

# Procedimientos

Robert Lu Zheng

3-756-1980

11/11/12

Introducción a  
la Química

1)  $m = 0.0055 \text{ g}$

$$V = 4.13 \text{ ml} \left( \frac{1 \text{ L}}{1000 \text{ ml}} \right) = 4.13 \times 10^{-3} \text{ L}$$

$$T = 23^\circ\text{C} + 273 = 296 \text{ K}$$

$$P = 760 \text{ torr} \rightarrow 1 \text{ atm}$$

$$N_2 = 2 \times 14 = 28 \text{ uma}$$

$$O_2 = 2 \times 16 = 32 \text{ uma}$$

$$C_2H_4 = 2 \times 12 = 24$$

$$4 \times 1 = 4$$

$$28 \text{ uma}$$

$$Cl_2 = 2 \times 35 = 70 \text{ uma}$$

$$C_2H_6 = 2 \times 12 = 24$$

$$6 \times 1.01 = 6.06$$

$$30.06 \text{ uma}$$

$$\begin{aligned} PV &= nRT \\ PV &= \frac{g}{MM} RT \\ MM &= \frac{gRT}{PV} \end{aligned} \rightarrow MM = \frac{(0.0055 \text{ g}) \left( 0.08206 \frac{\text{L atm}}{\text{mol K}} \right) (296 \text{ K})}{(1 \text{ atm}) (4.13 \times 10^{-3} \text{ L})}$$
$$MM = 32.35 \text{ uma}$$

El gas puede ser  $O_2$ . Puesto que  
se acerca a la masa molar.

2) 45 Neutrones (isótopo)

$${}_{34}^{78}\text{Se} = 44 \text{ neutrones}$$

$${}_{36}^{80}\text{Kr} = 44 \text{ neutrones}$$

$${}_{17}^{34}\text{Cl} = 17 \text{ neutrones}$$

$${}_{45}^{103}\text{Rh} = 58 \text{ neutrones}$$

$${}_{35}^{80}\text{Br} = 45 \text{ neutrones}$$

3)  $29.1\% \text{ Na} \rightarrow 29.1 \text{ g}$

$$40.6\% \text{ S} \rightarrow 40.6 \text{ g}$$

$$100\% - 40.6\% - 29.1\% = 30.3\% \text{ O} \rightarrow 30.3 \text{ g}$$

$$29.1 \text{ g Na} \left( \frac{1 \text{ mol Na}}{23 \text{ g Na}} \right) = 1.265 \text{ mol Na} / 1.265 = 1 \times 2 = 2$$

$$40.6 \text{ g S} \left( \frac{1 \text{ mol S}}{32 \text{ g S}} \right) = 1.268 \text{ mol S} / 1.265 = 1 \times 2 = 2$$

$$30.3 \text{ g O} \left( \frac{1 \text{ mol O}}{16 \text{ g O}} \right) = 1.894 \text{ mol O} / 1.265 = 1.50 \times 2 = 3$$

$$\text{Fórmula Empírica} = \text{Na}_2\text{S}_2\text{O}_3$$

4) 15g Sal hidratada

7.05g H<sub>2</sub>O

$$7.05g H_2O \left( \frac{1 \text{ mol } H_2O}{18g H_2O} \right) = 0.392 \text{ mol } H_2O / 0.0559 = 7$$

Na<sub>2</sub>SO<sub>4</sub>

$$Na = 2 \times 23 = 46$$

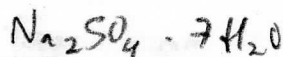
$$S = 1 \times 32 = 32$$

$$O = 4 \times 16 = 64$$

142 uma

$$7.95g Na_2SO_4 \left( \frac{1 \text{ mol } Na_2SO_4}{142g Na_2SO_4} \right) = 0.0559 \text{ mol } Na_2SO_4 / 0.0559 = 1$$

$$x = 7$$



$$(15 - 7.05)g = 7.95g Na_2SO_4$$

6) %rendimiento = 92%

g S necesarios para 80g de CS<sub>2</sub>



CS<sub>2</sub>

$$C = 1 \times 12 = 12$$

$$S = 2 \times 32 = 64$$

76 uma

$$80g CS_2 + 8\% = 80g CS_2 + 6.4g CS_2 = 86.4g CS_2$$

$$86.4g CS_2 \left( \frac{1 \text{ mol } CS_2}{76g CS_2} \right) \left( \frac{4 \text{ mol } S}{1 \text{ mol } CS_2} \right) \left( \frac{32g S}{1 \text{ mol } S} \right) = 145.5g S$$

Explicación:

Esta reacción unidireccional tiene un rendimiento de producción de 92%. Por lo tanto, si se quiere saber cuánto reactivo es necesario para producir 80g de producto, se ajusta esa cantidad de producto al 100%, para que el reactivo cumpla con el % de rendimiento del mismo.

7) M<sub>60.4%</sub>

$$\text{Isótopo 1} = 68.9257 \text{ uma}$$

$$\text{Isótopo 2} = 70.9249 \text{ uma}$$

$$100\% - 60.4\% = 39.6\%$$

$$M_{\text{atómica promedio}} = (68.9257g) \left( \frac{60.4}{100} \right) + (70.9249g) \left( \frac{39.6}{100} \right)$$

$$= 41.63 + 28.08$$

$$= 69.71 \text{ uma}$$

$$10) \quad P = 1.2 \text{ atm} \quad P_f = 2.4 \text{ atm} \\ V = 12 \text{ L} \quad V_f = ?$$

$$PV = P_f V_f$$

$$(1.2 \text{ atm})(12 \text{ L}) = (2.4 \text{ atm}) V_f$$

$$V_f = \frac{(1.2 \text{ atm})(12 \text{ L})}{2.4 \text{ atm}} = 6 \text{ L}$$

12) 1 átomo de Fe

$$\text{Fe} = 55.85 \text{ uma}$$

$$\frac{55.85 \text{ uma}}{6.022 \times 10^{23} \text{ átomos}} = 9.27 \times 10^{-23} \text{ g/átomo}$$

$$14) \quad D = 1.28 \text{ g/L}$$

$$T = 56^\circ\text{C} + 273 \text{ K} = 329 \text{ K}$$

$$P = 454 \text{ torr} \left( \frac{1 \text{ atm}}{760 \text{ torr}} \right) = 0.597 \text{ atm}$$

62% C

10.4% H

27.6% O

$$62 \text{ g C} \left( \frac{1 \text{ mol C}}{12 \text{ g C}} \right) = 5.167 \text{ mol C} / 1.725 = 3$$

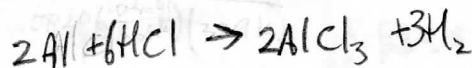
$$10.4 \text{ g H} \left( \frac{1 \text{ mol H}}{1 \text{ g H}} \right) = 10.4 \text{ mol H} / 1.725 = 6.03$$

$$27.6 \text{ g O} \left( \frac{1 \text{ mol O}}{16 \text{ g O}} \right) = 1.725 \text{ mol O} / 1.725 = 1$$



$$15) \quad 9.2 \text{ cm} \times 8.25 \text{ cm} \times 5.2 \text{ cm} = 245.7 \text{ cm}^3 \text{ Al} \rightarrow 245.7 \text{ ml}$$

$$245.7 \text{ ml} \left( \frac{3.9 \text{ g}}{1 \text{ ml}} \right) = 958.23 \text{ g Al}$$



$$958.23 \text{ g Al} \left( \frac{1 \text{ mol Al}}{27 \text{ g Al}} \right) \left( \frac{3 \text{ mol H}_2}{2 \text{ mol Al}} \right) \left( \frac{2 \text{ g H}_2}{1 \text{ mol H}_2} \right) = 106.47 \text{ g H}_2$$

18)  $V = 10L$

$mol = (0.2 + 0.3 + 0.4) mol = 0.9 mol$

$T = 25^{\circ}C + 273 = 298 K$

$PV = nRT$

$P = \frac{nRT}{V}$

$= \frac{(0.9 mol) (0.08206 \frac{atm \cdot L}{mol \cdot K}) (298 K)}{10 L}$

$= 2.20 atm \left( \frac{760 torr}{1 atm} \right) = 1672 torr$

20)  $S_8$

$S = 8 \times 32.07 = 256.56 umg$

$0.568 mm^3 \left( \frac{1 cm^3}{1000 mm^3} \right) \left( \frac{1 ml}{1 cm^3} \right) \left( \frac{2.07 g}{1 ml} \right) \left( \frac{1 mol S_8}{256.56 g} \right) = 4.6 \times 10^{-6} mol S_8$

27) 120g de cada reactivo

15g  $K_2Cr_2O_7$  como producto



$K = 2 \times 39.1 = 78.2$

$Cr = 2 \times 52 = 104$

$O = 7 \times 16 = 112$

$294.2 umg$

$120g H_2O \left( \frac{1 mol H_2O}{18 g H_2O} \right) \left( \frac{1 mol K_2Cr_2O_7}{1 mol H_2O} \right) = 6.66 mol K_2Cr_2O_7$  limitante

$120g PbO_2 \left( \frac{1 mol PbO_2}{239.2g PbO_2} \right) \left( \frac{1 mol K_2Cr_2O_7}{3 mol PbO_2} \right) = 0.167 mol K_2Cr_2O_7$

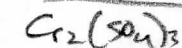
$120g Cr_2(SO_4)_3 \left( \frac{1 mol}{392.3g} \right) \left( \frac{1 mol K_2Cr_2O_7}{1 mol Cr_2(SO_4)_3} \right) = 0.305 mol K_2Cr_2O_7$

$120g K_2SO_4 \left( \frac{1 mol}{174.1g} \right) \left( \frac{1 mol K_2Cr_2O_7}{1 mol K_2SO_4} \right) = 0.689 mol K_2Cr_2O_7$



$Pb = 1 \times 207.2 = 207.2$

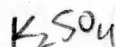
$O = 2 \times 16 = 32$   
 $239.2 umg$



$Cr = 2 \times 52 = 104$

$S = 3 \times 32.1 = 96.3$

$O = 12 \times 16 = 192$   
 $392.3 umg$



$K = 2 \times 39 = 78$

$S = 1 \times 32.1 = 32.1$

$O = 4 \times 16 = 64$   
 $174.1 umg$

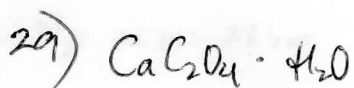
$0.167 mol K_2Cr_2O_7 \left( \frac{294.2g K_2Cr_2O_7}{1 mol K_2Cr_2O_7} \right) = 49.13g$

$\frac{15g}{49.13g} \times 100\% = 30.5\% \text{ rendimiento}$

28) 15 mol  $\text{CH}_4$   $T = 23^\circ\text{C} + 273 = 296\text{K}$   
 $V = ?$   $P = 0.985\text{ atm}$

$$15\text{ mol CH}_4 \left( \frac{1\text{ mol CO}_2}{1\text{ mol CH}_4} \right) = 15\text{ mol CO}_2$$

$$V = \frac{nRT}{P} = \frac{(15\text{ mol}) \left( 0.08206 \frac{\text{atm L}}{\text{mol K}} \right) (296\text{K})}{0.985\text{ atm}} = 370\text{ L}$$



mayor porcentaje de masa (elemento)

$$\text{Ca} = 1 \times 40.1 = 40.1$$

$$\text{C} = 2 \times 12 = 24$$

$$\text{O} = 4 \times 16 = 64$$

$$\underline{128.1\text{ una}}$$



$$\text{H} = 2 \times 1 = 2$$

$$\text{O} = 1 \times 16 = 16$$

$$\underline{18\text{ una}}$$

$$128.1\text{ una} + 18\text{ una} = 146.1\text{ una}$$

$$\text{Ca} = 40.1 / 146.1 \times 100\% = 27.45\%$$

$$\text{C} = 24 / 146.1 \times 100\% = 16.43\%$$

$$\text{O} = (64 + 16) / 146.1 \times 100\% = 54.76\%$$

$$\text{H}_2\text{O} = 18 / 146.1 \times 100\% = 12.32\%$$

← el elemento  
 Oxígeno es el  
 que tiene mayor  
 porcentaje de masa