APPLICATION NOTE
LD12-2

Analysis of permanent gases and light hydrocarbons with the PlasmaDetek

The PlamaDetek is ideal to measure permanent gases and light hydrocarbons in different matrices. Only one detector system is needed to accomplish this task. Such measurement is required in many different applications field: industrial, petrochemical, energy, environmental, etc. The sensitivity, the stability, the ease of start-up and installation make this system very attractive for any users.

> PLASMADETEK CONFIGURATION

The PlasmaDetek is configured with two outputs signal to be able to detect all components. Both argon or helium carrier gas can be used.

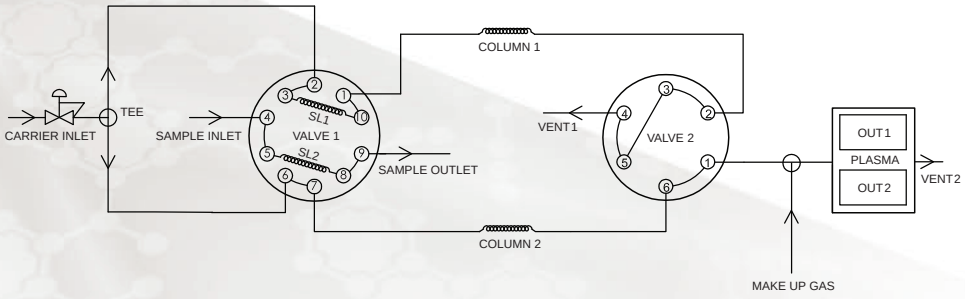
- **Output 1 : H2, C1 to C4**
- **Output 2 : O2, N2, CO, CO_2**

No need of fuel, air, dopping gas, methanizer or other devices with the system. This is a stand-alone detector system that requires only carrier gas to make the measurement of each compound.

Figure 1:
PlasmaDetek detector

> CHROMATOGRAPHY CONFIGURATION

To make the measurement of all components described above, figure 2 describes an easy configuration. Only one 10 ports injection valve and one selection valve are used. One RT Molecular Sieve 5A 30m x 0.53mm(column 2) separates H2, O2, N2, CH4, CO before being measured by the detector. The other column, a RT Alumina Bond 30m x 0.53mm x 10mm(column 1), does the same for the CO_2 and C1 to C4.



- 1 x 10 ports injection valve
- 1 x 6 ports valve for channel selection
- 1 x RT Alumina Bond 30m x 0.53mm x 10mm (column 1)
- 1 x RT Molecular Sieve 5A 30m x 0.53mm (column 2)
- Argon or helium carrier
- Carrier Flow : 4 cc/min
- Make-up : 60 cc/min
- Detector : PlasmaDetek two outputs

Figure 2:
Plumbing configuration for H2,O2,N2,CO, C1 to C4 in Helium or Argon

LDetek

> RESULTS AND PERFORMANCE

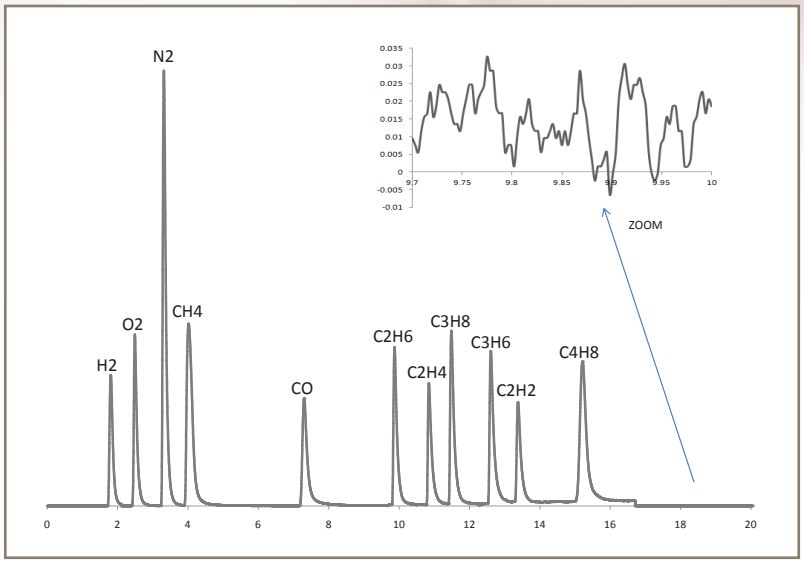


Figure 3: 10ppm H2 - O2 - N2 - CH4 - CO - C2H6 - C2H4 - C3H8 - C3H6 - C2H2 - C4H8

Figure 3 shows the chromatogram obtained from this configuration. The chromatograph uses output 1 to measure H2 and the HC's and output 2 for the others.

Component	Concentration	Peak Height	Noise	S/N	LOD (ppb) S/N =3	LOQ (ppb) S/N=5
H2	10	342	0,039	8769	3,4	5,7
O2	10	450	0,039	11538	2,6	4,3
N2	10	1142	0,039	29282	1,0	1,7
CH4	10	576	0,039	14769	2,5	4,1
CO	10	282	0,039	7230	4,1	6,9
C2H6	10	402	0,039	10307	2,9	4,9
C2H4	10	330	0,039	8461	3,6	5,9
C3H8	10	442	0,039	11333	2,6	4,4
C3H6	10	426	0,039	10923	2,7	4,6
C2H2	10	274	0,039	7025	4,3	7,1
C4H8	10	366	0,039	9384	6,4	5,4

Figure 4: LOQ and LOD calculation

Figure 4 shows the performance of the PlasmaDetek for such components obtained with the configuration described above.

Those results and performances depend on the chromatographic system and conditions of operation.

> CONCLUSION

With the PlasmaDetek, we can measure permanent gases and C1-C4 with only one detector. This is a very cost effective solution in terms of gas supply, plumbing configuration and time consuming. The performance is indisputable. Application in ppb is now easy to make with such configuration.

Selectivity on some impurities can also be configured in the PlasmaDetek to make Chromatography easier when working on different background or focus on some impurities. Heavier hydrocarbons can also be measured. Please contact LDetek for more information.

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