APPLICATION NOTE
LD12-8

Analysis of Sulfurs with the PlasmaDetek

The analysis of sulfurs can now be performed using the PlasmaDetek technology. With its sulfurs selective mode, the analysis of low ppb sulfurs can be easily quantified.

> PLASMADETEK CONFIGURATION

The PlasmaDetek is configured with one output signal to be selective to sulfurs.

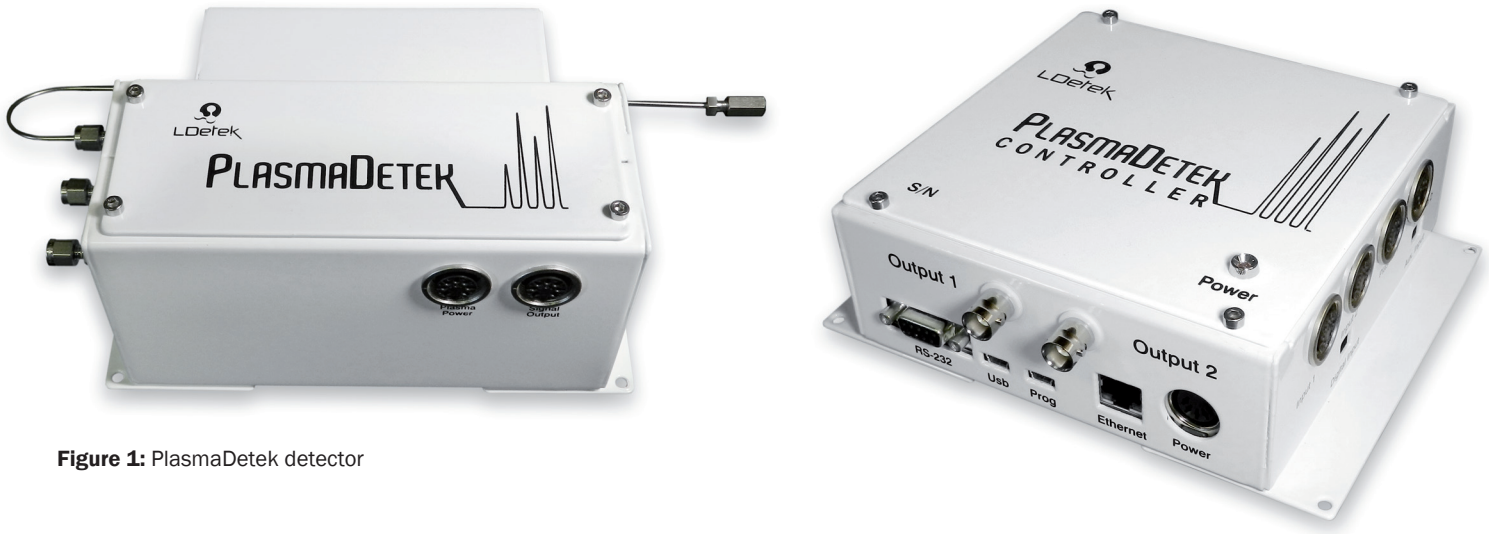

Figure 1: PlasmaDetek detector

This is a stand-alone detector system that requires only **argon or helium** as carrier gas to make the measurement. No need of doping gas or other devices to make it selective to sulfurs.

> CHROMATOGRAPHY CONFIGURATION

The detector can be used with different configurations to run the sulfurs analysis. As example, the H2S and COS analysis in balance nitrogen has been tested using a 2 meter RT-XLSulfur column from Restek with a backflush to detector configuration using a 10 ports diaphragm valve. The carrier flow rate has been adjusted to 5sccm using helium **(Argon can also be used as carrier gas to reduce operational cost)**.

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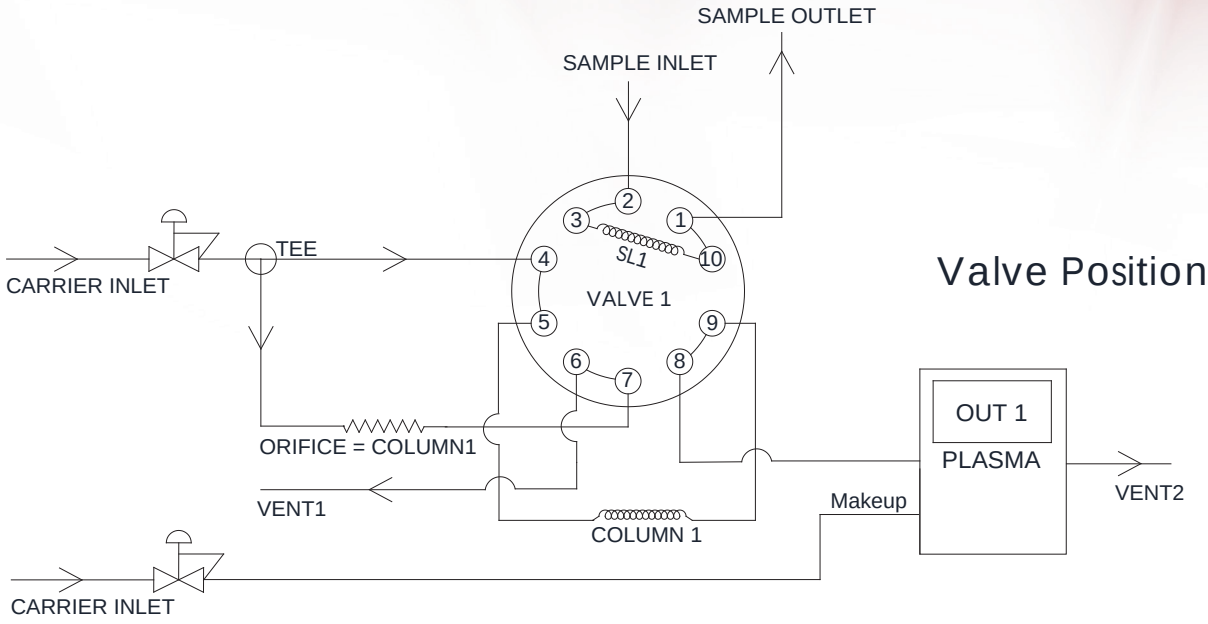
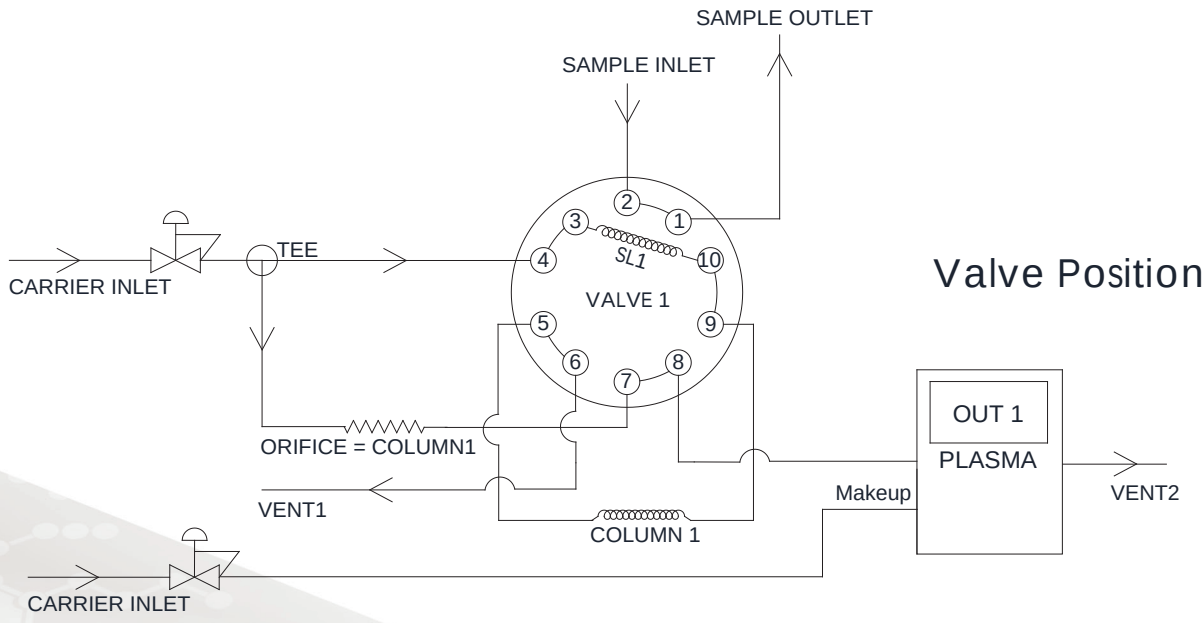
The diaphragm valve is first set to ''position on'' to allow the sample injection through the chromatographic column. Most of the nitrogen and/or air are then vented out of the system. The valve position is hold to ''position on'' until the major parts of the nitrogen and/or air have been vented out. The valve is then set to ''position off'' just before the hydrogen sulfide elution time to avoid venting it out. The sulfurs impurities then flow back through the 2 meter RT-XLSulfur and goes one by one to the PlasmaDetek for analysis.





- One PlasmaDetek selective to sulfurs
- Helium carrier gas: 5 cc/min
- 1 x 10 ports diaphragm valve
- 1 x 2 meters RT-XLSulfur micro packed column
- 1 x sampling loop: 250 µl

Figure 2: plumbing configuration for analysis of H2S & COS in balance Nitrogen

> RESULTS AND PERFORMANCE

Figure 3 shows a chromatogram run with this configuration with a sample containing ppm H2S and COS in a nitrogen balance. The chromatogram demonstrates the high sensitivity and selectivity to sulfurs in comparison with pure nitrogen.

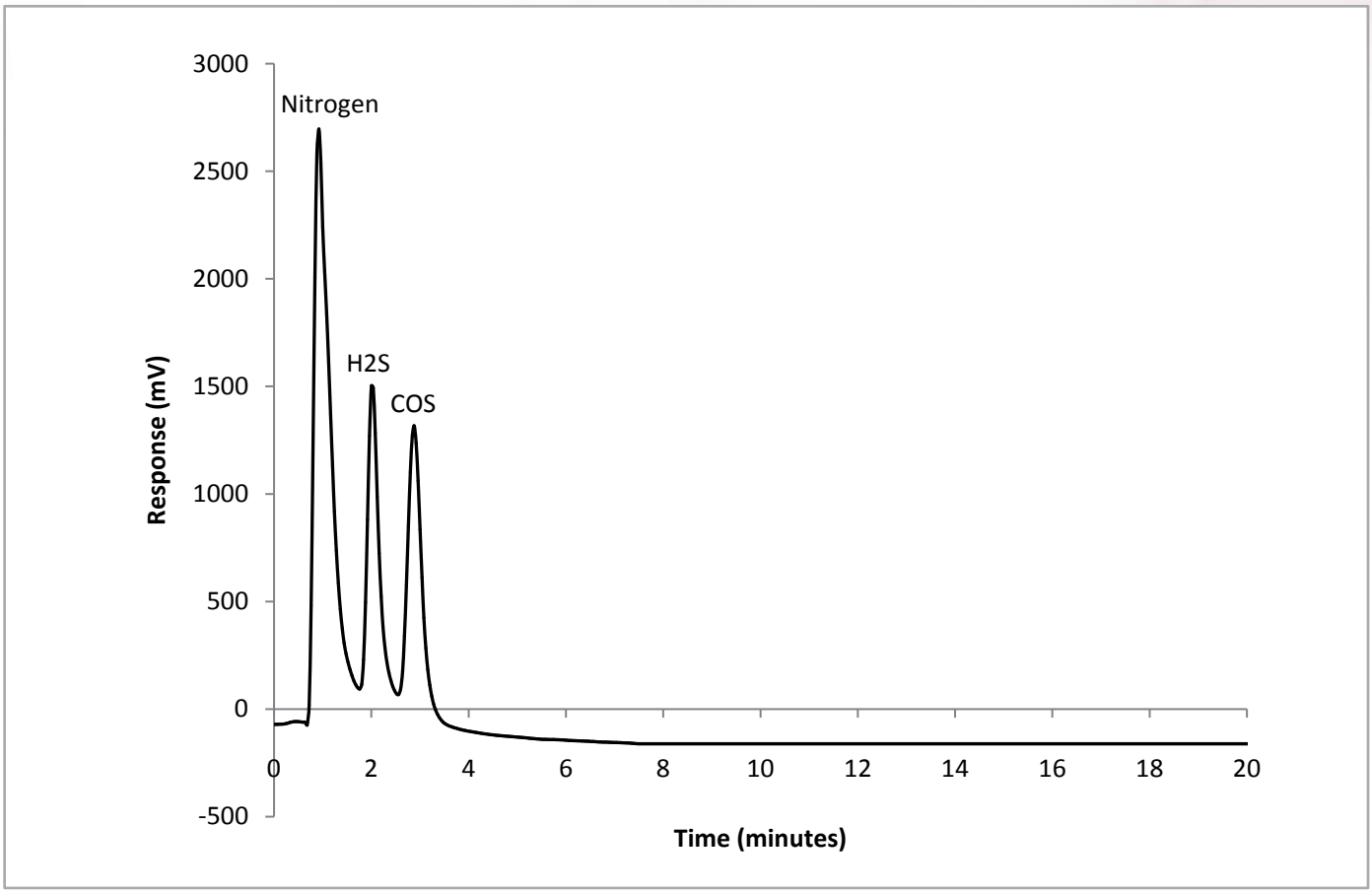


Figure 3: Mixture 10ppm H2S, 9ppm COS in balance Nitrogen

Figure 4 shows the performance of the PlasmaDetek system obtained with the configuration described above.The results demonstrate the high level of sensitivity to sulfurs.

Component	Concentration (ppm)	Peak Height	Noise	S/N	LOD (ppb) S/N =3	LOQ (ppb) S/N=5
Hydrogen sulfide	10	1410	0.054	26111	1.10	1.9
Carbonyl sulfide	9	1302	0.054	24111	1.11	1.8

Figure 4: LOQ and LOD calculation

> APPLICATIONS

The PlasmaDetek can be easily installed in any laboratory, industrial or portable gas chromatography system. For the sulfurs analysis, the use of a portable unit is often required since the GC system needs to be moved at different locations. The ability of the PlasmaDetek to offer a quick purging and stabilization makes it ideal for portable unit like demonstrated on figure 5.

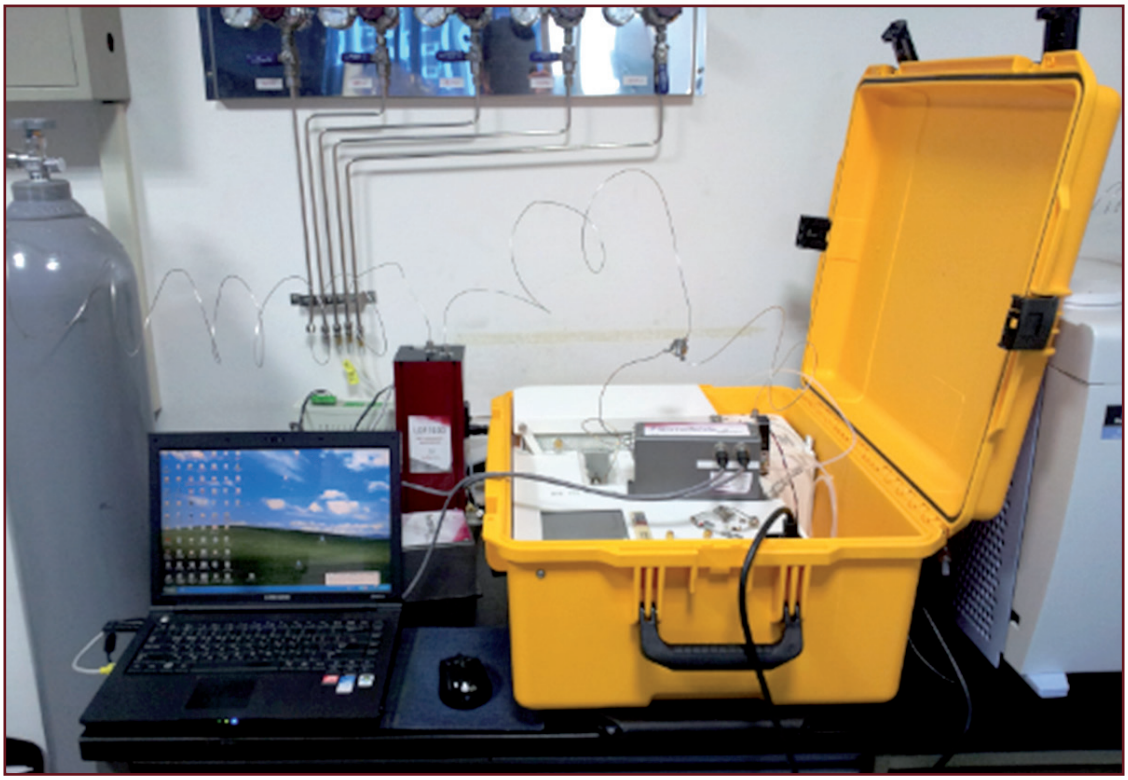


Figure 5: PlasmaDetek installed in a portable unit

> CONCLUSION

Using the PlasmaDetek, the analysis of sulfurs can be performed with success. The possibility to use argon or helium as carrier gas gives more flexibility and allows reducing operational cost. Its ability to be very sensitive to sulfurs simplifies the chromatographic configuration. This is a cost effective and maintenance free system that offers many benefits.

LDetek

Where innovation leads to success!

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