



$$n = \frac{m}{M} \quad M(\text{Na}) = 23 \text{ g/mol} \quad n(\text{Na}) = \frac{100 \text{ g}}{23 \text{ g/mol}} = 4,35 \text{ mol}$$

$$M(\text{H}_2\text{O}) = 2 \cdot 1 \text{ g/mol} + 16 \text{ g/mol} = 18 \text{ g/mol}$$

$$n(\text{H}_2\text{O}) = \frac{100 \text{ g}}{18 \text{ g/mol}} = 5,56 \text{ mol}$$

$$\frac{J}{\text{m}^2} = \frac{N \cdot m}{\text{m}^2} = \frac{N}{\text{m}^2} = p_a$$

$$n(\text{H}_2) = \frac{n(\text{Na})}{2} = \frac{4,35 \text{ mol}}{2} = 2,175 \text{ mol}$$

$$p = \frac{nRT}{V} = \frac{2,175 \text{ mol} \cdot 8,314 \frac{\text{J}}{\text{mol K}} \cdot 293,15 \text{ K}}{0,1 \text{ m}^3} = 5,3 \cdot 10^3 \text{ Pa}$$

$$g = 0,903 \text{ g/L} \quad T = 20^\circ\text{C} \quad p = 0,5 \text{ bar} \cdot \frac{10^5 \text{ Pa}}{1 \text{ bar}} = 5 \cdot 10^4 \text{ Pa}$$

$$M = \frac{gRT}{p} = \frac{0,903 \text{ g/m}^3 \cdot 8,314 \frac{\text{J}}{\text{mol K}} \cdot 293,15 \text{ K}}{5 \cdot 10^4 \text{ Pa}} = 44,0 \text{ g/mol} \quad \begin{matrix} \text{CO}_2 \\ \text{N}_2\text{O} \end{matrix}$$

$$0,903 \frac{\text{g}}{\text{L}} \cdot \frac{1000 \text{ L}}{1 \text{ m}^3} = 903 \frac{\text{g}}{\text{m}^3} \quad \frac{\frac{\text{g}}{\text{m}^3} \frac{\text{J}}{\text{mol K}}}{\text{Pa}} = \frac{\frac{\text{g}}{\text{m}^3} \frac{\text{Nm}}{\text{mol K}}}{\text{N}^2 \text{ mol}^2 \text{ K}} = \text{g/mol}$$

$$9,25 \text{ g CO} ; 7,83 \text{ g CO}_2 ; p = 0,8 \text{ bar}$$

$$p_i = x_i \cdot p_{\text{gesamt}}$$

$$M(\text{CO}) = 28 \text{ g/mol} \quad M(\text{CO}_2) = 44 \text{ g/mol}$$

$$x(\text{CO}) = \frac{9,25 \text{ g}}{28 \text{ g/mol}} \cdot \frac{28 \text{ g/mol}}{\frac{9,25 \text{ g}}{28 \text{ g/mol}} + \frac{7,83 \text{ g}}{44 \text{ g/mol}}} = 0,65 \quad x(\text{CO}) = 0,65$$

$$x(\text{CO}_2) = 1 - x(\text{CO}) = 1 - 0,65 = 0,35$$

$$p(\text{CO}) = 0,65 \cdot 0,8 \text{ bar} = 0,52 \text{ bar}$$

$$p(\text{CO}_2) = 0,35 \cdot 0,8 \text{ bar} = 0,28 \text{ bar}$$

$$pV = nRT = \frac{m}{M} RT$$

$$p = \frac{\frac{m}{V} RT}{M} = \frac{\rho RT}{M}$$

$$\rho = \frac{pM}{RT}$$

$$\bar{M} = x_1 \cdot M_1 + x_2 \cdot M_2 + \dots$$

$$\bar{M}(\text{Luft}) = 0,78 \cdot 28 + 0,21 \cdot 32 \text{ g/mol} + 0,01 \cdot 40 \text{ g/mol}$$

$$= 29 \text{ g/mol}$$

$$\rho = \frac{10^5 \text{ Pa} \cdot 29 \text{ g/mol}}{8,314 \frac{\text{J}}{\text{mol K}} \cdot 293,15 \text{ K}} = 1,276 \quad \frac{\frac{\text{Pa}}{\text{J}} \frac{\text{g}}{\text{mol K}}}{\frac{\text{N}^2}{\text{m}^2} \frac{\text{Nm}}{\text{mol K}}} = \frac{\text{g}}{\text{m}^3}$$

$$= 1,276 \cdot 10^3 \text{ g/m}^3 = 1,276 \frac{\text{kg}}{\text{m}^3}$$