Answer on Question #61135, Chemistry / General Chemistry

Conditions: I am planning to make a dilution of CO2 into several concentrations (400ppm to 1000ppm) from purified air cylinder and purified carbon dioxide cylinder in a 2L dilute flask.My idea is using the ideal gas law, PV=nRT, so since R and T is constant, I am having problems to get the value of P from the CO2 and the air.Does the P value comes from the pressure of gas in the cylinder or, should I set the P to certain value?Also, for the purified air it is made of 21% oxygen and 79% nitrogen, I am confused to how to calculate the num of mole.

Solution:

Density of Air(20°C)=1.2kg/m^3

N2 75,5% by weight in Air

O2 23,15% by weight in Air

For 1L of Air m(N2)=1.2g*75,5%=0.906; n(O2)=1,2/28=0.0324(mol)

For 1L of Air m(O2)=1.2g*23.15%=0.278; n(O2)=1,2/32=0.0086(mol)

You can get value of P from this PV=nRT, look at this P of air 101.325kPa at T=293.15K or 20°C.

The initial pressure CO2 is P=nRT/V. If you know the concentration of CO2 you can calculate n(CO2).

If you don't know n(CO2). You need to weight flask with CO2

m=m(flask) + m(CO2) =>m(CO2)=m-m(flask). n(CO2)=m(CO2)/44(g/mol).

Answer:1) n(N2)= 0.0324(mol)

2) N(O2)= 0.0086(mol)

3) P_{air} = 101.325kPa(at 20°C)

4) P(CO2)= nRT/V