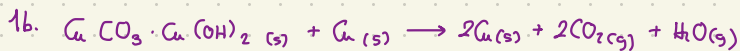
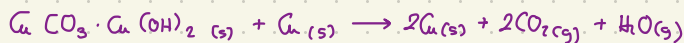


1.



$$300 \text{ g Macaquita} \cdot \frac{57 \text{ g CuCO}_3 \cdot \text{Cu(OH)}_2}{100 \text{ g Macaquita}} \cdot \frac{1 \text{ mol CuCO}_3 \cdot \text{Cu(OH)}_2}{224,13 \text{ g CuCO}_3 \cdot \text{Cu(OH)}_2} \cdot \frac{2 \text{ mol Cu}}{1 \text{ mol CuCO}_3 \cdot \text{Cu(OH)}_2} = 1,55 \text{ mol Cu}$$

$$1,55 \text{ mol Cu} \cdot \frac{63,55 \text{ g}}{1 \text{ mol}} \cdot \frac{80 \text{ g real}}{100 \text{ g teórico}} = 79,80 \text{ g Cu}$$



$$25 \text{ g casiterita} \cdot \frac{78,6 \text{ g SnO}_2}{100 \text{ g casiterita}} \cdot \frac{1 \text{ mol SnO}_2}{150,71 \text{ g SnO}_2} \cdot \frac{1 \text{ mol Sn}}{1 \text{ mol SnO}_2} = 0,13 \text{ mol Sn}$$

$$0,13 \text{ mol Sn} \cdot \frac{118,71 \text{ g Sn}}{1 \text{ mol Sn}} \cdot \frac{95 \text{ g REACES}}{100 \text{ g teórico}} = 14,70 \text{ g Sn}$$

BRONCE 11% Sn
89% Cu

$$14,70 \text{ g Sn} \cdot \frac{89 \text{ g Cu}}{11 \text{ g Sn}} = 118,93 \text{ g de Cu NECESITARÍA}$$

NO LOS TENGO $\Rightarrow$ Cu
REACTIVO LIMITANTE

$$79,80 \text{ g Cu} \cdot \frac{11 \text{ g Sn}}{89 \text{ g Cu}} = 9,74 \text{ g Sn}$$

$$79,80 \text{ g} + 9,74 \text{ g} = 89,54 \text{ g BRONCE}$$

2.

$$Q_{\text{NEUTRALIZACIÓN}} = - \left(Q_{\text{DILUCIÓN}} + Q_{\text{CALORÍMETRO}} \right) = -m_d \cdot c_e \Delta T = 200 \cdot 4,18 \cdot 9 = -7524 \text{ J}$$

$$\Delta H = \frac{Q}{n} = \frac{-7524}{0,15} = -50160 \text{ J/mol}$$

$$= -50,160 \text{ kJ/mol}$$

$\underbrace{\hspace{10em}}_{\text{equivalente en agua} = 0}$
 $Q_{\text{CALORÍMETRO}} = 0$

NaOH

$$M = \frac{n}{V} \quad n_{\text{NaOH}} = 0,1 \cdot 1,5 = 0,15 \text{ mol} = n_{\text{HCl}}$$

$$d = \frac{m}{V} \Rightarrow 1 = \frac{m}{100} \quad m_{\text{DIL. NaOH}} = 100 \text{ g} = m_{\text{DIL. HCl}}$$

$$m_{\text{DIL}} = 100 + 100 = 200 \text{ g}$$

7.2. Collemos un calorímetro e miramos o valor do seu equivalente en auga; como neste caso é depreciable supoñemos $m_0 = 0\text{g}$. Collemos cunha probeta 100 mL da disolución de NaOH de concentración 2,0 M e vértense nun calorímetro, medindo a continuación cun termómetro a temperatura desta disolución que chamamos t_1 . Lavamos a probeta e collemos agora 100 mL da disolución de HCl de concentración 2,0 M, comprobando que a súa temperatura sexa a mesma ca da disolución de base, verténdoa no calorímetro. A continuación, pechamos o calorímetro e removemos lixeiramente cun axitador, anotando a temperatura máxima que se alcanza no termómetro, e que chamamos t_2 .

3. a) APLICANDO LA LEY DE VELOCIDAD ($V = k[A]^{\alpha}[B]^{\beta}$) a los distintos experimentos

$$\begin{array}{lcl} \text{Exp 1} & 1,2 \cdot 10^{-3} = k \cdot 1^{\alpha} \cdot 0,5^{\beta} \\ \text{Exp 3} & 2,4 \cdot 10^{-3} = k \cdot 1^{\alpha} \cdot 1^{\beta} \\ \text{Exp 2} & 9,6 \cdot 10^{-3} = k \cdot 2^{\alpha} \cdot 1^{\beta} \end{array} \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} \text{dividiendo} \\ \\ \text{Combinando} \end{array} \quad \begin{array}{l} \frac{1,2 \cdot 10^{-3}}{2,4 \cdot 10^{-3}} = \frac{k \cdot \cancel{1^{\alpha}} \cdot 0,5^{\beta}}{\cancel{k} \cdot \cancel{1^{\alpha}} \cdot 1^{\beta}} \quad \frac{1}{2} = \left(\frac{1}{2}\right)^{\beta} \quad \beta = 1 \\ \frac{9,6 \cdot 10^{-3}}{2,4 \cdot 10^{-3}} = \frac{k \cdot 2^{\alpha} \cdot 1^{\beta}}{k \cdot 1^{\alpha} \cdot 1^{\beta}} \quad 4 = 2^{\alpha} \quad \alpha = 2 \end{array}$$

ORDEN RESPECTO A $\alpha = 2$

" " B $\beta = 1$

ORDEN TOTAL $\alpha + \beta = 3$

Substituyendo en 1 y usando el experimento 1

$$1,2 \cdot 10^{-3} = k \cdot 1^{\alpha} \cdot 0,5^{\beta} \quad k = 0,024 \frac{\text{l}^2}{\text{mol}^2 \cdot \text{s}}$$

b) $V = k[A][B]^2$

$$V = 0,0024 [A][B]^2$$

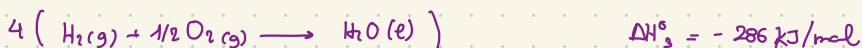
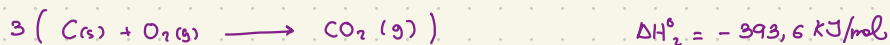
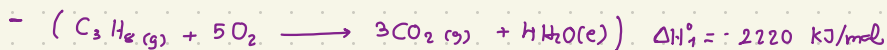
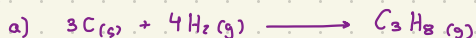
$$\frac{\text{mol}}{\text{l} \cdot \text{s}} = k \frac{\text{mol}}{\text{l}} \left(\frac{\text{mol}}{\text{l}} \right)^2$$

$$\frac{\text{l}^2}{\text{mol}^2 \cdot \text{s}} = k$$

b2) $V_0 = k[A_0]^2[B_0]$

$$= k[2A_0]^2[B_0] = k \cdot 4 \cdot [A_0]^2[B_0] = 8 \cdot k[A_0]^2[B_0] = \underline{8 \cdot V_0}$$

4.



$$\Delta H_R^\circ = -\Delta H_1^\circ + 3\Delta H_2^\circ + 4\Delta H_3^\circ = 2220 + (3 \cdot (-393,6)) + 4 \cdot (-286) = -104,8 \text{ kJ}$$

(4.b)

 $\Delta G < 0$ ESPONTANEO

$$\Delta G = \Delta H - T\Delta S$$

SIGNO
NEGATIVOEL SIGNO DE ΔG
DEPENDE $T\Delta S$ $\Delta S < 0$ (DESCIENDE EL N° MOLES GAS)SERÁ ESPONTANEO $|\Delta H| > |T\Delta S|$

4.c

$$\Delta S = \sum S_{f, \text{PROD}}^\circ - \sum S_{f, \text{REAC}}^\circ =$$

$$= 296,6 - (3 \cdot 5,7 + 4 \cdot 130,7) = -270,3 \text{ J/K}$$

$$\Delta G = \Delta H - T\Delta S$$

$$0 = -104800 - T(-270,3) \quad T = 388,15 \text{ K}$$

A TEMPERATURA MENOR 388,15 K ES ESPONTÁNEA.