① $V = 400\,cm^3$ $V = 50\,cm^3$

$P = 1\,atm$

$T = 15°C$ $T = 77°C$

$$\frac{P_1 V_1}{T_1} = \frac{P_1 V_1}{T_1}$$

$$\frac{400 \times 1}{(273+15)} = \frac{50 \times P_2}{(77+273)} \Leftrightarrow P_2 =$$

---

② $V = 1{,}2 \times 10^7\,l$

P 737 mmg

m_{He}

0,9697

$PV = nRT$

$$PV = \frac{m}{M} RT$$

$$\frac{MPV}{RT} = m$$

$$m_{He} = \frac{0{,}9677 \times 1{,}2 \times 10^7 \times 4}{0{,}082 \times 298} =$$

$$= 1{,}5 \times 10^6\,J$$

---

③ $B_x H_y = ?$

$P = 24{,}8\,mmHg$

$T = 25$

$V = 0{,}125\,l$

$m = 12{,}5\,mg$

$PV = nRT$

$$\frac{PV}{RT} = \frac{m}{M}$$

$$M = \frac{mRT}{PV}$$

$$m = \frac{12{,}5 \times 10^{-3} \times 0{,}082 \times 298}{0{,}033 \times 0{,}125}$$

$m = 74{,}92$

$B = 10{,}811$

$H = 1$

$\frac{74.9}{10.811} \approx 6{,}9 = 6$

B_6H_{10}

Schnitt 10

④ $2NaN_3(s) \rightarrow 3Na(s) + 3N_2(g)$

$P = 1,3\ atm$

$T = 25$

$V = 75\ l$

$PV = nRT.$

$n_{N_2} = \frac{1,3 \times 7,5}{0,082 \times 298} = 4$

$3\ mols\ N_2 \longrightarrow 2NaN_3$

$4 \qquad 2,67\ mols\ NaN_3$

$2,67 \times 65 = 173,6\ g$

---

⑤ $C_2HBrClF_3 + O_2$

$P = 170\ mmHg \qquad P_{O_2} = 570\ mmHg$

$P_{(Halotano)} = x_{Halotano} \times P_T = \frac{170}{740} = 0,229$

$P_{(O_2)} = x_{O_2} \times P_t = \frac{570}{740} = 0,770$

$P_T = 170 + 570 = 740\ mmHg$

$x_H = \frac{n_H}{n_H + n_{O_2}}$

b) $160\ g\ O_2 \rightarrow C_2HBrClF_3$

$0,229 = \frac{n_H}{5 + n_H}$

$n_H = 1,49\ mols$

$n_{O_2} = \frac{160\ g}{32\ g/mol} = 5\ mols$

$m_{C_2HBrClF_3} = 197,38 \times 1,49 = 293,5\ g$

⑥ $\frac{v_x}{v_{He}} = \sqrt{\frac{M_{He}}{M_x}}$

$\frac{v_x}{3v_{He}} = \sqrt{\frac{4}{M_x}} \Leftrightarrow \left(\frac{1}{3}\right)^2 = \frac{4}{M_x} \Rightarrow M_x = 36\ g/mol$

---

⑦ $S_x F_y = ?$ 25,23% S

0,09 F y

V = 85 mL

T = 45 °C

P = 83,8 mmHg = 0,11 atm

$PV = nRT$

$M = \frac{mRT}{PV}$

$M = \frac{0,095 \times 0,082 \times (273+45)}{0,11 \times 8,9 \times 10^{-3}}$

$M = 254,37\ g/mol$

nós sabemos que 25,23% do gás é constituído por enxofre.

$0,2523 \times 254,37 = 64,17$

$64,17/32 \simeq 2$

$M_S = 32$

logo $S = 2$

$(1-0,2523)\ 254,37 = \frac{190,11}{19} \simeq 10$

$M_F = 19$

logo $F = 10$

$S_2 F_{10}$

(8) $V = 5\,\ell$

$325\,g\ H_2O$

$T = 275\,K$

$PV = nRT$

e

$$P = \frac{nRT}{V - bn} - a\left(\frac{n}{V}\right)^2$$

bn → Volume

$a\left(\frac{n}{V}\right)^2$ → interacção

$$P = \frac{\frac{325}{18} \times 0{,}082 \times (275 + 273)}{5 - 0{,}0305 \times \frac{325}{18}} - 5{,}46 \left(\frac{325}{18 \times 5}\right)^2$$

$P = 111\ atm$

Nota

os valores de a e b são tabelados

Têm isso no vosso livro e nos slides da aula

$$PV = \frac{\frac{325}{18} \times 0{,}082 \times 576}{5} = 162$$

$$bn = 0{,}0305 \times \frac{325}{18} = 4{,}44$$

$$a\left(\frac{n}{V}\right)^2 = 5{,}46 \times \left(\frac{325}{18} \times \frac{1}{5}\right) = 71{,}2$$

A contribuição da interacção é mais importante

(9)

ClO_2 $\quad$ $ClOF$

0,150 g
172 mm Hg
V = 1850 ml
T = 21°C

$PV = \frac{m}{M} RT$

$M = \frac{mRT}{PV}$

$M = \frac{0,150 \times 0,082 \times 294}{\frac{17,2}{760} \times 1,850}$

$M = 86,4 \text{ g/mol}$

$Cl_x O_y F_z$

35,5 $\quad$ 16 $\quad$ 19

2,43 $\quad$ 5,4 $\quad$ 4,54

(2,7)

Podemos verificar que:

$86,4 - 3 \times 2 - 35,5 = 18,8 \approx 19$ (1)

$Cl O_2 F$

---

(10) $4NH_3(g) + 3F_2(g) \rightarrow 3NH_4F(s) + NF_3(g)$

$P(NH_3 + F_2) = 120 \text{ mm}$

$P_{NH_3} = P_T \chi_{NH_3} = \frac{4}{7} \times 120 = 69 \text{ mm Hg}$

$P_{F_2} = P_T \chi_{F_2} = \frac{3}{7} \times 120 = 51,4 \text{ mm Hg}$