MET6208 – Contrôle II – le 23 nov., 2017

Solutionnaire

Question 1

(i) $\Delta h = -100/100 = -1.00$ kJ/mol

(ii) $\Delta h_B = d\Delta H/dn_B \approx \frac{\Delta(\Delta H)}{\Delta n_B} = \frac{-670}{1.0} = -670$ J/mol

(iii) $\Delta h = X_A \Delta h_A + X_B \Delta h_B$

$-1000 = 0.4\,\Delta h_A + 0.6(-670)$

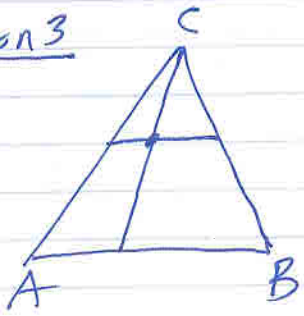
$\Delta h_A = -1495$ J/mol.

Question 2

$$\begin{cases} n_{Na^+} = 2(80) = 160 \\ n_{Ca^{2+}} = 80 \\ n_{SiO_4^{4-}} = 10 \\ n_{O^=} = 80 + 80 - 2(10) = 140 \end{cases}$$

$$a_{Na_2O} = X_{Na^+}^2 \cdot X_{O^=} = \left(\frac{160}{160+80}\right)^2 \left(\frac{140}{140+10}\right) = 0.415$$

Question 3



Kohler/Toop

$$g^E = X_A X_B \left[a_1 + \frac{X_B}{X_A + X_B} \cdot b_1 + \left(\frac{X_B}{(X_A + X_B)}\right)^2 c_1 \right]$$

$$+ X_B X_C \left[a_2 + b_2 (1 - 2X_C) \right]$$

$$+ X_C X_A \left[a_3 + b_3 X_C \right]$$

Question 4

(i) $g = (X_A X_X g^\circ_{AX} + X_B X_Y g^\circ_{BY} + X_B X_X g^\circ_{BX} + X_A X_Y g^\circ_{AY})$
$+ RT(X_A \ln X_A + X_B \ln X_B + X_X \ln X_X + X_Y \ln X_Y)$

$X_A = 0.4$ $\quad X_X = 0.4$
$X_B = 0.6$ $\quad X_Y = 0.6$

$g = [(0.16)(-100) + 0.36(-50) + 0.24(-100) + 0.24(-150)] \times 10^3$
$+ 2RT(0.4 \ln 0.4 + 0.6 \ln 0.6)$

$= -94000 + 2(8.315)(1000)(-0.6730)$
$= -105,192$

$0.4\,AX + 0.6\,BY = 1.0$ (Solution)

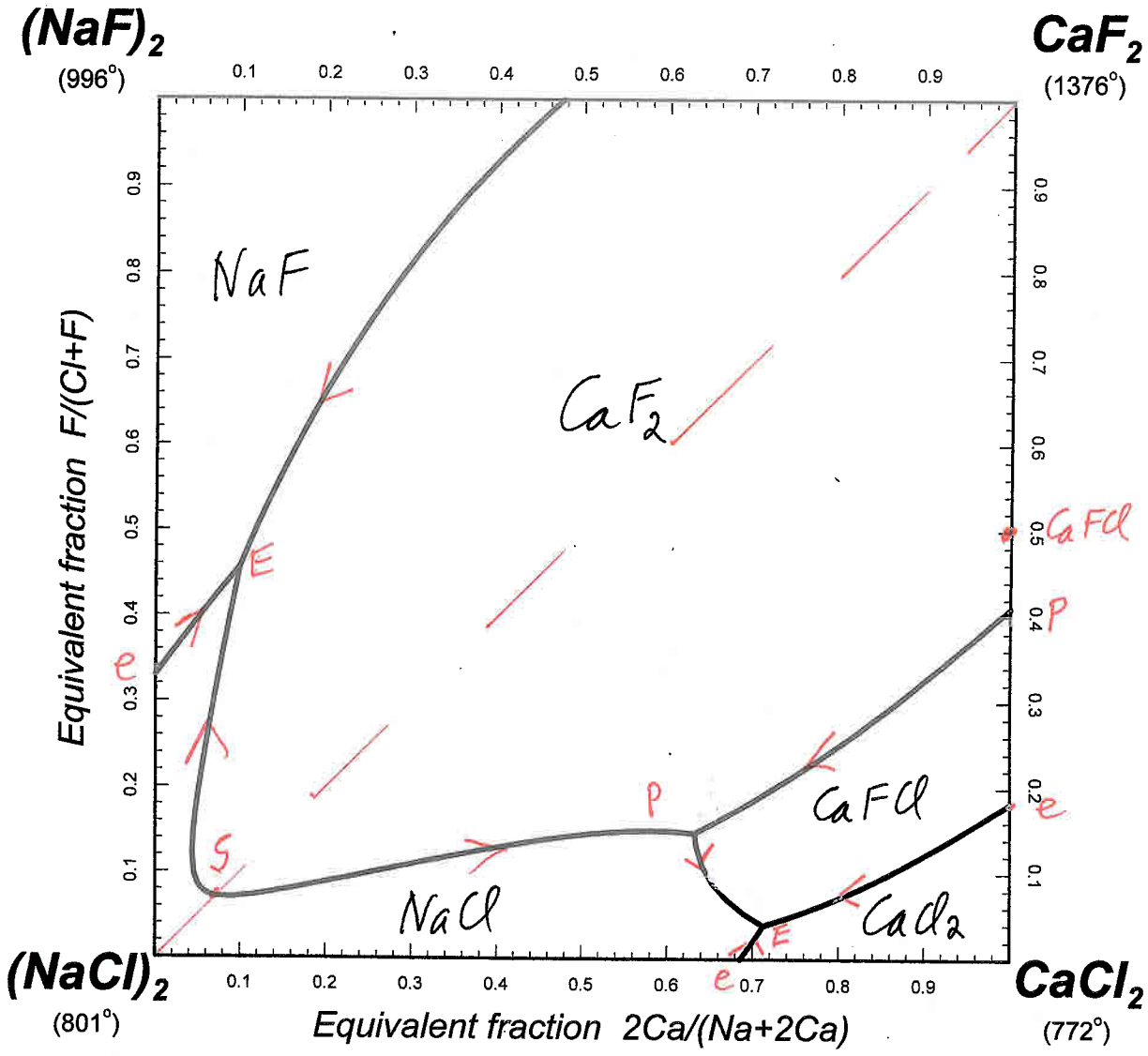
$\Delta G = -105192 - 0.4 g^\circ_{AX} - 0.6 g^\circ_{BX}$

$= -105,192 - 0.4(100,000) - 0.6(-50,000)$
$= -35192\ J.$

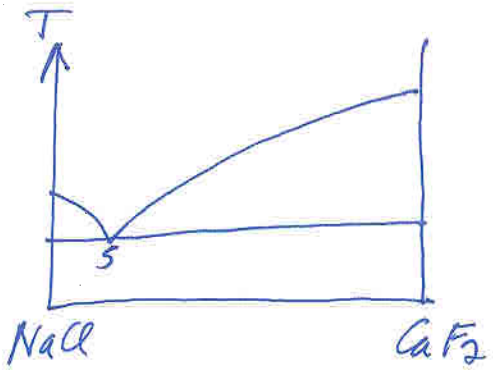
(ii) Le SRO permet la solution de diminuer son enthalpie libre.
Donc g et ΔG sont réduite.

Question 5

(i)



(ii)



(iii)