

Gas parfaits Corrigés des exercices

Exercice 1 100g H₂ ⇒ 50 mol H₂

$$\begin{array}{l|l} 1 \text{ mol gaz parfait} \rightarrow 22,4 \text{ l aux TPN} & \\ 50 \text{ " " " " } \rightarrow X \text{ " " " " } & X = 22,4 \cdot 50 = \underline{\underline{1120 \text{ l}}} \end{array}$$

Exercice 2 O₂ ⇒ 21 vol% dans l'air

$$60 \text{ m}^3 \text{ air} \Rightarrow \frac{60 \cdot 21}{100} = 12,6 \text{ m}^3 \text{ O}_2 \Rightarrow 12600 \text{ l O}_2$$

$$\begin{array}{l|l} 22,4 \text{ l O}_2 \text{ aux TPN} \rightarrow 1 \text{ mol} & \\ 12600 \text{ l " " " " } \rightarrow X \text{ " " " " } & X = \frac{12600}{22,4} = 562,5 \text{ mol O}_2 \end{array}$$

• masse O₂ = 562,5 · (O₂) = 562,5 · 32 = 18000g O₂

Exercice 3

$$\begin{array}{l|l} 448 \text{ l CO}_2 \rightarrow X \text{ mol aux TPN} & \\ 22,4 \text{ l CO}_2 \rightarrow 1 \text{ mol " " " " } & X = \frac{448}{22,4} = 20 \text{ mol CO}_2 \end{array}$$

$$20 \text{ mol CO}_2 \rightarrow ? \text{ g} \quad m = 20 \cdot (\text{CO}_2) = 20 \cdot 44 = \underline{\underline{880 \text{ g CO}_2}}$$

Exercice 4 1 l (TPN) → 2,86 g

$$22,4 \text{ l} \rightarrow 22,4 \cdot 2,86 = 64,064 \text{ g}$$

$$\begin{array}{l} \downarrow \\ 1 \text{ mol aux TPN} \end{array} \quad \text{et} \quad \begin{array}{l} \downarrow \\ 64,064 \text{ g} \end{array} \Rightarrow \text{masse volumique} = 64,064 \text{ g/mol}$$

⇒ 64,064 u

Exercice 5 Cf cours!

Exercice 6

Le système est fermé car la masse de gaz ne varie pas!

Système fermé:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \Rightarrow V_2 = \frac{P_1 V_1 T_2}{P_2 T_1}$$

$$V_2 = \frac{\overset{(TPN), [K]}{1} \cdot \overset{[L]}{100} \cdot \overset{(TPN), [K]}{373}}{\underset{[atm]}{5} \cdot \underset{(TPN), [K]}{273}} = \underline{\underline{27,326 \text{ l } O_2}}$$

Exercice 7

Masse ne varie pas \Rightarrow Systeme fermé $\Rightarrow \frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$

$$T_2 = \frac{p_2 V_2 T_1}{p_1 V_1} = \frac{1 \cdot 250 \cdot 373}{0,95 \cdot 190} = \underline{\underline{516,62 \text{ K}}} (\approx 243,5^\circ\text{C})$$

Exercice 8 SO_2 aux TPN !

22,4 l $SO_2 \rightarrow$ 1 mol aux TPN
 1 mol $SO_2 = 1 \cdot (SO_2) = 64,06 \text{ g/mol}$ } $64,06 \text{ g} / 22,4 \text{ l}$
 \Rightarrow masse volumique : $\frac{64,06}{22,4} = \underline{\underline{2,859 \text{ g/l}}}$

Exercice 9 6g $H_2 \rightarrow ?$ mol $m = \frac{6}{2} = 3 \text{ mol } H_2$

Systeme fermé $\Rightarrow \frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$ La pression initiale est inconnue !

a) $p_1 V_1 = n R T_1 \Rightarrow p_1 = \frac{n R T_1}{V_1} = \frac{3 \cdot 0,0821 \cdot 293}{10} = 7,277 \text{ atm}$

$p_1 = 7,277 \text{ atm}$ $p_2 = 100 \text{ atm}$
 $V_1 = 10 \text{ l} = V_2$ $T_2 = ? \Rightarrow T_2 = \frac{p_2 V_2 T_1}{p_1 V_1}$

$$T_2 = \frac{100 \cdot 10 \cdot 293}{7,277 \cdot 10} = \underline{\underline{4059,9 \text{ K}}}$$

b) Si $p_2 = 300 \text{ atm}$

$$T_2 = \frac{p_2 V_2 T_1}{p_1 V_1} = \frac{300 \cdot 10 \cdot 293}{7,277 \cdot 10} = \underline{\underline{12179,6 \text{ K} !!}}$$