

FACITLISTE 1. runde Kemi-OL 2004

(Databog 2000)

- 1a $\text{pH} = \frac{1}{2}(4,20 - \log 0,010) = 3,10$
- 1b Puffer; $\text{pH} = 4,20 + \log(0,204/0,046) = 4,85$
- 1c 1) $4,00 - 4,20 = \log([B]/[S]); [B]/[S] = 0,63$ 2) $[B]/[S] = 63$
- 1d $\text{pH} = 4$ da $[B]/[S]$ er tættest på 1
- 2a 0,0436 bar
- 2b $p(\text{NH}_3) = 0,325 \text{ bar}$ $p(\text{H}_2\text{S}) = 0,369 \text{ bar}$
- 2c $x(\text{H}_2\text{S}) = 0,369/(0,369 + 0,325) = 0,532$
- 2d $m(\text{NH}_4\text{HS}) = 3,35 \text{ g}$ (0,656 mol)
- 3a $M = 131,3 \text{ g/mol}$ **A** = Xe
- 3b **B** = XeF_4 $\text{Xe} + 2 \text{F}_2 \rightarrow \text{XeF}_4$
- 3c **C** = XeF_6 $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow \text{XeF}_6 + \text{O}_2$
- 3d $\text{Xe} + \text{F}_2 \rightarrow \text{XeF}_2$ $\text{XeF}_2 + \text{H}_2 \rightarrow \text{Xe} + 2 \text{HF}$
- 4a $K_0 = [\text{Ag}^+]^2 \cdot [\text{C}_2\text{O}_4^{2-}] = 4\text{S}^3$
- 4b $[\text{H}_2\text{C}_2\text{O}_4] = ([\text{C}_2\text{O}_4^{2-}] \cdot [\text{H}_3\text{O}^+]^2) / K_s(\text{H}_2\text{C}_2\text{O}_4) \cdot K_s(\text{HC}_2\text{O}_4^-)$
 $[\text{HC}_2\text{O}_4^-] = ([\text{C}_2\text{O}_4^{2-}] \cdot [\text{H}_3\text{O}^+]) / K_s(\text{HC}_2\text{O}_4^-)$
- 4c $K_0 = 3,5 \cdot 10^{-11} \text{ M}^3$
- 4d $\text{S} = 2,9 \cdot 10^{-4} \text{ M}$
- 5a $\text{C}_5\text{H}_{12}\text{O}$
- 5b 2-methylbutan-2-ol tophøjder: 1(-OH): 2(-CH₂-): 6(2 -CH₃): 3(-CH₃)
 kobling: nej ja til -CH₃ nej ja til -CH₂-
- 5c $2 \text{Cr}_2\text{O}_7^{2-} + 3 \text{alkohol} + 16 \text{H}^+ \rightarrow 4 \text{Cr}^{3+} + 3 \text{carboxylsyre} + 11 \text{H}_2\text{O}$
- 5d 3-methylbutanal
- 5e Spektrum 1: 3400 sv (overtone), lige under 3000 m(sp³-stræk), 2700 m (aldehyd H stræk) og 1730 s (C=O stræk) altså stof **C**
 Spektrum 2: 3200-2900 m (OH stræk), lige under 3000 m (sp³-stræk) og 1700 s (C=O stræk) altså **B**
- 6a $\text{H}_2\text{O}_2 + \text{Mn}^{2+} + 2 \text{OH}^- \rightarrow \text{MnO}_2 + 2 \text{H}_2\text{O}$
- 6b $5 \text{H}_2\text{O}_2 + 2 \text{MnO}_4^- + 6 \text{H}^+ \rightarrow 2 \text{Mn}^{2+} + 5 \text{O}_2 + 8 \text{H}_2\text{O}$
- 6c $c(\text{H}_2\text{O}_2) = 0,030 \text{ M}$
- 6d $\log K = U_0 / 0,0592 \text{ V} = 0,979 \text{ V} / 0,0592 \text{ V}; K = 3,44 \cdot 10^{+16}$
- 6e $[\text{Fe}^{3+}] / [\text{Fe}^{2+}] = K^{1/2} = 1,86 \cdot 10^{+8}$ $U = 1,26 \text{ V}$