

A60 Un clorur de mercuri conté un 84,97% de mercuri. Quan s'evapora un gram d'aquest compost ocupa 0,0615L a 350K i 1,01atm. Calcula:

a) La massa molecular del compost.

b) La seua fórmula empírica. (HgCl)

$$\text{Cl}=35,5 \quad \text{Hg}=200,6$$

c) La seua fórmula molecular (Hg₂Cl₂)

$$m_{\text{compost}} = 100 \text{ g} \rightarrow \begin{array}{l} m_{\text{Hg}} = 84,97 \text{ g} \\ m_{\text{Cl}} = 15,03 \text{ g} \end{array} \quad \begin{array}{l} M_{\text{Hg}} = 200,6 \text{ g/mol} \\ M_{\text{Cl}} = 35,5 \text{ g/mol} \end{array}$$

$$m_{\text{compost}} = 100 \text{ g} \rightarrow \begin{array}{l} n_{\text{Hg}} = \frac{m_{\text{Hg}}}{M_{\text{Hg}}} = \frac{84,97}{200,6} = 0,424 \text{ mol} \\ n_{\text{Cl}} = \frac{m_{\text{Cl}}}{M_{\text{Cl}}} = \frac{15,03}{35,5} = 0,423 \text{ mol} \end{array} \quad \frac{n_{\text{Cl}}}{n_{\text{Hg}}} = 1 \quad \text{La fórmula empírica és HgCl}$$

Per determinar la fórmula molecular necessita la massa molecular M

$$\begin{array}{l} m = 1 \text{ g} \\ V = 0,0615 \text{ L} \\ P = 1,01 \text{ atm} \\ T = 350 \text{ K} \\ R = 0,082 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}} \end{array}$$

$$n = \frac{m}{M}$$

$$P \cdot V = n \cdot R \cdot T$$

$$P \cdot V = \frac{m}{M} R \cdot T$$

$$M = \frac{m \cdot R \cdot T}{P \cdot V}$$

$$M = \frac{1 \text{ g} \times 0,082 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}} \times 350 \text{ K}}{1,01 \text{ atm} \times 0,0615 \text{ L}} = 462 \text{ g/mol}$$

La fórmula molecular serà (HgCl)_a

$$M_r[(\text{HgCl})_a] = 462$$

$$M_r[\text{HgCl}] = 236,1$$

$$a = \frac{462}{236} = 2$$

La fórmula molecular serà Hg₂Cl₂