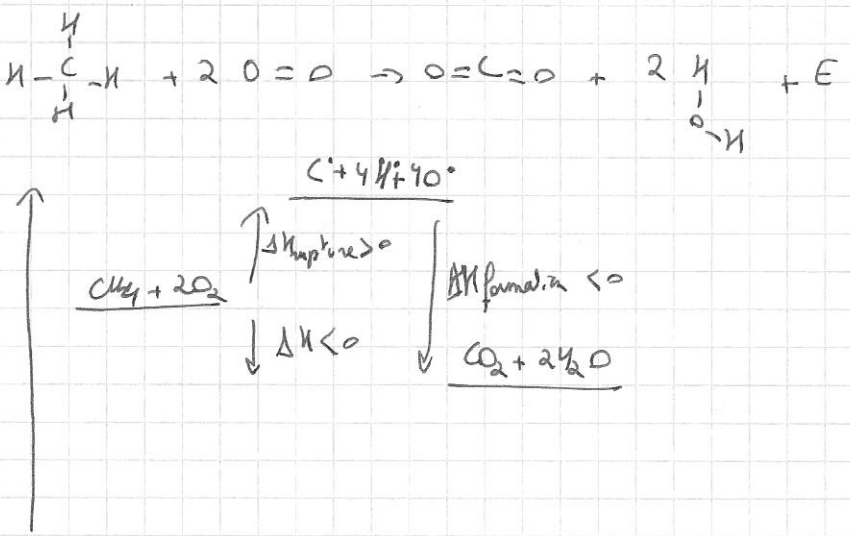
8. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O + E$

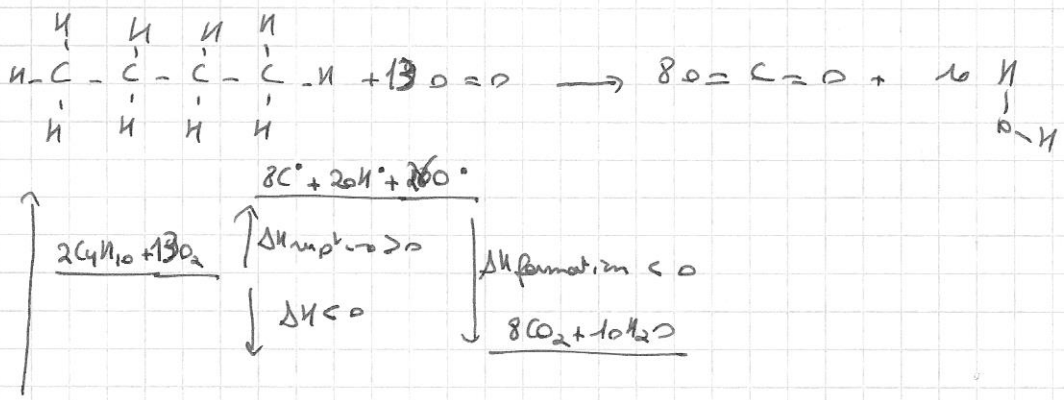


$\Delta H_{rupture} = 4 C-H + 2 O=O = 4.413 + 2.498 = 2648\ kJ/mol$

$\Delta H_{formation} = 2 C=O + 4 O-H = 2.803 + 4.464 = 3462\ kJ/mol$

$\Delta H = \underset{>0}{\Delta H_{rupture}} + \underset{<0}{\Delta H_{formation}} = 2648 - 3462 = -814\ kJ/mol$

9. $2 C_4H_{10} + 13 O_2 \rightarrow 8 CO_2 + 10 H_2O + E$



$\Delta H_{rupture} = 20 C-H + 6 C-C + 13 O=O = 20.413 + 6.346 + 13.498 = 16810\ kJ/mol$

$\Delta H_{formation} = 16 C=O + 20 H-O = 16.803 + 20.464 = 22128\ kJ/mol$

$\Delta H_{réaction} = \underset{>0}{\Delta H_{rupture}} + \underset{<0}{\Delta H_{formation}} = 16810 - 22128 = -5318\ kJ/mol$

2 mol de butane → −5318 kJ

1,72 mol → 4573 kJ par 100 g

$m = 100\ g$

$M_{C_4H_{10}} = 58\ g/mol$

$n = 1,7\ mol$

(10) 1 kg de butane 49,8 MJ/kg

$$m_{eau} = \frac{E_{disponible}}{E_{utilisée}/1kg} = \frac{49800\ kJ}{330\ kJ/kg} = 151\ kg\ d'eau$$

(11) $2\,C_8H_{18} + 25\,O_2 \rightarrow 16\,CO_2 + 18\,H_2O$

$m = 130\ g$
$\downarrow /M = 44\ g/mol$
$n = 2,95\ mol$

n_0 0,37
Δn $-2.0,1846$
n_f 0

$+16 . 0,1856$
2,955

$n = 0,37\ mol$
$\downarrow \times M_{C_8H_{18}} = 114\ g/mol$
$m = 42,18\ g$
$\downarrow /\rho = 0,7\ g/mL$
$V_{liq} = 60,26\ mL$ pour 1 lcm
$\downarrow \times 100$
$V_{liq} = 6026\ mL = 6,026\ L$

(12) $2\,C_8H_{18} + 25\,O_2 \longrightarrow 16\,CO_2 + 18\,H_2O$

$V_{liq} = 6,2\ L/100\ lcm$
$= 0,062\ L/lcm$
$= 62\ mL$
$\downarrow \times \rho = 0,7\ g/mL$
$m = 43,4\ g$
$\downarrow /M = 114\ g/mol$
$n = 0,38\ mol$

n_0 0,38
$-2.0,19$
0

$V_{gaz} = 68\ L$
$\uparrow \times V_{m\,a\,0°C} = 22,4\ L/mol$
$n = 3,04\ mol$

0
$+16.0,19$
3,04

valeur inférieure légèrement
$m = 133,76\ g$
$\uparrow /M = 44\ g/mol$
$n = 3,04\ mol$

(13)

Q = valeur en eau · $\Delta t°$ = 32,9 · 12,5 = 411,25 kJ

valeur en eau = 32,9 kJ/°C

$\Delta t° = 12,5°C$

1 kg de paraffine
(x1000
1000 g = 1 kg

411,25 kJ
(x1000
411250 kJ/kg = pouvoir thermique