

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

$$m_{\text{C}_6\text{H}_{12}\text{O}_6} = M_{\text{C}_6\text{H}_{12}\text{O}_6} \cdot n_{\text{C}_6\text{H}_{12}\text{O}_6} = 180,2\text{g/mol} \cdot 0,10\text{mol} = 18,02\text{g}$$

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

d

$$m_{\text{C}_6\text{H}_{12}\text{O}_6} = M_{\text{C}_6\text{H}_{12}\text{O}_6} \cdot n_{\text{C}_6\text{H}_{12}\text{O}_6} = 180,2\text{g/mol} \cdot 0,10\text{mol} = 18,02\text{g}$$

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

5.42



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

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

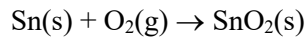
$$p = 101,3\text{kPa} = 101300\text{N/m}^2$$

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

$$\begin{aligned} n_{\text{gas}} = n_{\text{CO}_2} + n_{\text{H}_2\text{O}} &= 36 \cdot n_{\text{C}_{17}\text{H}_{35}\text{COOH}} = 36 \cdot \frac{m_{\text{C}_{17}\text{H}_{35}\text{COOH}}}{M_{\text{C}_{17}\text{H}_{35}\text{COOH}}} \\ &= 36 \cdot \frac{55\text{g}}{(12,01 \cdot 18 + 1,008 \cdot 36 + 16,0 \cdot 2)\text{g/mol}} = 36 \cdot 0,19334336\text{mol} \\ &= 6,9603611\text{mol} \end{aligned}$$

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

5.44



a)

$$m_{\text{Sn}} = 8 \text{ uns} = 8 \cdot 576 \text{ grains} = 8 \cdot 576 \cdot 0,0531 \text{ g} = 244,6848 \text{ g} \approx 245 \text{ g}$$

$$m_{\text{luft}} = 46/3 \text{ grains} = 46/3 \cdot 0,0531 \text{ g} = 0,8142 \text{ g} \approx 0,814 \text{ g}$$

$$\Delta m = 3,12 \text{ grains} = 3,12 \cdot 0,0531 \text{ g} = 0,165672 \text{ g} \approx 0,166 \text{ g}$$

b)

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

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

$$\frac{n_{\text{O}_2}}{n_{\text{Sn}}} < \frac{2}{1}, \text{ alltså } \text{ } n_{\text{O}_2} \text{ begränsande.}$$

c)

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

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

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.

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

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

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