

Answer on Question #64711, Chemistry / General Chemistry

Which sample contains more molecules: 2.50L of air at 50 degrees Celsius and 750mm Hg pressure or 2.16L of CO₂ at -10 c and 765mm hg pressure

Answer

1 For air:

$$V=2,5L=0,0025m^3$$

$$T=273+50=323^{\circ}K$$

$$P=750mmHg \text{ pressure} =99992Pa$$

$$M=29 \text{ g/Mol}$$

$$pV = mRT/M, \quad pV= nRT$$

$$n=\frac{pV}{RT}=\frac{99992*0,0025}{8,314*323}=0,093 \text{ Mol}$$

$$n=\frac{N}{N_A}, \quad N=n*N_A$$

$$N=0,093*6,02*10^{23}=5,6*10^{22}$$

2. For CO₂:

$$V=2,16L=0,00216m^3$$

$$T=273-10=263^{\circ}K$$

$$P=765 \text{ mmHg pressure}=101992Pa$$

$$M=44g/Mol$$

$$N=\frac{pV}{RT}$$

$$N=\frac{101992*0,00216}{8,314*263}=0,1 \text{ mol}$$

$$N=n*N_A=0,1*6,02*10^{23}=6,02*10^{22}$$

3. N air=5,6*10²² molecules

N co₂ =6,02*10²² molecules