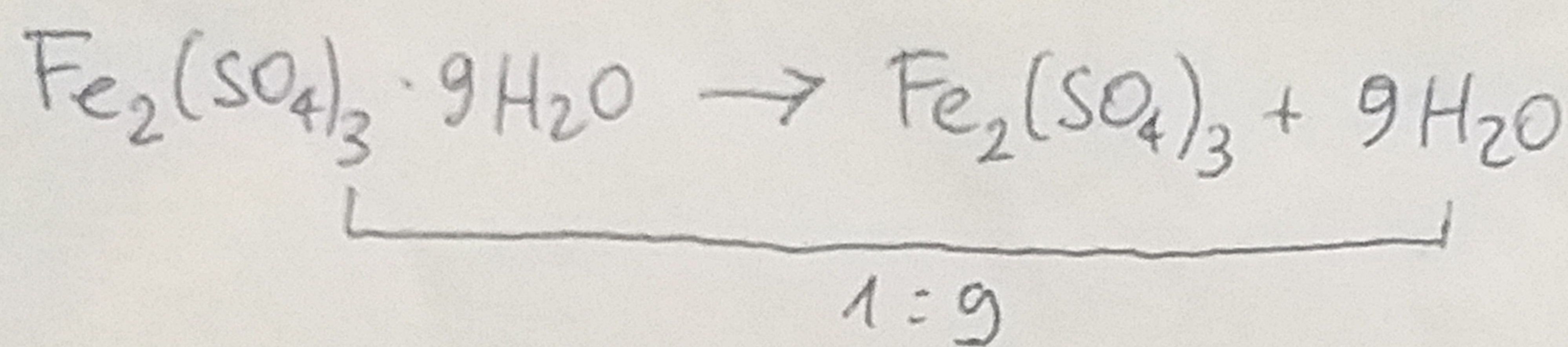
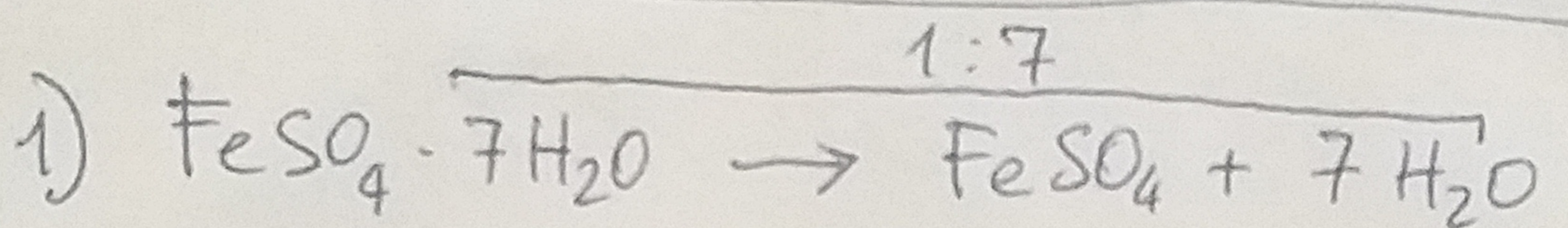


Soluzioni delle Prove Scritte del 23 ottobre 2018



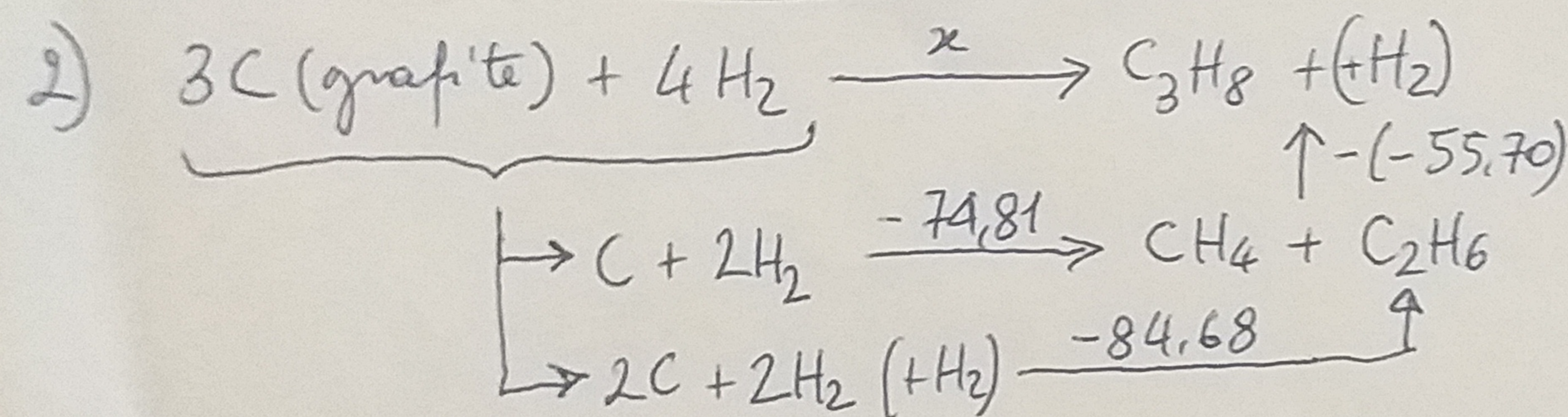
$$M(\text{FeSO}_4 \cdot 7\text{H}_2\text{O}) = 278,05 \text{ g/mol}$$

$$M(\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}) = 562,06 \text{ g/mol}$$

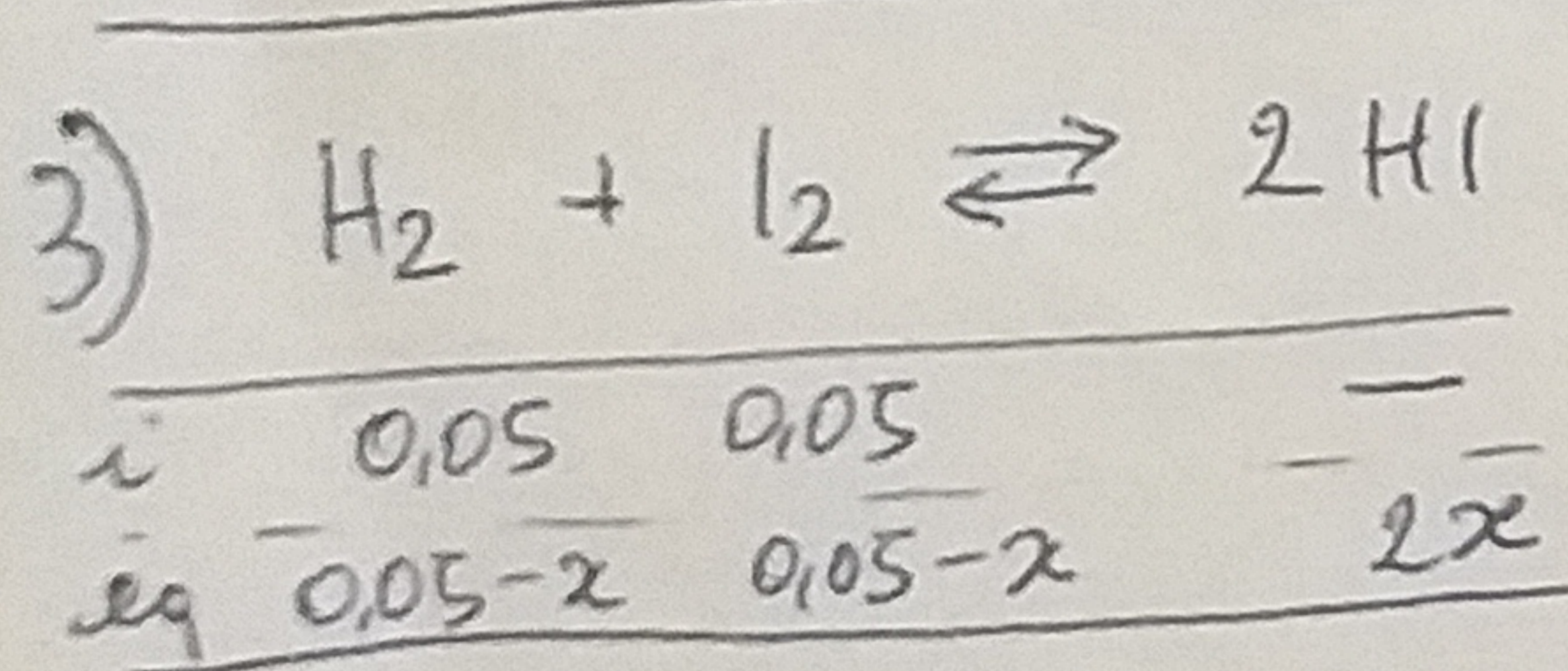
$$M_{\text{H}_2\text{O}} = 18,02 \text{ g/mol}$$

$$n_{\text{FeSO}_4 \cdot 7\text{H}_2\text{O}} = x ; n'_{\text{H}_2\text{O}} = 7x ; n_{\text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O}} = y ; n''_{\text{H}_2\text{O}} = 9y$$

$$\begin{cases} 278,05x + 562,06y = 100 \\ 7x + 9y = \frac{42,4}{18,02} \end{cases} \rightarrow \begin{cases} x = 0,2943 \\ y = 0,0307 \end{cases} \rightarrow \begin{cases} \% \text{FeSO}_4 \cdot 7\text{H}_2\text{O} = 81,83 \\ \% \text{Fe}_2(\text{SO}_4)_3 \cdot 9\text{H}_2\text{O} = 18,17 \end{cases}$$



$$\begin{aligned} x = \Delta H_R^\circ &= \\ &= -74,81 - 84,68 + 55,70 = \\ &= -103,8 \text{ kJ} \end{aligned}$$



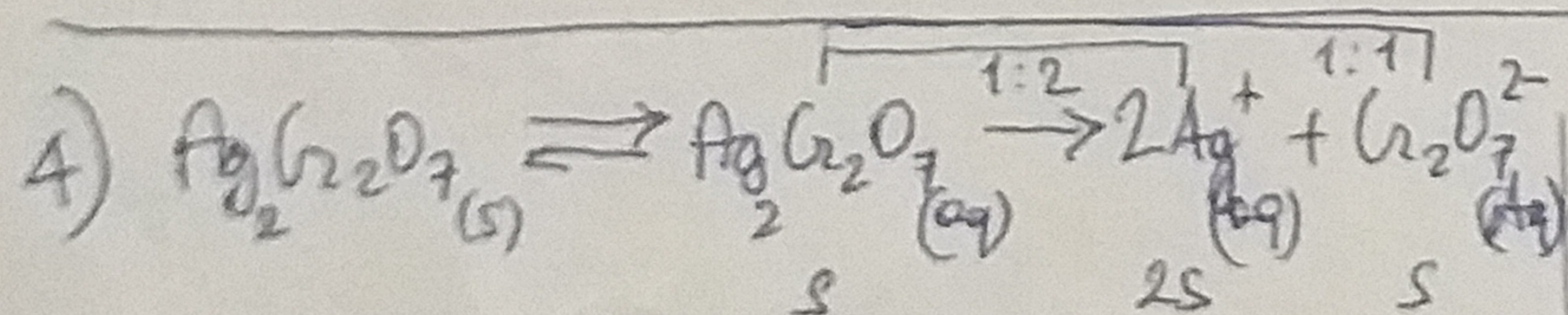
$$K = \frac{(2x)^2}{(0,05-x)^2} = 60 ; 0 < x < 0,05$$

$$4x^2 = 60(0,0025 - 0,1x + x^2) \rightarrow 56x^2 - 6x + 0,15 = 0$$

$$x_{\text{H}_2} = \frac{3 \pm \sqrt{9 - 8,4}}{56} = \begin{cases} \frac{3 + \sqrt{0,6}}{56} = 0,04 \\ \frac{3 - \sqrt{0,6}}{56} \text{ NO} \end{cases}$$

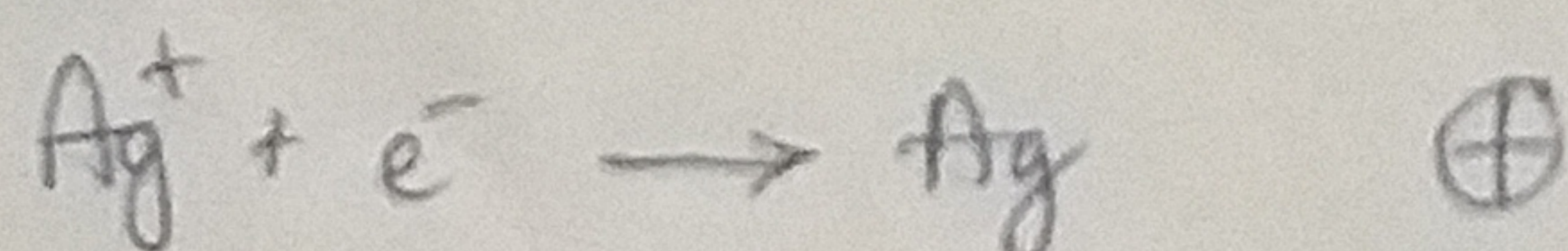
$$p_{\text{H}_2} = p_{\text{I}_2} = 0,21 \text{ atm}$$

$$p_{\text{HI}} = 1,63 \text{ atm}$$

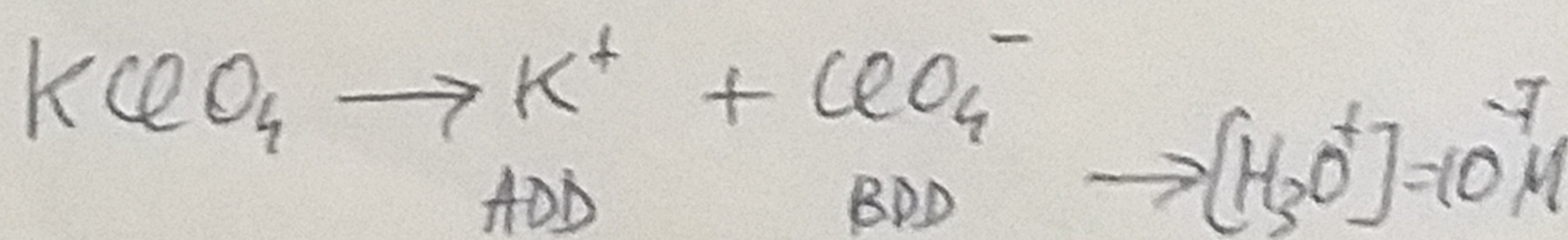


$$K_{ps} = [\text{Ag}^+]^2 [\text{Cr}_2\text{O}_7^{2-}] = (2s)^2 \cdot s = 4s^3$$

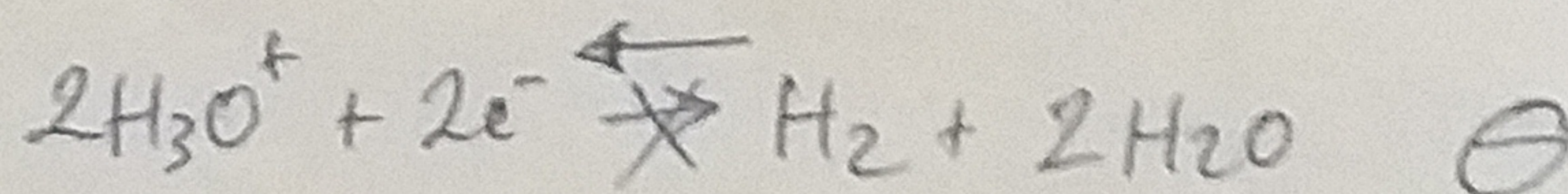
$$s = \sqrt[3]{\frac{K_{ps}}{4}} ; [\text{Ag}^+] = 2s = 2\sqrt[3]{\frac{K_{ps}}{4}} = \sqrt[3]{2K_{ps}}$$



$$E = 0,80 + 0,0592 \log \sqrt{2 \cdot 1,08 \cdot 10^{-10}} = 0,609 \text{ V}$$



$$\rightarrow [\text{H}_3\text{O}^+] = 10^{-7} \text{ M}$$



$$E = 0 + \frac{0,0592}{2} \log \frac{(10^{-7})^2}{1} =$$

$$= 0,0592(-7) = -0,414 \text{ V}$$

$$\Delta E = E^\oplus - E^\ominus = 0,609 - (-0,414) =$$

$$= 1,024 \text{ V} \cong 1,02 \text{ V}$$