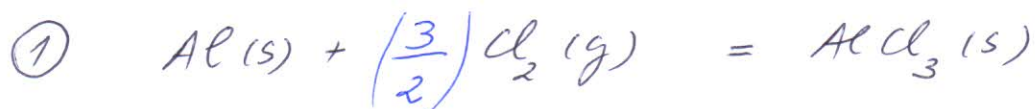


LISTA EXERCÍCIOS 2 PARTE A



$$27 \text{ g/mol} \quad \frac{3}{2} \cdot \cancel{2} \cdot 35,5 \text{ g/mol} = 133,5 \text{ g/mol}$$

106,5

$$\begin{array}{ccc} 27 \text{ g} & 106,5 \text{ g} & x = 10,65 \text{ g Cl}_2 \\ 2,7 \text{ g} & x & \end{array}$$

(a) Reagente limitante Cl<sub>2</sub> (cloro) 4,05 g

(b)	27	106,5	133,5	$y = 5,08 \text{ g}$ AlCl <sub>3</sub> (s)
	z	4,05	y	

$$(c) \quad z = \frac{27 \cdot 4,05}{106,5} = 1,03 \text{ g Al}$$

Reagente em excesso Al(s)

Resta $2,7 - 1,03 \approx 1,67 \text{ g Al(s)}$
---

2



Sulfato cúprico penta hidratado

$$\bar{M} = 249,7 \text{ g/mol}$$

3,25 g do sal:

(a)

$$\text{n.º mols Cu} : \frac{3,25 \text{ g}}{249,7 \text{ g/mol}} = 0,013$$

$$\text{n.º mols S} = 0,013$$

$$\text{n.º mols O} = 9 \times 0,013 = 0,117$$

$$\text{n.º mols H} = 10 \times 0,013 = 0,130$$

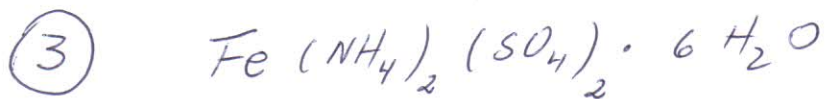
$$\text{(b) MOLARIDADE} \quad \frac{\text{n.º mols}}{V(\text{L})} = \frac{0,013 \text{ mols}}{0,250}$$

$$\text{MOLARIDADE} = 5,2 \times 10^{-2} \text{ mol/L}$$

(c) % (m/v) Cu 63,5 g/mol

$$\text{massa Cu} = 0,8255 \text{ g} \quad \begin{matrix} 250 \text{ mL} & \text{H}_2\text{O} \\ \alpha & \text{solução} \\ & 100 \text{ mL} \end{matrix}$$

$$\alpha = 0,33 \% \text{ Cobre (m/v)}$$



SULFATO FERRUSO AMONÍACAL (Hexa hidratado)  
CRISTAL VERDE  $\rightarrow$  SAL DE MOHR

$$\bar{M} = 392,14 \text{ g/mol}$$

(a)  $[\text{SO}_4^{2-}] = 0,1 \text{ mol/L} ; 0,5 \text{ L}$

$$[\text{sol}] = \frac{0,1}{2} \text{ mol/L} = 0,05 \text{ mol/L}$$

Assim massa do sol =  $\frac{\bar{M} \times 0,05}{2} = 9,8 \text{ g}$

$9,8 \text{ g sol}$

(b)  $\text{Fe(II)} \Rightarrow$ 

$[\text{Fe(II)}] = 0,05 \text{ mol/L}$

% (m/v) ions  $\text{Fe(II)}$

$$0,5 \text{ L} \rightarrow \frac{0,05}{2} \text{ mol Fe(II)} =$$

$$\text{massa Fe(II)} = 55,8 \times 0,025 = 1,395 \text{ g}$$

$$100 \text{ mL} \rightarrow \frac{1,395}{5} = 0,279 \text{ g}$$

ou seja

$0,28\% \text{ Fe(II)}$

 m/v

(4)



322,2 g/mol

0,2 mol/L Na<sup>+</sup>      CONDIÇÃO

$$15\text{g SAL} \Rightarrow \text{m.º mols sol} = \frac{15}{322,2}$$

$$\text{m.º mols sol} = 4,65 \times 10^{-2} \text{ mols}$$

$$\text{m.º mols Na}^+ = 2 \times 4,65 \times 10^{-2}$$

$$\text{m.º mols Na}^+ = 9,31 \times 10^{-2} \text{ mols}$$

Volume solução:

$$\begin{array}{r} 0,2 \text{ mol} \\ 9,31 \times 10^{-2} \end{array} \quad \begin{array}{r} 1 \text{ L} \\ x \end{array}$$

$$x = 0,465 \text{ L} \quad \text{ou} \quad 465 \text{ mL}$$

5)  $\text{NaHCO}_3$  bicarbonato de sódio

$$\bar{M} = 84,01 \text{ g/mol}$$

conc. para 26,3 g em 200 mL

$$[\text{NaHCO}_3] = \frac{n^\circ \text{ mols}}{V(\text{L})} = \frac{m/\bar{M}}{V(\text{L})} = \frac{26,3/84,01}{0,2}$$

$$[\text{NaHCO}_3] = 1,565 \text{ mol/L}$$

6)  $\text{NaCl}$  58,4 g/mol

$$[\text{NaCl}] \approx 0,14 \text{ mol/L} = \frac{n^\circ \text{ mols}}{V(\text{L})}$$

$$V(\text{L}) = \frac{n^\circ \text{ mols}}{[\text{NaCl}]} = \frac{2\text{g}/58,4 \text{ g/mol}}{0,14}$$

$$V(\text{L}) \approx 0,24 \text{ L}$$

7 Redução de Prata e formação  
de Nanopartículas (NP)



i) CÁLCULO DA MASSA DE  $\text{Ag}^0$

$$n^{\circ} \text{ mols } \text{AgNO}_3 \equiv n^{\circ} \text{ mols } \text{Ag}^0 = [\text{AgNO}_3] \cdot V$$

$$[\text{AgNO}_3] = 10^{-4} \text{ mol/L} \quad V = 5 \text{ mL}$$

$$n^{\circ} \text{ mols } \text{Ag}^0 = 5 \times 10^{-3} \text{ L} \cdot 10^{-4} \text{ mol/L}$$

$$n^{\circ} \text{ mols } \text{Ag}^0 = 5 \times 10^{-7} \text{ mols}$$

$$\text{massa } \text{Ag}^0 = \bar{M}_{\text{Ag}} \cdot n = 108 \text{ g/mol} \times 5 \times 10^{-7}$$

$$\text{massa } \text{Ag}^0 = 5,4 \times 10^{-5} \text{ g}$$

$$d = \frac{m}{V} \quad V_{\text{Ag}^0} = \frac{5,4 \times 10^{-5} \text{ g}}{10,5 \text{ g/cm}^3}$$

$$d = 10,49 \text{ g/cm}^3$$

$$V_{\text{Ag}^0} = 5,14 \times 10^{-6} \text{ cm}^3$$

Volume total de  
Prata metálica.

7 CONTINUAÇÃO:

ii) Volume NP  $r_{NP} = 6 \text{ nm} = 6 \times 10^{-7} \text{ cm}$

$$V_{NP} = \frac{4}{3} \pi r_{NP}^3 \quad V_{NP} \approx 9 \times 10^{-19} \text{ cm}^3$$

$$n^{\circ} \text{ NP} = \frac{V_{\text{total}} A_{g^{\circ}}}{V_{NP}} = \frac{5,14 \times 10^{-6} \text{ cm}^3}{9 \times 10^{-19} \text{ cm}^3}$$

$$n^{\circ} \text{ NP} = 5,7 \times 10^{12} \text{ Nanopartículas.}$$

iii) CÁLCULO DA CONC. NP mol/L

$$[NP] = \frac{n^{\circ} \text{ mols NP}}{V_{\text{SOL}} (\text{L})} \quad V_{\text{SOL}} = 5 \text{ mL} + 5 \text{ mL}$$

$$V_{\text{SOL}} = 10^{-2} \text{ L}$$

$$n^{\circ} \text{ mols NP} = \frac{n^{\circ} \text{ NP}}{N} = \frac{5,7 \times 10^{12}}{6,02 \times 10^{23}}$$

$$[NP] = \frac{9,5 \times 10^{-12}}{10^{-2}} = \underline{\underline{9,5 \times 10^{-10} \text{ mol/L}}}$$

$$\text{conc. g/L} \quad [NP] \text{ g/L} = \frac{5,4 \times 10^{-5} \text{ g}}{10^{-2} \text{ L}} = \underline{\underline{5,4 \times 10^{-3} \text{ g/L}}}$$

ppm (partes por milhão) ou mg/L 5,4 ppm  
ppb (partes por bilhão)  $10^3 \times \text{ppm}$