Exercise 9-3

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$T = 300\ K \qquad p = 2\ atm \qquad volume\ V$

1 kmol He	2 kmol Ne	3 kmol Ar

$x_{He} = \frac{1}{6}$ $\qquad p_{He} = x_{He}\, p = \frac{1}{6} \cdot 2 = \frac{1}{3}\ atm$

$x_{Ne} = \frac{2}{6} = \frac{1}{3}$ $\qquad p_{Ne} = x_{Ne}\, p = \frac{1}{3} \cdot 2 = \frac{2}{3}\ atm$

$x_{Ar} = \frac{3}{6} = \frac{1}{2}$ $\qquad p_{Ar} = x_{Ar}\, p = \frac{1}{2} \cdot 2 = 1\ atm$

$$\Delta G = nRT \sum_i x_i \ln(x_i)$$

$$= 6 \times 10^3 \times 8{,}314 \times 300 \times \left(\frac{1}{6} \ln\left(\frac{1}{6}\right) + \frac{1}{3} \ln\left(\frac{1}{3}\right) + \frac{1}{2} \ln\left(\frac{1}{2}\right) \right) =$$

$$-1{,}51 \cdot 10^7\ J$$

$$S = -\left(\frac{\partial G}{\partial T}\right)_p \Rightarrow S = \frac{-\Delta G}{T} = 5{,}05 \cdot 10^4\ J K^{-1}$$