

Esercizio 1

$$\frac{d_x}{d_{H_2}} = 28,8$$

$$d = \frac{m}{V}$$

$$P_x V_x = \frac{m_x}{PM_x} RT_x$$

$$P_{H_2} V_{H_2} = \frac{m_{H_2}}{PM_{H_2}} RT_{H_2}$$

nelle stesse condizioni di P e T

$$\frac{d_x}{d_{H_2}} = \frac{PM_x}{PM_{H_2}} = 28,8$$

$$d_{H_2} = \frac{P_{H_2} PM_{H_2}}{RT_{H_2}}$$

$$d_x = \frac{P_x PM_x}{RT_x}$$

$$PM_x = 2,016 \times 28,8 = 58,06$$

su 100 g 82,64 g di C
 17,36 g di H

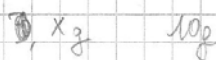
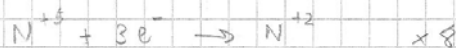
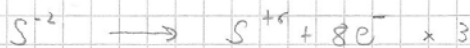
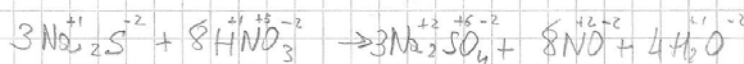
82,64/12 = 6,88 moli di C
17,36/1,008 = 17,22 moli di H

$$6,88/6,88 = 1$$

$$17,36/6,88 = 2,5$$

Moltiplicando per 2 C₂H₅ FORMULA MINIMA

$$P_f = 12 \times 2 + 5 = 29 \quad \Rightarrow 58,06/29 = 2 \quad \Rightarrow C_4H_{10} \text{ BUTANO}$$

Esercizio 2

si ottengono 806 ml di NO a c.m. \Rightarrow moli = $\frac{PV}{RT} = \frac{1 \cdot 0,806}{0,0821 \cdot 273,15} = 0,036$

si ottengono 0,036 moli di NO sono le stesse di HNO₃ reagito -

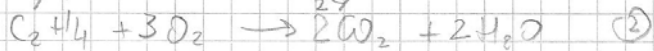
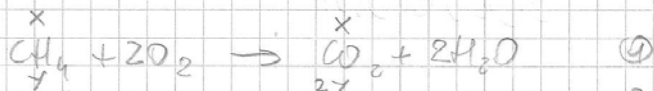
$$10/63 = 0,158 \text{ moli di HNO}_3 \quad 0,158 - 0,036 = 0,122 \text{ moli HNO}_3 \text{ rimosse} \times 3$$

$$0,036/8 \times 3 = 0,0135 \text{ moli di Ne}_2\text{S} \times 70,04 \quad 7,73 \text{ grammi HNO}_3 \text{ rimosse}$$

$$1,053 \text{ g di Ne}_2\text{S}$$

$$1,053/3,23 \times 100 = 32,61\%$$

esercizio 3



$$x + y = 100$$

$$x = 100 - y$$

$$x + 2y = 160$$

$$100 - y + 2y = 160$$

$$y = 60 ; x = 40$$

abbiamo 40 cc di CH_4 \Rightarrow 40% di CH_4 % in volume =
60 cc di C_2H_4 60% di C_2H_4 % in moli

$$\Delta H_1 = 2\Delta H_f^\circ(\text{H}_2\text{O}) + \Delta H_f^\circ(\text{CO}_2) - \Delta H_f^\circ(\text{CH}_4) =$$

$$(-68,3) \times 2 + (-94,1) - (-17,3) =$$

$$-136,6 - 94,1 + 17,3 = -212,8 \text{ kcal/mol}$$

$$\Delta H_2 = 2\Delta H_f^\circ(\text{H}_2\text{O}) + 2\Delta H_f^\circ(\text{CO}_2) - \Delta H_f^\circ(\text{C}_2\text{H}_4) =$$

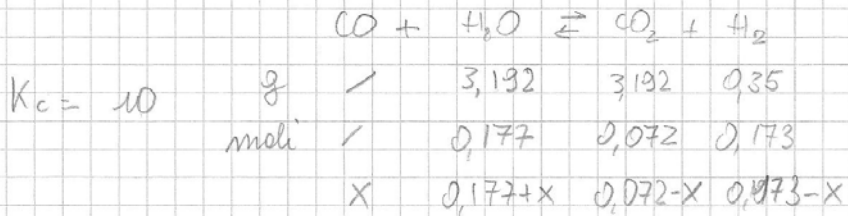
$$(-68,3) \times 2 + (-94,1) \times 2 - (+12,5) =$$

$$-136,6 - 188,2 - 12,5 = -337,3 \text{ kcal/mol}$$

22,4 l/litri sono 1 mole a.c.m. \Rightarrow

$$Q = 0,4(-212,8) + 0,6(-337,3) = \underline{\underline{-287,5 \text{ kcal}}}$$

esempio 4



$$10 = \frac{(0,072-x)(0,173-x)}{x(0,177+x)}$$

$$1,77x + 10x^2 = 0,0124 - 0,072x - 0,173x + x^2$$

$$9x^2 + 2,015x - 0,0124 = 0$$

$$x = \frac{-2,015 \pm \sqrt{(2,015)^2 + 36 \cdot 0,0124}}{18} = 0,006$$

moli di CO = 0,006

$0,006 \times 28 = 0,168$ g di CO

moli di H_2O = 0,183

$0,183 \times 18 = 3,29$ g di H_2O

moli di CO_2 = 0,066

$0,066 \times 44 = 2,904$ g di CO_2

moli di H_2 = 0,167

$0,167 \times 2,016 = 0,336$ g di H_2

6,698 g TOT

2,5% di CO

49,45% di H_2O

43,35% di CO_2

5% di H_2