

RESITVE NALOG (Raztopline)

1. $n(\text{NaCl}) = 3 \text{ mol}$

$V_r = 12 \text{ L}$

$c(\text{NaCl}) = \frac{n}{V} = \frac{3 \text{ mol}}{12 \text{ L}} = \underline{\underline{0,25 \text{ mol/L} (0,25 \text{ M})}}$

2. $V_r(\text{HNO}_3) = 200 \text{ mL}$

$m_r = 280 \text{ g}$

$\rho(\text{HNO}_3) = \frac{m_r}{V_r} = \frac{280 \text{ g}}{200 \text{ mL}} = \underline{\underline{1,4 \text{ g/mL}}}$

3. $m_r = 250 \text{ g}$

$\omega = 0,20$

$t = \text{topljenec}; v \text{ naravnem primira saharoza}$

$\omega = \frac{m_t}{m_r} \Rightarrow m_t = \omega \cdot m_r = 0,20 \cdot 250 \text{ g} = \underline{\underline{50 \text{ g}}}$

4. $m(\text{KI}) = 2,5 \text{ g}$

$V_r = 360 \text{ mL}$

$n(\text{KI}) = \frac{m}{M} = \frac{2,5 \text{ g}}{166 \text{ g/mol}} = \underline{\underline{0,015 \text{ mol}}}$

$c(\text{KI}) = \frac{n(\text{KI})}{V_r} = \frac{0,015 \text{ mol}}{0,36 \text{ L}} = \underline{\underline{0,042 \text{ mol/L}}}$

5. $m_r = 1000 \text{ g}$

$\omega = 0,1$

$m(\text{NaCl}) = 6 \text{ g}$

$m_t = \omega \cdot m_r = 0,1 \cdot 1000 \text{ g} = \underline{\underline{100 \text{ g}}}$

$m_{t \text{ konec}} = m_t(\text{v rast.}) + m_t(\text{dodan}) = 100 \text{ g} + 6 \text{ g} = \underline{\underline{106 \text{ g}}}$

$m_r \text{ konec} = m_r + m_t(\text{dodan}) = 1000 \text{ g} + 6 \text{ g} = \underline{\underline{1006 \text{ g}}}$

$\omega = \frac{m_{t \text{ konec}}}{m_r \text{ konec}} = \frac{106 \text{ g}}{1006 \text{ g}} = 0,105 \Rightarrow \underline{\underline{10,5\%}}$

$$\begin{aligned}
 G. \quad m_{r1} &= 250 \text{ g} \\
 \omega_1 &= 0,23 \\
 m_{r2} &= 620 \text{ g} \\
 \omega_2 &= 0,12
 \end{aligned}$$

$$m_1(\text{Na}_2\text{SO}_4) = \omega_1 \cdot m_{r1} = 0,23 \cdot 250 \text{ g} = \underline{57,5 \text{ g}}$$

$$m_2(\text{Na}_2\text{SO}_4) = \omega_2 \cdot m_{r2} = 0,12 \cdot 620 \text{ g} = \underline{74,4 \text{ g}}$$

$$m(\text{Na}_2\text{SO}_4)_{\text{po mešanju}} = 57,5 \text{ g} + 74,4 \text{ g} = \underline{131,9 \text{ g}}$$

$$m_r \text{ po mešanju} = m_{r1} + m_{r2} = 250 \text{ g} + 620 \text{ g} = \underline{870 \text{ g}}$$

$$\omega \text{ po mešanju} = \frac{m(\text{Na}_2\text{SO}_4)_{\text{po mešanju}}}{m_r \text{ po mešanju}} = \frac{131,9 \text{ g}}{870 \text{ g}} = \underline{\underline{0,15}}$$

$$\begin{aligned}
 F. \quad V_r(\text{KOH}) &= 130 \text{ mL} & V_r \text{ po razreditvi} &= 2 \text{ L} \\
 c(\text{KOH}) &= 2,5 \text{ M}
 \end{aligned}$$

$$n(\text{KOH}) = c(\text{KOH}) \cdot V_r(\text{KOH}) = 2,5 \text{ mol/L} \cdot 0,13 \text{ L} = \underline{0,325 \text{ mol}}$$

$$c(\text{KOH})_{\text{po razreditvi}} = \frac{n(\text{KOH})}{V_r \text{ po raz.}} = \frac{0,325 \text{ mol}}{2 \text{ L}} = \underline{\underline{0,16 \text{ mol/L}}}$$

$$\begin{aligned}
 8. \quad V_{r1}(\text{NaCl}) &= 250 \text{ mL} & 1 \text{ cm}^3 &= 1 \text{ mL} \\
 c_1(\text{NaCl}) &= 2,1 \text{ mol/L} \\
 V_{r2}(\text{NaCl}) &= 500 \text{ mL} \\
 \omega_2 &= 0,12 \\
 \rho_2 &= 1,09 \text{ g/mL}
 \end{aligned}$$

$$n_1(\text{NaCl}) = c \cdot V = 2,1 \text{ mol/L} \cdot 0,25 \text{ L} = \underline{0,53 \text{ mol}}$$

$$\rho_2 = \frac{m_{r2}}{V_{r2}} \Rightarrow m_{r2} = \rho_2 \cdot V_{r2}(\text{NaCl}) = 1,09 \text{ g/mL} \cdot 500 \text{ mL} = \underline{545 \text{ g}}$$

$$\omega_2 = \frac{m_2(\text{NaCl})}{m_{r2}} \Rightarrow m_2(\text{NaCl}) = \omega_2 \cdot m_{r2} = 0,12 \cdot 545 \text{ g} = \underline{65,4 \text{ g}}$$

$$n_2(\text{NaCl}) = \frac{m_2(\text{NaCl})}{M(\text{NaCl})} = \frac{65,4 \text{ g}}{58,5 \text{ g/mol}} = \underline{1,12 \text{ mol}}$$

$$n_3(\text{NaCl})_{\text{po mešanju}} = n_1(\text{NaCl}) + n_2(\text{NaCl}) = 0,53 \text{ mol} + 1,12 \text{ mol} = \underline{1,65 \text{ mol}}$$

$$V_3(\text{NaCl}) = V_{r1} + V_{r2} = 250 \text{ mL} + 500 \text{ mL} = 750 \text{ mL} = \underline{0,75 \text{ L}}$$

$$c_3(\text{NaCl})_{\text{po mešanju}} = \frac{n_3(\text{NaCl})_{\text{po mešanju}}}{V_3(\text{NaCl})} = \frac{1,65 \text{ mol}}{0,75 \text{ L}} = 2,2 \text{ mol/L} = \underline{\underline{2,2 \text{ M}}}$$

9. $V_r(\text{LiBr}) = 2,5 \text{ L} = 2500 \text{ mL}$ $\omega(\text{LiBr})_{\text{po odparavanju}} = 0,15$
 $c(\text{LiBr}) = 0,02 \text{ mol/L}$
 $\rho_r(\text{LiBr}) = 1,02 \text{ g/mL}$

$$\rho_r = \frac{m_r}{V_r} \Rightarrow m_{r, \text{izh.}} = \rho_r(\text{LiBr}) \cdot V_r(\text{LiBr}) = 1,02 \text{ g/mL} \cdot 2500 \text{ mL} = \underline{2550 \text{ g}}$$

$$n(\text{LiBr}) = c(\text{LiBr}) \cdot V_r(\text{LiBr}) = 0,02 \text{ mol/L} \cdot 2,5 \text{ L} = \underline{0,05 \text{ mol}}$$

$$m(\text{LiBr}) = n(\text{LiBr}) \cdot M(\text{LiBr}) = 0,05 \text{ mol} \cdot 86,8 \text{ g/mol} = \underline{4,34 \text{ g}}$$

$$\omega = \frac{m_{\text{izh.}}}{m_r} \Rightarrow m_r \text{ po odparavanju} = \frac{m(\text{LiBr})}{\omega_{\text{po odp.}}} = \frac{4,34 \text{ g}}{0,15} = \underline{28,9 \text{ g}}$$

$$m(\text{H}_2\text{O})_{\text{odpari}} = m_r \text{ izh.} - m_r \text{ po odparavanju} = 2550 \text{ g} - 28,9 \text{ g} = \underline{2521,1 \text{ g}}$$

10. $\omega(\text{HCl}) = 0,36$
 $\rho_r(\text{HCl})_{36\%} = 1,18 \text{ g/mL}$
 $m(\text{Zn}) = 145 \text{ g}$

$m(\text{HCl})_{100\%}$ pomeni množino čistega toplice
 $m(\text{HCl})_{36\%}$ pomeni masa 36% raztopine klorovodikove kisline



$$n(\text{Zn}) = \frac{m(\text{Zn})}{M(\text{Zn})} \Rightarrow m(\text{HCl})_{100\%} = 2 \cdot n(\text{Zn}) = 2 \cdot 2,23 \text{ mol} = \underline{4,46 \text{ mol}}$$

$$m(\text{Zn}) = \frac{m(\text{Zn})}{M(\text{Zn})} = \frac{145 \text{ g}}{65,4 \text{ g/mol}} = \underline{2,23 \text{ mol}}$$

$$m(\text{HCl})_{100\%} = \omega \cdot m_r(\text{HCl})_{36\%} \Rightarrow m_r(\text{HCl})_{36\%} = \frac{m(\text{HCl})_{100\%}}{\omega} = \frac{462,8 \text{ g}}{0,36} = \underline{1282,8 \text{ g}}$$

$$m(\text{HCl})_{100\%} = n(\text{HCl})_{100\%} \cdot M(\text{HCl}) = 4,46 \text{ mol} \cdot 36,5 \text{ g/mol} = \underline{162,2 \text{ g}}$$

$$V_r(\text{HCl})_{36\%} = \frac{m_r(\text{HCl})_{36\%}}{\rho_r(\text{HCl})_{36\%}} = \frac{1282,8 \text{ g}}{1,18 \text{ g/mL}} = \underline{1086,2 \text{ mL}}$$

11. $m_r = 840 \text{ g}$
 $\omega = 0,25$

$$m_{\text{izh.}}(\text{C}_6\text{H}_{12}\text{O}_6) = \omega \cdot m_r = 0,25 \cdot 840 \text{ g} = \underline{210 \text{ g}}$$

$$n(\text{C}_6\text{H}_{12}\text{O}_6) = \frac{m_{\text{izh.}}(\text{C}_6\text{H}_{12}\text{O}_6)}{M(\text{C}_6\text{H}_{12}\text{O}_6)} = \frac{210 \text{ g}}{180 \text{ g/mol}} = \underline{1,17 \text{ mol}}$$

$$N(\text{C}_6\text{H}_{12}\text{O}_6) = n(\text{C}_6\text{H}_{12}\text{O}_6) \cdot N_A = 1,17 \text{ mol} \cdot 6,023 \cdot 10^{23} \text{ molekul/mol} =$$

$$= \underline{7,05 \cdot 10^{23} \text{ molekul}}$$

$$12. m_{r1} = 800 \text{ g}$$

$$\omega_1 = 0,1$$

$$m_{r2} = 1520 \text{ g}$$

$$\omega_2 = 0,09$$

Število ionov v raztopini: Če KNO_3 damo v vodo nastanejo K^+ in NO_3^- ioni, to pomeni, da je 2x večja množina ionov v raztopini, kot se je raztopila množina KNO_3 .

$$m_{t1}(\text{KNO}_3) = \omega_1 \cdot m_{r1} = 0,1 \cdot 800 \text{ g} = \underline{80 \text{ g}}$$

$$m_{t2}(\text{KNO}_3) = \omega_2 \cdot m_{r2} = 0,09 \cdot 1520 \text{ g} = \underline{136,8 \text{ g}}$$

$$m_t(\text{KNO}_3) \text{ po mešanju} = (m_{t1}(\text{KNO}_3) + m_{t2}(\text{KNO}_3)) = 80 \text{ g} + 136,8 \text{ g} = \underline{216,8 \text{ g}}$$

$$\omega \text{ po mešanju} = \frac{m_t(\text{KNO}_3) \text{ po mešanju}}{m_r \text{ po mešanju}} = \frac{216,8 \text{ g}}{2320 \text{ g}} = \underline{0,093}$$

$$m_r \text{ po mešanju} = m_{r1} + m_{r2} = 800 \text{ g} + 1520 \text{ g} = \underline{2320 \text{ g}}$$

$$m_t(\text{KNO}_3) \text{ v } 0,5 \text{ kg raztopine} = \omega \cdot m_{r,0,5 \text{ kg}} = 0,093 \cdot 500 \text{ g} = \underline{46,7 \text{ g}}$$

$$n(\text{KNO}_3) \text{ v } 0,5 \text{ kg} = \frac{m_t(\text{KNO}_3) \text{ v } 0,5 \text{ kg}}{M(\text{KNO}_3)} = \frac{46,7 \text{ g}}{101,1 \text{ g/mol}} = \underline{0,46 \text{ mol}}$$

$$N(\text{K}^+, \text{NO}_3^-) \text{ v } 0,5 \text{ kg} = 2 \cdot n(\text{KNO}_3) \cdot N_A = 2 \cdot 0,46 \text{ mol} \cdot 6,023 \cdot 10^{23} \text{ ionov/mol} = \underline{5,6 \cdot 10^{23} \text{ ionov}}$$