$$\ln x_A = \frac{\Delta H_{fus,A}}{R T^*_{fus,A}} - \frac{\Delta H_{fus,A}}{R} \frac{1}{T_{fus}}$$

y = o.o. + malda x

$x < x_{eutec}$

$$\ln x_B = \frac{\Delta H_{fus,B}}{R T^*_{fus,B}} - \frac{\Delta H_{fus,B}}{R} \frac{1}{T_{fus}}$$

y = o.o. + malda x



- ✓ Alderatu ΔH_{fus} hauek eta handbook-ekoak
- ✓ Konparatu T_e eta x_e esperiamentalak eta idealak