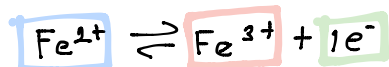


Encontrar el potencial de equilibrio de las siguientes soluciones, formadas por la mezcla de:

a) 10 mL de Fe^{2+} 0.15 M y 5 mL de Fe^{3+} 0.2 M

$$E = E^\circ_{\text{Fe}^{3+}/\text{Fe}^{2+}} + \frac{0.06}{n} \log \frac{[\text{Ox}]}{[\text{Red}]}$$

$$\text{Volumen total} = V_T = 15 \text{ mL}$$



$$[\text{Ox}] = [\text{Fe}^{3+}] = 5 \text{ mL} \left(\frac{0.2 \text{ mmol}}{1 \text{ mL}} \right) = \frac{1 \text{ mmol}}{V_T} = \frac{1 \text{ mmol}}{15 \text{ mL}} = 0.067 \text{ M}$$

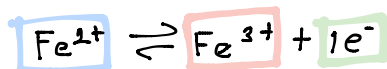
$$[\text{Red}] = [\text{Fe}^{2+}] = \frac{10 \text{ mL}}{15 \text{ mL}} \left(\frac{0.15 \text{ mmol}}{1 \text{ mL}} \right) = 0.1 \text{ M}$$

$$E = 0.77 + \frac{0.06}{1} \log \frac{0.067 \text{ M}}{0.1 \text{ M}} = 0.76 \text{ V}$$

b) 20 mL de Fe^{2+} 0.0015 M y 10 mL de Fe^{3+} 0.002 M

$$E = E^\circ_{\text{Fe}^{3+}/\text{Fe}^{2+}} + \frac{0.06}{n} \log \frac{[\text{Ox}]}{[\text{Red}]}$$

$$V_T = 30 \text{ mL}$$



$$[\text{Ox}] = [\text{Fe}^{3+}] = 10 \text{ mL} \left(\frac{0.002 \text{ mmol}}{1 \text{ mL}} \right) = \frac{0.02 \text{ mmol}}{V_T} = \frac{0.02 \text{ mmol}}{30 \text{ mL}} = 6.67 \times 10^{-4} \text{ M}$$

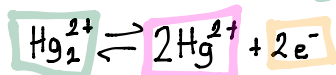
$$[\text{Red}] = [\text{Fe}^{2+}] = \frac{20 \text{ mL}}{30 \text{ mL}} \left(\frac{0.0015 \text{ mmol}}{1 \text{ mL}} \right) = 1 \times 10^{-3} \text{ M}$$

$$E = 0.77 + \frac{0.06}{1} \log \frac{6.67 \times 10^{-4} \text{ M}}{1 \times 10^{-3} \text{ M}} = 0.76 \text{ V}$$

c) 5 mL de HgCl_2 0.23 M y 5 mL de Hg_2Cl_2 0.23 M

$$E = E^\circ_{\text{Hg}_2^{2+}/\text{Hg}^{2+}} + \frac{0.06}{n} \log \frac{[\text{Ox}]^2}{[\text{Red}]}$$

$$V_T = 10 \text{ mL}$$



$$[\text{Ox}] = [\text{Hg}^{2+}] = \frac{5 \text{ mL HgCl}_2 \left(\frac{0.23 \text{ mmol HgCl}_2}{1 \text{ mL HgCl}_2} \right) \left(\frac{1 \text{ mmol Hg}^{2+}}{1 \text{ mmol HgCl}_2} \right)}{V_T} = \frac{1.15 \text{ mmol Hg}^{2+}}{10 \text{ mL}} = 0.115 \text{ M}$$

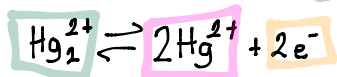
$$[\text{Red}] = [\text{Hg}_2^{2+}] = \frac{5 \text{ mL Hg}_2\text{Cl}_2 \left(\frac{0.23 \text{ mmol Hg}_2\text{Cl}_2}{1 \text{ mL Hg}_2\text{Cl}_2} \right) \left(\frac{1 \text{ mmol Hg}_2^{2+}}{1 \text{ mmol Hg}_2\text{Cl}_2} \right)}{V_T} = \frac{1.15 \text{ mmol}}{10 \text{ mL}} = 0.115 \text{ M}$$

$$E = 0.91 + \frac{0.06}{2} \log \frac{(0.115)^2}{0.115} = 0.88 \text{ V}$$

$$E = 0.88 \text{ V}$$

d) 10 mL de HgCl_2 0.0023 M y 10 mL de Hg_2Cl_2 0.0023 M

$$E = E^\circ_{\text{Hg}_2^{2+}/\text{Hg}^{2+}} + \frac{0.06}{n} \log \frac{[\text{Ox}]^2}{[\text{red}]} \quad V_T = 20 \text{ mL}$$



$$[\text{Ox}] = [\text{Hg}^{2+}] = \frac{10 \text{ mL HgCl}_2 \left(\frac{0.0023 \text{ mmol HgCl}_2}{1 \text{ mL HgCl}_2} \right) \left(\frac{1 \text{ mmol Hg}^{2+}}{1 \text{ mmol HgCl}_2} \right)}{20 \text{ mL}} = 1.15 \times 10^{-3} \text{ M}$$

$$[\text{red}] = [\text{Hg}_2^{2+}] = \frac{10 \text{ mL Hg}_2\text{Cl}_2 \left(\frac{0.0023 \text{ mmol Hg}_2\text{Cl}_2}{1 \text{ mL Hg}_2\text{Cl}_2} \right) \left(\frac{1 \text{ mmol Hg}_2^{2+}}{1 \text{ mmol Hg}_2\text{Cl}_2} \right)}{20 \text{ mL}} = 1.15 \times 10^{-3} \text{ M}$$

$$E = 0.91 + \frac{0.06}{2} \log \frac{(1.15 \times 10^{-3})^2}{1.15 \times 10^{-3}} = 0.82 \text{ V}$$

$$E = 0.82 \text{ V}$$

DATOS

$\text{Fe}^{3+}/\text{Fe}^{2+}$ $E^\circ = 0.77 \text{ V}$

$\text{Hg}_2^{2+}/\text{Hg}^{2+}$ $E^\circ = 0.91 \text{ V}$