

28

$$V_r = 2L$$

$$\rho_r = 1,058 \text{ g/ml}$$

$$\Delta H_{\text{neutralization}} = -4,23 \text{ kJ/g}$$

$$\Delta T = 57,1K$$

$$C_p = 4,2 \text{ J/g}\cdot\text{K}$$

$$C = 2$$

$$W = 2$$

$$m_{\text{NaOH}} \cdot \Delta H_{\text{neut}} = m_r \cdot c_p \cdot \Delta T$$

$$m_{\text{NaOH}} = \frac{V_r \cdot \rho_r \cdot c_p \cdot \Delta T}{\Delta H_{\text{neut}}}$$

$$m_{\text{NaOH}} = \frac{2L \cdot 1,058 \frac{\text{g}}{\text{ml}} \cdot 4,2 \frac{\text{J}}{\text{g}\cdot\text{K}} \cdot 57,1K}{-4,23 \frac{\text{kJ}}{\text{g}}}$$

$$\underline{m_{\text{NaOH}} = 120 \text{ g}}$$

$$c = \frac{m}{V} = \frac{m}{n \cdot V} = \frac{120 \text{ g} \cdot \text{mol}}{60 \text{ g} \cdot 2L} = \boxed{1,5}$$

$$W = \frac{m_{\text{NaOH}} \cdot 100\%}{m_{\text{rinitial}}} = \frac{120 \text{ g} \cdot L \cdot 100\%}{2L \cdot 1058 \text{ g}}$$

$$\underline{W = 5,67\%}$$

30

$$w_{H_2SO_4} = 96\%$$

$$\rho = 1,835 \text{ g/cm}^3$$

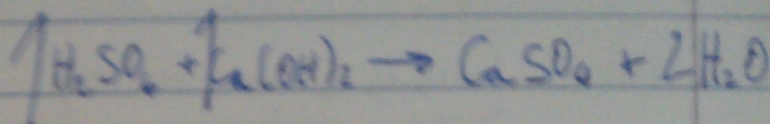
$$V_r = 10 \text{ L}$$

$$c_r = 0,125 \text{ mol/L}$$

$$\gamma_{Ca(OH)_2} = 100 \text{ g/L}$$

$$V_{H_2SO_4} = ?$$

$$V_{Ca(OH)_2} = ?$$



$$V_{H_2SO_4} = \frac{V_r \cdot c_r \cdot M_{H_2SO_4}}{w_{H_2SO_4} \cdot \rho_{H_2SO_4}}$$

$$V_{H_2SO_4} = \frac{10 \text{ L} \cdot 0,125 \text{ mol/L} \cdot 98 \text{ g/mol}}{0,96 \cdot 1,835 \text{ g/cm}^3}$$

$$V_{H_2SO_4} = 69,5 \text{ cm}^3 = \text{ml}$$

$$V_{Ca(OH)_2} = \frac{V_r \cdot c_r \cdot M_{Ca(OH)_2}}{\gamma_{Ca(OH)_2}} = \frac{10 \text{ L} \cdot 0,125 \text{ mol/L} \cdot 74 \text{ g/mol}}{100 \text{ g/L}}$$

$$V_{Ca(OH)_2} = 0,925 \text{ L}$$

31 $\Psi_{O_2} = 20,0\%$

$V_{s.pl.} = 1,00 \text{ m}^3$

interni plin; $\Psi_{H_2} = 44,0\%$

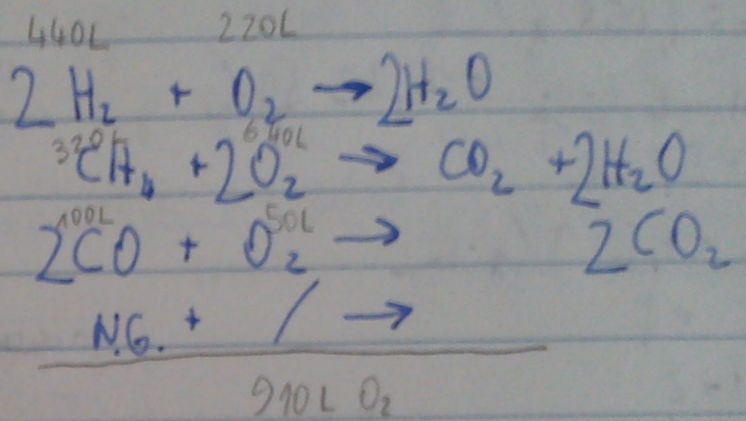
$\Psi_{CH_4} = 32,0\%$

$\Psi_{CO} = 10,0\%$

$\Psi_{n.p.} = 14,0\%$

$V_{ZRAK} = ?$

↓
nezgorljivi
plin



$910 \times 5 = 4550L$

$V_{ZRAK} = 4550L$ ✓

32 ZER. PLIN

$$\psi_{CH_4} = 95\%$$

$$\psi_{N_2} = 5\%$$

PRESEĚC → $P_{ZRAK} = 15\%$

$$T = 200^\circ C$$

$$P = 1 \text{ bar}$$

ZRAK:

$$\psi_{N_2} = 78\%$$

$$\psi_{O_2} = 20\%$$

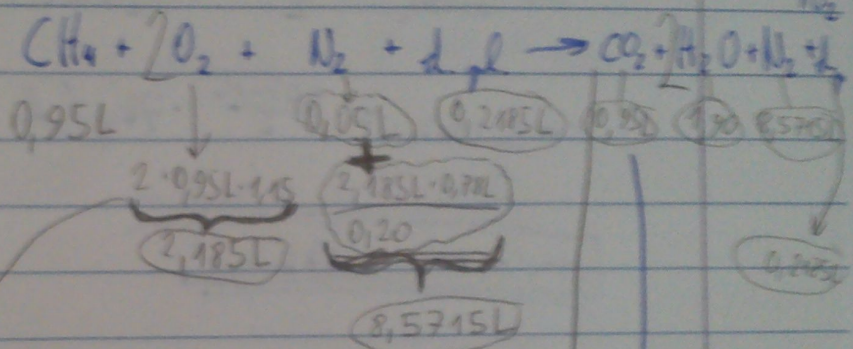
$$\psi_{D.P.L.} = 2\%$$

PREO $\psi_{CH_4} = ?$

$$\psi_{CO_2} = ?$$

$$\psi_{CH_4}^{PREO} = \frac{0,95L}{11,925L}$$

$$\psi_{CH_4} = 7,97\%$$



$$\sum V = 11,925L$$

$$\psi_{CO_2} = 7,97\%$$

38

$$V_K = 10L$$

$$W_K = 37\%$$

$$\rho_{HCl} = 1,185 \text{ g/ml}$$

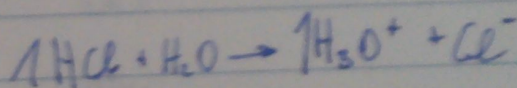
$$V_{H_2O}^{pH=6} = ?$$

$$m_{Ca(OH)_2} = ?$$

$$pH = -\log [H_3O^+]$$

$$m_{H_3O^+} = \frac{V_K \cdot \rho_{HCl} \cdot W_K}{M_{HCl}}$$

$$m_{H_3O^+} = \frac{10L \cdot 1,185 \frac{g}{ml} \cdot 0,37 \cdot mol}{36,5 g} = 120 \text{ mol}$$

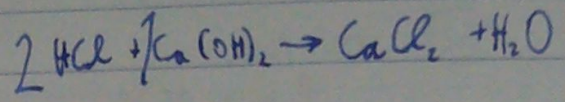


$$C_{H_3O^+} = 10^{-6} \frac{mol}{L} \quad \left\{ \begin{array}{l} pH=6 \end{array} \right.$$

$$V_{H_2O} = \frac{m}{C_{H_3O^+}} = \frac{120 \text{ mol} \cdot L}{10^{-6} \frac{mol}{L}} =$$

$$V_{H_2O} = 1,2 \cdot 10^8 L \Leftrightarrow 1,2 \cdot 10^5 m^3$$

$$m_{Ca(OH)_2} = \frac{n_{H_2O^+}}{2} \cdot M_{Ca(OH)_2}$$



$$m_{Ca(OH)_2} = \frac{120 \text{ mol}}{2} \cdot 74 \text{ g/mol}$$

$$m_{Ca(OH)_2} = 4440 \text{ g}$$

39

$$V_k = 6 \text{ L}$$

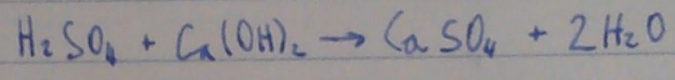
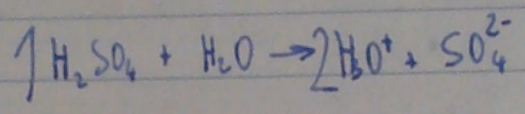
$$W_{H_2SO_4} = 98\%$$

$$S = 1,84 \text{ kg/dm}^3$$

$$V_{H_2O}^{pH=6} = ?$$

$$V_{H_2O}^{pH=2 \rightarrow pH=3} = ?$$

$$m_{Ca(OH)_2} = ?$$



$$m_{H_2SO_4} = \frac{V_k \cdot S \cdot W_{H_2SO_4}}{M_{H_2SO_4}} = \frac{6 \text{ L} \cdot 1,84 \text{ kg/L} \cdot 98\%}{98 \text{ g/mol}}$$

$$m_{H_3O^+} = 220,8 \text{ mol}$$

$$V_{H_2O}^{pH=6} = \frac{220,8 \text{ mol}}{10^{-6} \text{ mol/L}} = 2,21 \cdot 10^8 \text{ L}$$

$$V_{H_2O}^{pH=3} = \frac{220,8 \text{ mol}}{10^{-3} \text{ mol/L}} = 2,21 \cdot 10^5 \text{ L}$$

$$V_{H_2O}^{pH=2} = \frac{220,8 \text{ mol}}{10^{-2} \text{ mol/L}} = 2,21 \cdot 10^4 \text{ L}$$

$$\Delta V = 1,98 \cdot 10^5 \text{ L}$$

$$198 \text{ m}^3$$

$$m_{Ca(OH)_2} = m_{H_2SO_4} \cdot M_{Ca(OH)_2}$$

$$m_{Ca(OH)_2} = \frac{n_{H_2O^+}}{2} \cdot 74 \text{ g/mol}$$

$$m_{Ca(OH)_2} = 8,17 \text{ kg}$$

(reakcija)

6) $V_B = 10 \text{ m}^3$
 $c_{\text{H}_2\text{SO}_4} = 0,05 \text{ mol/L}$
 $m_{\text{APNO}} = 3700 \text{ kg}$
 $W_{\text{APNO}} = 98\%$

$$m_{\text{H}_2\text{SO}_4} = c \cdot V = 10 \cdot 0,05 \frac{\text{mol}}{\text{m}^3}$$

$$m_{\text{H}_2\text{SO}_4} = 500 \text{ mol}$$

$$pH = ?$$

$$m_{\text{APNO}} = ?$$

$$m_{\text{Ca(OH)}_2} = \frac{m_{\text{APNO}} \cdot W_{\text{APNO}}}{M_{\text{Ca(OH)}_2}} = \frac{37000 \text{ g} \cdot 0,98 \text{ mol}}{74 \text{ g}}$$

$$m_{\text{Ca(OH)}_2} = 490 \text{ mol}$$

$$\Delta m_{\text{H}_2\text{SO}_4} = 10 \text{ mol}$$

$$pH = -\log \left(\frac{n}{V} \right)$$
$$pH = -\log \frac{10 \text{ mol} \cdot 2}{10000 \text{ L}}$$

$$pH = 2,7$$

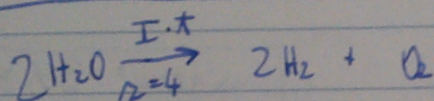
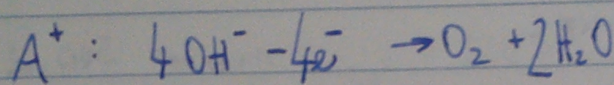
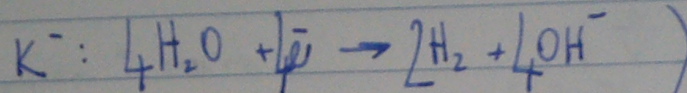
$$m_{\text{APNO}} = m_{\text{H}_2\text{SO}_4} \cdot \frac{M_{\text{Ca(OH)}_2}}{W_{\text{APNO}}}$$

$$m_{\text{APNO}} = 500 \text{ mol} \cdot \frac{74 \text{ g}}{\text{mol} \cdot 0,98}$$

$$m_{\text{APNO}} = 37,8 \text{ kg}$$

$$\Delta m_{\text{APNO}} = 0,8 \text{ kg}$$

33



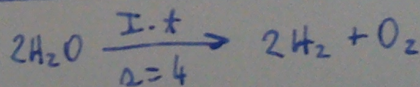
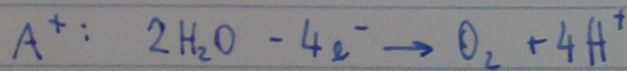
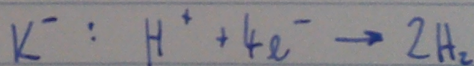
BAZA

4 · 1 F 3 mol PLN ZMESI

4 · 96490 Ag 3 mol · 22,4 L/mol

10A · 30s · 0,7 X X

$$x = V_{T.p.} =$$



KISLINA

6. $T = 25^\circ\text{C}$

$\text{SEM} = 5,5\%$

$p_2 = 1,00 \text{ bar}$

$\Delta H = 35,01 \text{ kJ/mol}$

$T_2 = 64,6^\circ\text{C}$

$p_2 = 1 \text{ bar}$

$$p_1 = p_2 \cdot e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$p_1 = 1 \cdot e^{-\frac{3501 \cdot 1000}{8,314} \cdot \left(\frac{1}{298} - \frac{1}{337,6} \right)}$$

$p_1 = 0,191 \text{ bar}$

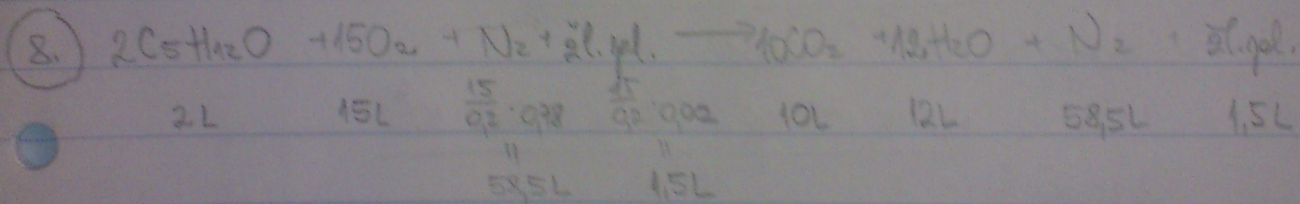
$$\psi^{25^\circ} = \frac{p_1}{p_2} \cdot 100\% = \frac{0,191}{1 \text{ bar}} \cdot 100\% = 19,1\%$$

TRSEŽENA!

$$T_{\text{SEM}} = \left(-\frac{(\ln p_1 - \ln p_2) \cdot R}{\Delta H} + \frac{1}{T_2} \right)^{-1}$$

$$T_{\text{SEM}} = \left(-\frac{(\ln 0,055 - \ln 1) \cdot 8,314}{35,01 \cdot 10^3} + \frac{1}{337,6} \right)^{-1}$$

$T_{\text{SEM}} = 0,9^\circ\text{C}$



1.) $\psi_{\text{CO}_2} = \frac{V_{\text{CO}_2}}{V_s} \cdot 100\% = \frac{10\text{L}}{82\text{L}} \cdot 100\% = 12,195\%$

$Q_{\text{NH}_3} \cdot 100\% = \text{SEM} \cdot Q_{\text{NH}_3}$

12. $\text{SEM} = 15\%$ $Q_{\text{REAK}} < \frac{\text{SEM}}{\text{SEM}}$

$\text{SEM} = 28\%$ $2,20 \cdot 100 = 15 \cdot 2,20$

$Q_{\text{REAK}} < 15$

$Q_{\text{REAK}} < 12,47 \text{ m}^3/\text{min}$

$$(13.) \text{SEM} = 15\%$$

$$\text{ZEM} = 28\%$$

$$p = 1,5 \cdot 10^5 \text{ Pa}$$

$$T = 850^\circ \text{C}$$

$$m = 600 \text{ t}$$

$$p \cdot V = \frac{m}{M} \cdot R \cdot T$$

$$m \cdot R \cdot T$$

$$V = \frac{p \cdot M}{1000}$$

$$600 \cdot 1000 \cdot 8,314 \cdot 1123$$

$$V = 1,5 \cdot 10^5 \cdot 17$$

$$V = 2,197 \cdot 10^6 \text{ m}^3$$

$$\frac{V}{t} = \frac{2,197 \cdot 10^6}{24}$$

$$Q = \frac{V}{t} = \frac{2,197 \cdot 10^6}{24} = 9,1535 \cdot 10^4 \text{ m}^3/\text{h}$$

$$Q_{\text{NH}_3}$$

$$\text{SEM} < \frac{Q_{\text{NH}_3} + Q_{\text{ZRAK}}}{Q_{\text{NH}_3}} \cdot 100\%$$

$$\text{SEM} \cdot (Q_{\text{NH}_3} + Q_{\text{ZRAK}}) < Q_{\text{NH}_3} \cdot 100\%$$

$$\text{SEM} \cdot Q_{\text{NH}_3} + \text{SEM} \cdot Q_{\text{ZRAK}} < Q_{\text{NH}_3} \cdot 100\%$$

$$\text{SEM} \cdot Q_{\text{ZRAK}} < Q_{\text{NH}_3} \cdot 100\% - \text{SEM} \cdot Q_{\text{NH}_3}$$

$$Q_{\text{NH}_3} \cdot 100\% - \text{SEM} \cdot Q_{\text{NH}_3}$$

$$Q_{\text{ZRAK}} < \frac{\text{SEM}}{\text{SEM}}$$

$$9,1535 \cdot 10^4 \cdot 100\% - 15\% \cdot 9,1535 \cdot 10^4$$

$$Q_{\text{ZRAK}} < \frac{\quad}{15\%}$$

$$Q_{\text{ZRAK}} < - 85432 \frac{?}{?} \text{ m}^3/\text{h}$$

6

$$T_1 = 25^\circ\text{C} = 298\text{K}$$

$$\text{SEM} = 5,5\%$$

$$P_{\text{summi}} = 1\text{ bar}$$

$$T_2 = 64,6^\circ\text{C} = 337,6\text{K}$$

$$\Delta H = 35210\text{ J/mol} = 35210\text{ J/mol}$$

$$P_2 = 1\text{ bar}$$

$$P_1 = ?$$

$$T_1 = 25^\circ\text{C}$$

$$P_{\text{summi}} = ?$$

$$P_1 = P_2 \cdot e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$P_1 = 1 \cdot e^{-\frac{35210}{8,314} \left(\frac{1}{298} - \frac{1}{337,6} \right)}$$

$$P_1 = 0,189\text{ bar}$$

$$\psi^{25} = \frac{P_1}{P_{\text{summi}}} \cdot 100 = \frac{0,189}{1} \cdot 100 = 18,9\%$$

b) $P_1 = 0,055\text{ bar}$

$$T_1 = \frac{1}{-\frac{\ln(0,055) \cdot 8,314}{35210} + \frac{1}{337,6}}$$

$$T_1 = 274,2\text{K} = \underline{\underline{1,2^\circ\text{C}}}$$

5) $T_1 = 25^\circ\text{C} = 298\text{K}$

$$P_1 = P_2 \cdot e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$P_2 = 1\text{ bar}$$

$$\Delta H = 38,56 \text{ kJ/mol} = 38560 \quad P_1 = 1 \cdot e^{-\frac{38560}{8,314} \left(\frac{1}{298} - \frac{1}{351,4} \right)}$$

$$T_2 = 78,4^\circ\text{C} = 351,4\text{K}$$

$$P_1 = 0,0939 \text{ bar}$$

$$\text{SEM} = 3,5\%$$

$$P_{\text{skloni}} = 1\text{ bar}$$

$$\psi^{25^\circ\text{C}} = \frac{P_1}{P_{\text{skloni}}} = \frac{0,0939}{1} \cdot 100\% = 9,39\%$$

b) pri kakšni temp. je dosežena SEM 2%?

$$P_1 = 0,035\text{ bar}$$

$$P_1 = P_2 \cdot e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$\frac{P_1}{P_2} = e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$T_1 = \frac{1}{-\frac{\ln 0,035 \cdot 8,314}{38560} + \frac{1}{351,4}} = 280,2$$

$$\ln P_1 - \ln P_2 = -\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$T_1 = 280,2\text{K} \approx \underline{7,2^\circ\text{C}}$$

$$-\frac{\ln P_1 \cdot R}{\Delta H} + \frac{1}{T_2} = \frac{1}{T_1}$$

$$T_1 = \frac{1}{-\frac{\ln P_1 \cdot R}{\Delta H} + \frac{1}{T_2}}$$

1

$$\rho_{\text{max}} = \frac{P_{\text{min}}}{P_{\text{max}}} \rightarrow \frac{\eta_{\text{min}}}{\eta_{\text{max}}}$$

$$\begin{aligned} \eta_{\text{max}} &= \varphi_{\text{N}_2} \cdot \eta_{\text{N}_2} + \varphi_{\text{O}_2} \cdot \eta_{\text{O}_2} \\ &= 0,79 \cdot 28 + 0,21 \cdot 32 \\ &= 28,84 \end{aligned}$$

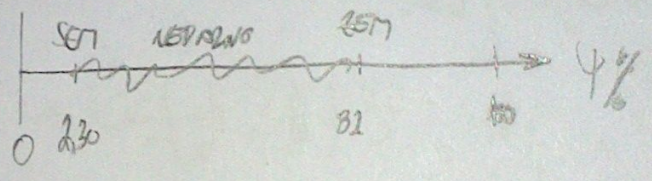
$$\rho_{\text{CO}} = \frac{P_{\text{CO}}}{P_{\text{max}}} = \frac{28}{28,84} = 0,971$$

$$\rho_{\text{CO}_2} = \frac{P_{\text{CO}_2}}{P_{\text{max}}} = \frac{44}{28,84} = 1,526$$

4

$$EO = 2,30 - 82\%$$

$$V_{\text{ZBRAVA}} = 200 \text{ m}^3$$



$$\begin{aligned} V_{\text{AC}}^{\text{SEM}} \\ V_{\text{AC}}^{\text{TEM}} \end{aligned}$$

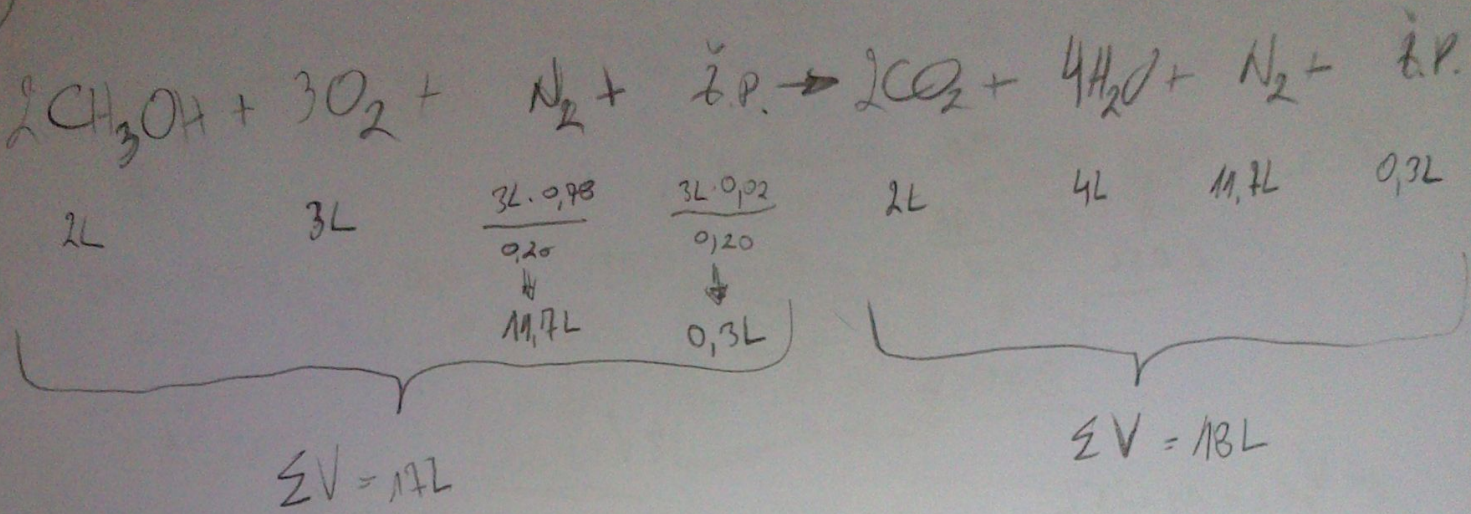
$$\text{SEM} > \frac{V_{\text{ac}}}{(V_{\text{ac}} + V_{\text{ZBRAVA}})} \cdot 100\%$$

$$\frac{\text{SEM}}{100} \rightarrow \frac{V_{\text{ac}}}{V_{\text{ac}}} + \frac{V_{\text{ac}}}{V_{\text{ZBRAVA}}}$$

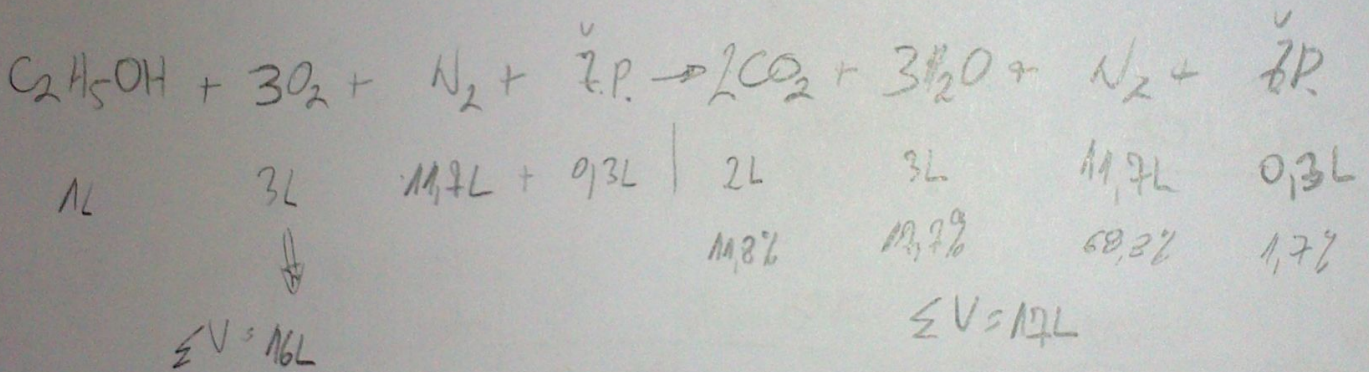
$$\frac{\text{SEM}}{100} - \frac{V_{\text{ac}}}{V_{\text{ac}}} > \frac{V_{\text{ac}}}{V_{\text{ZBRAVA}}} \quad / : V_{\text{ac}}$$

$$\frac{\text{SEM}}{100} - 1 > \frac{1}{V_{\text{ZBRAVA}}} \cdot V_{\text{ac}}$$

9

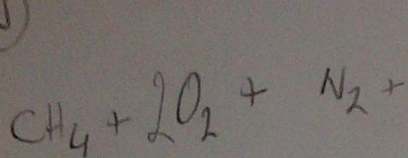


$$\varphi_{\text{CH}_3\text{OH}} = \frac{V_{\text{CH}_3\text{OH}}}{V_{\text{sump.}}} = \frac{2\text{L}}{17\text{L}} \cdot 100 = \underline{\underline{11,8\%}}$$



$$\varphi_{\text{C}_2\text{H}_5\text{OH}} = \frac{V_{\text{C}_2\text{H}_5\text{OH}}}{V_{\text{sump.}}} \cdot 100 = \frac{1}{16} \cdot 100 = 6,25\%$$

9)



$$\begin{array}{r} 0,85\text{L} + 2 \cdot 0,85 \cdot 1,25 \\ \downarrow \\ 2,125\text{L} \end{array} \quad \begin{array}{r} 0,15\text{L} \\ 2,125 \cdot 0,90 \\ \downarrow \\ 1,9125\text{L} \end{array} \quad \begin{array}{r} 2,125 \cdot 0,02 \\ 0,0425 \\ \downarrow \\ 0,2125\text{L} \end{array}$$

$$0,85 \quad 2 \cdot 0,85 + 0,4375 + 0,2125 \quad \begin{array}{r} 2,125 \cdot 2 \cdot 0,85 \\ \downarrow \\ 0,425\text{L} \end{array}$$

$$8,4375\text{L}$$

$$\Sigma V = 11,625\text{L}$$

$$\Sigma V_{\text{p2}} = 11,625\text{L}$$

$$\psi_{\text{CH}_4} = \frac{0,85}{11,625} \cdot 100 = 7,312\%$$

2) TABLICA

SNBV	NEVARNOSTI			LD50 mg/kg		Ps mbat	ψ %	T_p %	0.5 %	MIN št.
1	F	T	/	5628	leb vnetljivo dampno	127	12,7	15	5,1-44	3286
2	F+	T	/	/	lumensyano molekularno	670	67	-36	23-14,3	2389
3	F	T	N	78	lumensyano dampno	124	12,4	-4,4	28-28	1093

a) študijivi na živalih - B

b) merjeni na mestnemel praven di exp. - A

$$V = \frac{SEM \cdot V_{\text{total}}}{1 - SEM} = \frac{2,3 \cdot 20}{1 - 2,3} \Rightarrow 45 \boxed{4,71 \text{ m}^3}$$

353,85

$$\frac{SEM \cdot V_{\text{total}}}{1 - SEM} = \frac{0,22 \cdot 200}{1 - 0,22} \Rightarrow \boxed{91,11 \text{ m}^3}$$

200

$$\text{SEM} > \frac{V_{ac}}{V_{em}} \cdot 100\% \quad \frac{V_{ac}}{V_{ac} + V_{anh}} \cdot 100\%$$

$$\text{SEM} > \frac{V_{ac}}{V_{ac} + V_{anh}} \cdot 100\% \quad \cdot V_{ac} + V_{anh}$$

$$\text{SEM}(V_{ac} + V_{anh}) > V_{ac} \cdot 100\%$$

$$\text{SEM}(1 + V_{anh}) > V_{ac} \quad \left. \begin{array}{l} \text{SEM} \\ 2,3 \times 102,3 \\ \hline 100 \end{array} \right\}$$

$$\frac{4,633}{12} \%$$

$$Z_{em} < \frac{V_{ac}}{V_{ac}} + \frac{V_{ac}}{V_{anh}} \cdot 100\%$$

$$Z_{em} < \frac{V_{ac}}{V_{ac} + V_{anh}} \cdot 100\%$$

$$Z_{em} - 1 < \frac{V_{ac} - 100\%}{V_{anh}}$$

$$Z_{em}(V_{ac} + V_{anh}) < V_{ac} \cdot 100\%$$

$$\frac{Z_{em}}{Ac} (1 + V_{anh}) < 100$$

$$(Z_{em} + 1) \cdot V_{anh} < V_{ac} \cdot 100\%$$

$$\frac{Z_{em}}{Ac} < \frac{100 \cdot V_{anh}}{1 + V_{anh}}$$

$$100\%$$

$$Z_{em} < \frac{100 \cdot Ac}{1 + V_{anh}}$$

$$\frac{Z_{em}}{V_{ac}} = 164\%$$

$$\frac{Z_{em}(1 + V_{anh})}{100} < Ac$$

$$T_1 = 25^\circ\text{C} = 298\text{K}$$

$$\text{SEM} = 5,5\%$$

$$P_{\text{swami}} = 1\text{ bar}$$

$$T_2 = 64,6^\circ\text{C} = 339,6\text{K}$$

$$\Delta H = 35,21\text{ kJ/mol} = 35210\text{ J/mol}$$

$$P_2 = 1\text{ bar}$$

$$P_1 = ?$$

$$\psi^{25^\circ\text{C}}_{\text{INSTANDE}} = ?$$

$$P_1 = P_2 \cdot e^{-\frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)}$$

$$P_1 = 1 \cdot e^{-\frac{35210}{8,314} \left(\frac{1}{298} - \frac{1}{339,6} \right)}$$

$$P_1 = 0,189\text{ bar}$$

$$\psi^{25^\circ\text{C}} = \frac{P_1}{P_{\text{swami}}} \cdot 100 = \frac{0,189}{1} \cdot 100 = 18,9\%$$

$$b) P_1 = 0,055\text{ bar}$$

$$T_1 = \frac{1}{-\frac{\ln(0,055) \cdot 8,314}{35210} + \frac{1}{339,6}}$$

$$T_1 = 274,2\text{ K} = \underline{\underline{1,2^\circ\text{C}}}$$

Umjeri u vakuumu

$$T_1 = 3^\circ\text{C} \quad T_2 = ?$$

$$T_2 = 23,1^\circ\text{C}$$

$$\Delta H = 23,20 \text{ kJ/mol} = 23200$$

$$S_{\text{v}} = 2,5\%$$

$$P_2 = 1 \text{ bar}$$

$$P_1 = P_2 \cdot e^{-\frac{\Delta H}{R} \cdot \left(\frac{1}{T_1} - \frac{1}{T_2}\right)}$$

$$= 1 \cdot e^{-\frac{23200}{8,314} \cdot \left(\frac{1}{276} - \frac{1}{326,1}\right)}$$

$$= 0,097 \text{ bar}$$

$$\psi = \frac{P_1}{P_{\text{sat}}} = \frac{0,097}{1} \cdot 100 = 9,7\%$$

$$P_1 = 9,7\%$$

$$T_1 = \frac{1}{-\frac{\ln P_1 \cdot R}{\Delta H} + \frac{1}{T_2}}$$

$$T_1 = \frac{1}{-\frac{\ln 0,025 \cdot 8,314}{23200} + \frac{1}{326,1}}$$

$$T_1 = 246,13 \approx \underline{\underline{-26,9^\circ\text{C}}}$$

20/8/2006

LABORATORIJ

9m x 5m x 4m = 180 m³
T = 26°C = 299 K
P = 1 bar
φ_{O₂} = 20,5%
φ_{N₂} = 78%
φ_{drugi plini} = 15%

TLAČNA POSODA

Ar = 96%
H₂ = 4%
P = 205 bar
V = 50 L = 50 dm³
X

$pV = n \cdot R \cdot T$
 $nRT = pV$
 $n = \frac{pV}{RT}$ ✓

ZATLAK V POSODI VEDA:

$P_p = P_{Ar} + P_{H_2}$

$n_{Ar} = \frac{205 \cdot 101,3 \cdot 10^3 \text{ N/m}^2 \cdot 50 \cdot 10^{-3} \text{ m}^3 \text{ mol K} \cdot 0,06}{\text{mol K} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K}} = 400,1 \text{ mol}$

$n_{H_2} = \frac{205 \cdot 101,3 \cdot 10^3 \text{ N/m}^2 \cdot 50 \cdot 10^{-3} \text{ m}^3 \text{ mol K} \cdot 0,04}{\text{mol K} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K}} = 16,7 \text{ mol}$

$V_{Ar} = \frac{nRT}{P} = \frac{400,1 \text{ mol} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K} \text{ m}^3}{\text{mol K} \cdot 101,3 \cdot 10^3 \text{ N}} = 9,8 \text{ m}^3$

$\varphi_{Ar} = \frac{V_{Ar}}{V_{eab}} = \frac{9,8 \text{ m}^3}{180 \text{ m}^3} \cdot 100\% = 5,4\%$

$V_{H_2} = \frac{nRT}{P} = \frac{16,7 \text{ mol} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K} \text{ m}^3}{\text{mol K} \cdot 101,3 \cdot 10^3 \text{ N}} = 0,41 \text{ m}^3$

koncentracija O₂: (V_{eab} - V_{Ar} - V_{H₂}) · 0,205 = 34,8 m³ - Van v balj

$n_{O_2} = \frac{pV}{RT} = \frac{101,3 \cdot 10^3 \text{ N/m}^2 \cdot 34,8 \text{ m}^3 \text{ mol K}}{8,314 \text{ N/m}^2 \cdot 299 \text{ K}} = 1418,1 \text{ mol}$

REDČITEV H₂ JE RAZMERNJE MEI $\varphi_{H_2}(A)$ in $\varphi_{H_2}(L)$:

$D = \frac{\varphi_{H_2}(P)}{\varphi_{H_2}(L)}$

$\varphi_{H_2}(P) = \frac{V_{H_2}}{V_P} = \frac{n_{H_2} \cdot R \cdot T}{V_P \cdot P}$

$= \frac{16,7 \text{ mol} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K} \cdot \text{m}^3}{\text{mol K} \cdot 50 \cdot 10^{-3} \text{ m}^3 \cdot 205 \cdot 101,3 \cdot 10^3 \text{ N}} =$

$\varphi_{H_2}(L) = \frac{V_{H_2}}{V_L} = \frac{16,7 \text{ mol} \cdot 8,314 \text{ N/m}^2 \cdot 299 \text{ K} \cdot \text{m}^3}{\text{mol K} \cdot 180 \text{ m}^3 \cdot 101,3 \cdot 10^3 \text{ N}} =$

$$2) 9m \cdot 5m \cdot 4m = 180m^3 = V_{LAB}$$

JEK
 $Ar = 06\%$
 $H_2 = 4\%$
 $P = 205 \text{ bar}$
 $V = 50L$

LAB
 $T = 26^\circ C$
 $P = 1 \text{ bar}$

ZRAK
 $205\% O_2$
 $78\% N_2$
 $1,5\% \text{ drugi plini}$

$\psi_{Ar} = ?$
 $\psi_{O_2} = ?$
 $f_R = ?$

$$f_R = \frac{\psi_{H_2}^{PRES}}{\psi_{H_2}^{PO}}$$

izhleden

$$V_1 \cdot P_1 = V_2 \cdot P_2$$

$$V_1 = \frac{V_2 \cdot P_2}{P_1} = \frac{50L \cdot 205 \text{ bar}}{1 \text{ bar}} = 10250L$$

$$V_{ZRAK} = V_{LAB} - V_{PZ} = 180000L - 10250L = 169750L$$

$$V(O_2) = V_{ZRAK} \cdot \psi(O_2) = 169750 \cdot 0,205 = 34798,75L$$

$$\psi(O_2)^{PO} = \frac{V(O_2)}{V(LAB)} \cdot 100 = \frac{34798,75L}{180000L} \cdot 100 = 19,33 \text{ vol}\%$$

$$V_{Ar} = V_1 \cdot Ar = 10250 \cdot 0,06 = 9840L$$

$$V_{H_2} = V_1 \cdot 0,04 = 10250 \cdot 0,04 = 410L$$

$$\psi_{Ar}^{PO} = \frac{V_{(Ar)}}{V(LAB)} \cdot 100\% = \frac{9840L}{180000L} \cdot 100 = 5,5 \text{ vol}\%$$

$$\psi_{H_2}^{PO} = \frac{V_{(H_2)}}{V(LAB)} \cdot 100\% = \frac{410L}{180000L} \cdot 100 = 0,22 \text{ vol}\%$$

$$f_R = \frac{\psi_{H_2}^{PRES}}{\psi_{H_2}^{PO}} = \frac{0,04}{0,0022} = \underline{\underline{18 \text{ krat se razredni}}}$$

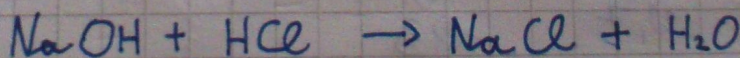
$$3) V = 1,2m^3$$

modro - barva
 rumeno - natrij

$$V_1 = 10 \text{ ml}$$

$$V_2 = 18,4 \text{ ml}$$

$$C_2 = 0,10 \text{ mol/l}$$



$$n(NaOH) = n(HCl)$$

$$C_1 \cdot V_1 = C_2 \cdot V_2$$

$$C_1 = \frac{C_2 \cdot V_2}{V_1} = \frac{0,10 \text{ mol/l} \cdot 18,4 \text{ ml}}{10 \text{ ml}} = \underline{\underline{0,184 \text{ mol}}}$$

$$C(NaOH) = ?$$

$$m(HCl) = ?$$

$$m(HCl) = m(NaOH)$$

$$\frac{m(HCl)}{M(HCl)} = V \cdot C_1$$

$$m(HCl) = M(HCl) \cdot V \cdot C_1 = 35,5 + 1 \cdot 1,2m^3 \cdot 0,184$$