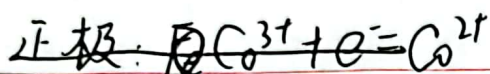
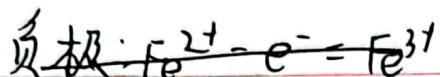
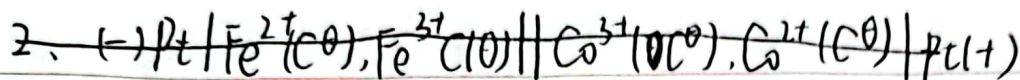
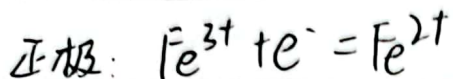
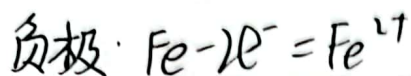
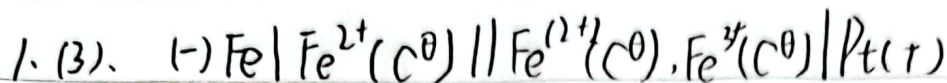
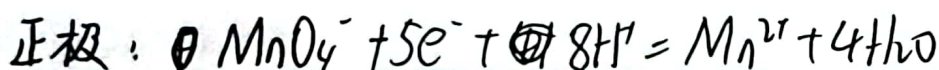
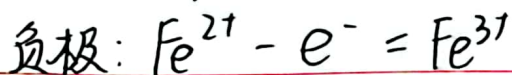
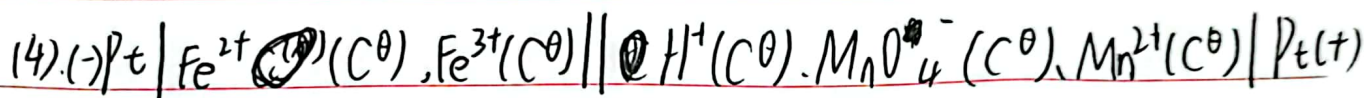




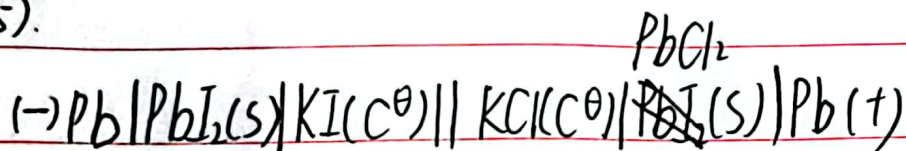
第七章



3



(5).

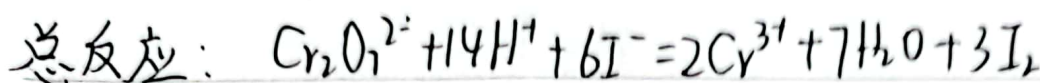
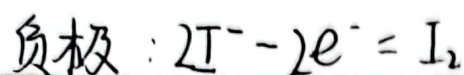
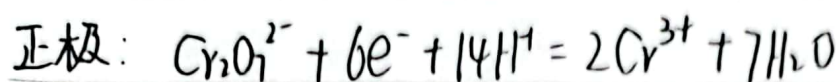


4. (1) $E(\text{I}_2/\text{I}^-) = E^\ominus + \frac{RT}{nF} \ln \frac{(\text{I}_2)}{(\text{I}^-)^2}$

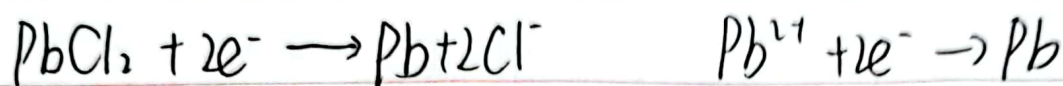
$$= E^\ominus - \frac{0.0592}{2} \lg (0.1)^2 = 0.5947 \text{ V}$$

$$E(\text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}) = E^\ominus(\text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}) + \frac{0.0592}{6} \lg \frac{C(\text{H}^+)^{14} \cdot C(\text{Cr}_2\text{O}_7^{2-})}{C(\text{Cr}^{3+})^2}$$
$$= 0.7893 \text{ V} > 0.5947 \text{ V}$$

 $\therefore \text{Cr}_2\text{O}_7^{2-}/\text{Cr}^{3+}$ 为正极, I_2/I^- 为负极



8.

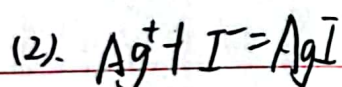


$$E(\text{PbCl}_2/\text{Pb}) = E^\theta(\text{Pb}^{2+}/\text{Pb}) + \frac{0.0592}{2} \lg \frac{c(\text{Pb}^{2+})}{1}$$

$$= E^\theta(\text{Pb}^{2+}/\text{Pb}) + \frac{0.0592}{2} \lg \frac{K_{\text{sp}}}{c(\text{Cl}^-)^2}$$

$$E^\theta(\text{PbCl}_2/\text{Pb}) = -0.126 + \frac{0.0592}{2} \lg K_{\text{sp}}$$

$$= -0.268$$



$$(3) E^\theta_{\text{池}} = E^\theta_{\text{正}} - E^\theta_{\text{负}}$$

$$= 0.7996 - (-0.1522) \text{ V} = 0.9518 \text{ V}$$

$$(4) \Delta_r G_m^\theta = -nFE^\theta = -91.848 \text{ kJ/mol}$$

$$(5) K^\theta = \frac{1}{K_{\text{sp}}^\theta}$$

$$\Delta_r G_m^\theta = -RT \ln K^\theta$$

$$= RT \ln K_{\text{sp}}^\theta$$

$$\ln K_{\text{sp}}^\theta = \frac{1}{RT} \Delta_r G_m^\theta$$

$$= 37.07$$

$$\therefore K_{\text{sp}} = 7.94 \times 10^{-17}$$





$$11. E(\text{Cd}^{2+}/\text{Cd}) = E^{\ominus}(\text{Cd}^{2+}/\text{Cd}) + \frac{0.0592}{2} \lg(\text{Cd}^{2+})$$

$$= -0.436 \text{ V}$$

$$E(\text{H}^{+}/\text{H}_2) = E^{\ominus}(\text{H}^{+}/\text{H}_2) + \frac{0.0592}{2} \lg(\text{C}(\text{H}^{+})) = 0.0592 \lg X$$

$$E = 0.0592 \lg X + 0.436 = 0.15$$

$$\lg X = -4.77$$

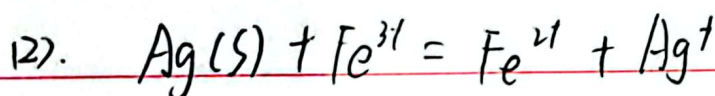
$$\text{pH} = -\lg X = 4.77$$

$$X = \text{C}(\text{H}^{+}) = 1.7 \times 10^{-5} \text{ mol} \cdot \text{L}^{-1}$$

$$13. (1) \Delta G_{\text{r}}^{\ominus} = -nFE^{\ominus} = -RT \ln K$$

$$\ln K^{\ominus} = \frac{nF}{RT} E^{\ominus} = \frac{1 \times 96500}{8.314 \times 298} \times 0.0286 = 1.139$$

$$K^{\ominus} = 3.046$$



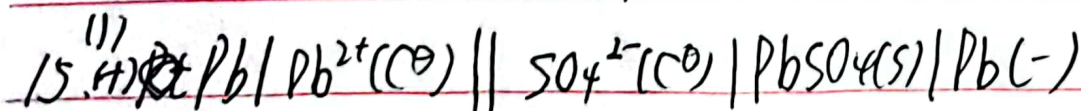
$$\text{初态:} \quad 0.1 \quad 0 \quad 0$$

$$\Delta C: \quad X \quad X \quad X$$

$$\text{终态:} \quad 0.1-X \quad X \quad X$$

$$\frac{X^2}{0.1-X} = \frac{1}{K^{\ominus}} \Rightarrow X = 0.0803 \text{ mol/L}$$

$$\text{C}(\text{Ag}^{+}) = 0.0803 \text{ mol} \cdot \text{L}^{-1}$$



(13). $E(\text{Pb}/\text{PbSO}_4)$

$$E(\text{PbSO}_4/\text{Pb}) = -0.356\text{V}$$

$$E(\text{Pb}^{2+}/\text{Pb}) = -0.126 + \frac{0.0591}{2} \lg 0.1$$

$$E = E(\text{Pb}^{2+}/\text{Pb}) - E(\text{PbSO}_4/\text{Pb})$$

$$= 0.2004$$

$$(14). \Delta_r G_m^\ominus = -nFE^\ominus = -44.39\text{kJ}\cdot\text{mol}^{-1}$$

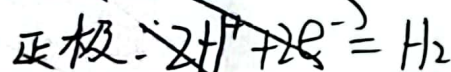
$$(15). E(\text{PbSO}_4/\text{Pb}) = E(\text{Pb}^{2+}/\text{Pb}) + \frac{0.0592}{2} \lg C(\text{Pb}^{2+})$$

$$= E(\text{Pb}^{2+}/\text{Pb}) + \frac{0.0592}{2} \lg \frac{K_{sp}(\text{PbSO}_4)}{C(\text{SO}_4^{2-})}$$

$$= E(\text{Pb}^{2+}/\text{Pb}) + \frac{0.0592}{2} \lg K_{sp}(\text{PbSO}_4)$$

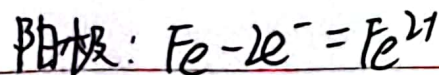
$$K_{sp} = 1.66 \times 10^{-8}$$

12. 1.5% 硫酸



1mol/L 硫酸

17. 1.5% 硫酸

1mol/L H_2SO_4 