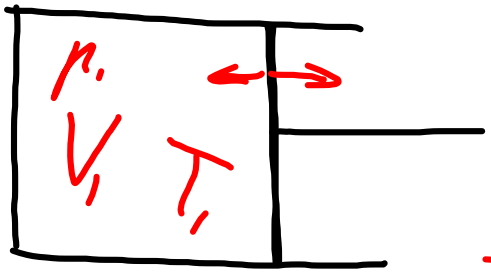
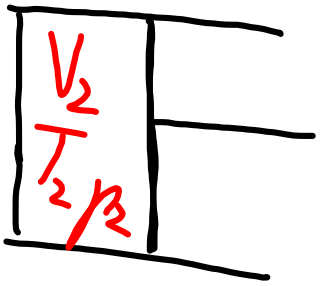
Tilstandslikningen

$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$



$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$



Eks: $p_1 = p_2$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$V_2 = \frac{T_2}{T_1} \cdot V_1$$

Eks: $V_1 = 1{,}0\ dm^3$

$T_1 = 300\ K$

$$V_2 = \frac{T_2}{300} \cdot 1{,}0$$

$T_2 = 200\ K$

$$V_2 = \frac{200\ K}{300\ K} \cdot 1{,}0\ dm^3$$

$$\frac{pV}{T} = N \cdot k$$

Antall molekyler

Boltzmanns konstant

$1{,}38 \cdot 10^{-23}\ \frac{J}{K}$

$$pV = Nk \cdot T$$

6.25

$pV = NkT$

$N = 2{,}4 \cdot 10^{24}$ $p = 200\,\text{kPa}$ $V = 48\,\text{dm}^3$

K Pa $1{,}0\,\text{dm} = 0{,}1\,\text{m}$ $1{,}0\,\text{dm}^3 = 0{,}1^3\,\text{m}^3$

T ?

$$T_K = \frac{pV}{N \cdot k} = \frac{200 \cdot 10^3 \left[\frac{N}{m^2}\right] \cdot 48 \cdot 10^{-3} [m^3]}{2{,}4 \cdot 10^{24} \cdot 1{,}38 \cdot 10^{-23} \left[\frac{N \cdot m}{K}\right]}$$

J

$$= \frac{9600}{33{,}12} \left[\frac{N \cdot m}{\frac{N \cdot m}{K}}\right] = 290\,[K]$$

$T_c = 290 - 273 = 17\,^\circ C$

b) Massetetthet: $\rho = \frac{m}{V}$

2 : Må finne massen til alle molekylen

I den periodiske tabellen finnes massen til hvert grunnstoff, oppgitt i benevningen [u]

Et molekyl består av flere grunnstoffer som "klumper" seg sammen

For å finne massen til et CO_2 molekyl finner vi massen til et C-atom og 2 O-atomer

Fra den periodiske tabellen:

$C = 12{,}011\,[u] = 12{,}01\,[u]$

$2 \cdot O = 2 \cdot 16{,}00 = 32{,}00\,[u]$

CO_2 : $12{,}01 + 32{,}00 = 44{,}01\,[u]$

Hva blir det i [kg]

Et molekyl: $44{,}01\,[u] \cdot 1{,}66 \cdot 10^{-27} \left[\frac{kg}{u}\right]$

$2{,}4 \cdot 10^{24}$ molekyler:

$m = 2{,}4 \cdot 10^{24} \cdot 44{,}01 \cdot 1{,}66 \cdot 10^{-27}\,[kg]$

$$\rho = \frac{m}{V} = \frac{175{,}3 \cdot 10^{-3}\,[kg]}{48\,[dm^3]} = 3{,}65 \cdot 10^{-3} \left[\frac{kg}{dm^3}\right]$$

$m = 10\,dm$

$m^3 = 10^3\,dm^3 \Rightarrow dm^3 = 10^{-3}\,m^3$

$$\rho = 3{,}65 \cdot 10^{-3} \left[\frac{kg}{10^{-3}\,m^3}\right] = 3{,}65 \left[\frac{kg}{m^3}\right]$$