Fullständiga lösningar till några uppgifter i Kemi 1

Är det någon uppgift du saknar lösning på? I så fall får du gärna mejla meundervisning@ehinger.nu, så ska jag se om jag kan lägga till den!

Senast uppdaterat 2020-06-10.

Kapitel 5

5.32c

$m_{C_6H_{12}O_6} = M_{C_6H_{12}O_6} \cdot n_{C_6H_{12}O_6} = 180{,}2\text{g/mol} \cdot 0{,}10\text{mol} = 18{,}02\text{g}$

$$c = \frac{18{,}02}{200 + 18{,}02} = 0{,}08265 \approx 8{,}3\%$$

d

$m_{C_6H_{12}O_6} = M_{C_6H_{12}O_6} \cdot n_{C_6H_{12}O_6} = 180{,}2\text{g/mol} \cdot 0{,}10\text{mol} = 18{,}02\text{g}$

$$c = \frac{18{,}02}{200} = 0{,}09009 \approx 9{,}0\%$$

5.42

$C_{17}H_{35}COOH + 26O_2 \rightarrow 18CO_2 + 18H_2O$

$$pV = nRT \Leftrightarrow V = \frac{nRT}{p}$$

$$T = (273{,}15 + 25)\text{K} = 298{,}15\text{K}$$

$$p = 101{,}3\text{kPa} = 101300\text{N/m}^2$$

$$R = 8{,}314\frac{\text{Nm}}{\text{mol} \cdot \text{K}}$$

$$\begin{aligned} n_{\text{gas}} = n_{CO_2} + n_{H_2O} = 36 \cdot n_{C_{17}H_{35}COOH} &= 36 \cdot \frac{m_{C_{17}H_{35}COOH}}{M_{C_{17}H_{35}COOH}} \\ &= 36 \cdot \frac{55\text{g}}{(12{,}01 \cdot 18 + 1{,}008 \cdot 36 + 16{,}0 \cdot 2)\text{g/mol}} = 36 \cdot 0{,}19334336\text{mol} \\ &= 6{,}9603611\text{mol} \end{aligned}$$

$$V = \frac{6{,}9603611\text{mol} \cdot 8{,}314\frac{\text{Nm}}{\text{mol} \cdot \text{K}} \cdot 298{,}15\text{K}}{101300\text{N/m}^2} = 0{,}017032059\text{m}^2 \approx 17\text{dm}^3$$

5.44

$Sn(s) + O_2(g) \rightarrow SnO_2(s)$

a)

m_{Sn} = 8 uns = 8 · 576 grains = 8 · 576 · 0,0531 g = 244,6848 g ≈ 245 g

m_{luft} = 46/3 grains = 46/3 · 0,0531 g = 0,8142 g ≈ 0,814g

Δm = 3,12 grains = 3,12 · 0,0531 g = 0,165672 g ≈ 0,166g

b)

$$n_{\text{Sn}} = \frac{m_{\text{Sn}}}{M_{\text{Sn}}} = \frac{244{,}6848\text{g}}{118{,}7\text{g/mol}} = 2{,}06137152\text{mol}$$

$$n_{\text{O}_2} = \frac{m_{\text{O}_2}}{M_{\text{O}_2}} = \frac{0{,}166\text{g}}{2 \cdot 16{,}0\text{g/mol}} = 0{,}0051875\text{mol}$$

$\frac{n_{O_2}}{n_{Sn}} < \frac{2}{1}$, alltså är n_{O_2} begränsande.

c)

$$n_{\text{O}_2} : n_{\text{SnO}_2} = 1:1 \Longrightarrow n_{\text{SnO}_2} = n_{\text{O}_2} = 0{,}0051875\text{mol}$$

$$m_{\text{SnO}_2} = n_{\text{SnO}_2} \cdot M_{\text{SnO}_2} = 0{,}0051875\text{mol} \cdot (118{,}7 + 16{,}0 \cdot 2)\text{g/mol} = 0{,}78175625\text{g} \approx 0{,}78\text{g}$$

5.47

$$c = \frac{500 \cdot 10^{-3}\text{g}}{(70000 + 500 \cdot 10^{-3})\text{g}} = 7{,}14280612 \cdot 10^{-6} \approx 7{,}1 \cdot 10^{-4}\%$$

Kapitel 7

7.17.

$$n_{\text{Mg}} = \frac{m_{\text{Mg}}}{M_{\text{Mg}}} = \frac{1{,}00\text{g}}{24{,}3\text{g/mol}} = 0{,}04115226\text{mol}$$

$$\Delta H_{\text{Mg}} = \frac{1202k\text{J}}{2} = 601k\text{J/mol}$$

$$q = n\Delta H_{\text{Mg}} = 0{,}04115226\text{mol} \cdot \frac{601k\text{J}}{\text{mol}} = 24{,}7325103\text{kJ} \approx 24{,}7k\text{J}$$