

100ml

0,632g $KMnO_4$ + 1,52g $FeSO_4$ pH=1

a) $[Fe^{2+}]_{eq}$?

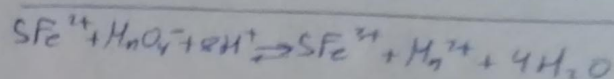
b) $E(MnO_4^-/Mn^{2+})$?

oxidation $Fe^{2+} \rightarrow Fe^{3+} + e^-$

$E^\circ(Fe^{3+}/Fe^{2+}) = 0,78V$

reduction $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

$E^\circ(MnO_4^-/Mn^{2+}) = 1,50V$



$$n_{Fe^{2+}} = \frac{1,52}{152} = 0,01 mol \quad [Fe^{2+}]_0 = 0,1 M$$

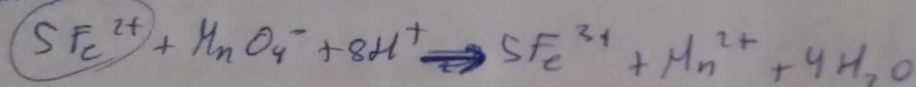
$$n_{MnO_4^-} = \frac{0,632}{158} = 4 \cdot 10^{-3} mol \quad [MnO_4^-]_0 = 0,04 M$$

Hallamos $K \rightarrow \Delta G^\circ = -RT \ln K$; $\Delta G^\circ = -nFE^\circ$

$$K = e^{\frac{nFE^\circ}{RT}} = e^{\frac{5 \cdot 96500 \cdot 0,72}{8,31 \cdot 298,15}} = 7,844 \cdot 10^{60}$$

$$E^\circ = 1,50 - 0,78 = 0,72V$$

balance



ini 0,1 0,04

equilibrio — $0,04 - \frac{0,1}{5}$ $\frac{0,1}{5}$ 0,1 $\frac{0,1}{5}$

$$K = \frac{[Mn^{2+}][Fe^{3+}]^5}{[Fe^{2+}]^5[MnO_4^-][H^+]^8} \rightarrow 7,844 \cdot 10^{60} = \frac{0,02 \cdot (0,1)^5}{[Fe^{2+}]^5 \cdot 0,02 \cdot (0,1)^8}$$

$$[Fe^{2+}] = 2,637 \cdot 10^{-12} M$$