

2. FIZIKAI KÉMIA ZÁRTHELYI DOLGOZAT**MEGOLDÁSVÁZLATOK**

(2013. április 23.)

1. feladat ld. jegyzet.

2. feladat $p_{forr} = 0,5 \cdot 11929 + 0,5 \cdot 3317 = 7623 \text{ Pa}$ és $p_{kond} = \left(\frac{0,5}{11929} + \frac{0,5}{3317} \right)^{-1} = 5190 \text{ Pa}$.
 40 Torr = 5333 Pa, tehát folyadék-gőz egyensúly alakul ki 40 Torr nyomáson.
 $x_t = \frac{5333-11929}{3317-11929} = 0,766$, $y_t = \frac{5333^{-1}-11929^{-1}}{3317^{-1}-11929^{-1}} = 0,476$, $\frac{n_g}{n_f} = \frac{0,5-0,766}{0,476-0,5} = 11,3$ ($\frac{n_f}{n_g} = 0,0888$)

3. feladat

$$\text{a) } \Delta_{pár}H = -R \cdot \frac{d \ln p}{d \frac{1}{T}} = -\frac{R}{\lg e} \cdot \frac{d \lg p}{d \frac{1}{T}} = -8,314 \cdot \frac{(-2596,876)}{0,434} = 49,713 \frac{\text{kJ}}{\text{mol}}.$$

$$\text{b) } T_{forr} = \frac{2596,876}{(7,967 - \lg 760)} = 510,6 \text{ K} = 237,4 \text{ °C és } \Delta_{pár}S = \frac{\Delta_{pár}H}{T_{forr}} = 97,37 \frac{\text{J}}{\text{mol K}}.$$

4. feladat $n_e = \frac{461}{58,3} = 7,907 \text{ mol}$, $n_v = \frac{570}{18,04} = 31,596 \text{ mol}$. $v_e = \frac{(461+570-31)-31,596 \cdot 17,9}{7,907} = 54,94 \frac{\text{cm}^3}{\text{mol}}$.

5. feladat $x_v = \frac{p}{p^*} = \frac{3123}{3167} = 0,9861$, $x_K = 1 - 0,9861 = 0,01389$. 0,9861 mol víz 17,75 g, ebben $17,75 \frac{4,5}{95,5} = 0,836 \text{ g}$ karbamid van, ami 0,01389 mol. $M = \frac{0,836}{0,01389} = 60,2 \frac{\text{g}}{\text{mol}}$.

6. feladat $\left(\frac{\partial H}{\partial p} \right)_{T,n} = \left(\frac{\partial H}{\partial p} \right)_{S,n} + \left(\frac{\partial H}{\partial S} \right)_{p,n} \left(\frac{\partial S}{\partial p} \right)_{T,n} = V + T \left(\frac{\partial S}{\partial p} \right)_{T,n}$. G-n keresztül Maxwell: $\left(\frac{\partial S}{\partial p} \right)_{T,n} = - \left(\frac{\partial V}{\partial T} \right)_{p,n}$.
 alapján: $\left(\frac{\partial H}{\partial p} \right)_{T,n} = V - T \left(\frac{\partial V}{\partial T} \right)_{p,n} = V - TV\alpha$, mivel $\alpha = \frac{1}{V} \left(\frac{\partial V}{\partial T} \right)_{p,n}$.