

APPLICATION NOTE

LD16-04



Sulfur Hexafluoride (SF6) purity analysis using the MultiDetek 2 and PlasmaDetek 2



▲ MultiDetek2

▲ PlasmaDetek2

SF6 is used in the electrical industry as a gaseous dielectric medium for high-voltage circuit breakers, switchgear and other electrical equipment. Due to its high electrical insulation properties, it is often used for replacing oil filled circuit breakers. The sulfur hexafluoride is an expensive gas and it also has been identified as the most potent greenhouse gas. A SF6 purity monitoring instrument is then required in the electrical industry to prevent failures, extend equipment life, reduces equipment cost and increase safety.

LDETEK SOLUTION:

Using the compact MultiDetek2 combined with the robust PlasmaDetek2 detector, this application note shows our solution for measuring impurities in SF6 to ensure good operations of electrical equipment. The system has been configured with two channels both merging in the PlasmaDetek2 detector.

The first channel is used for measuring O2-N2-CO using a porous polymer Q type pre column combined with a Mol Sieve separation column. The pre column is mounted on a 10 port injection/back flush diaphragm valve to flush out the SF6. The second column allows the separation of O2-N2 and CO.

The second channel is used for CF4 analysis. This channel is also mounted with a 10 port injection/back flush diaphragm valve with two Porapak Q type columns. The pre column is used to flush out the SF6 and the second column for separation of CF4 from other impurities. This channel can also allow the analysis of CO2 and SOF2.

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RESULTS:

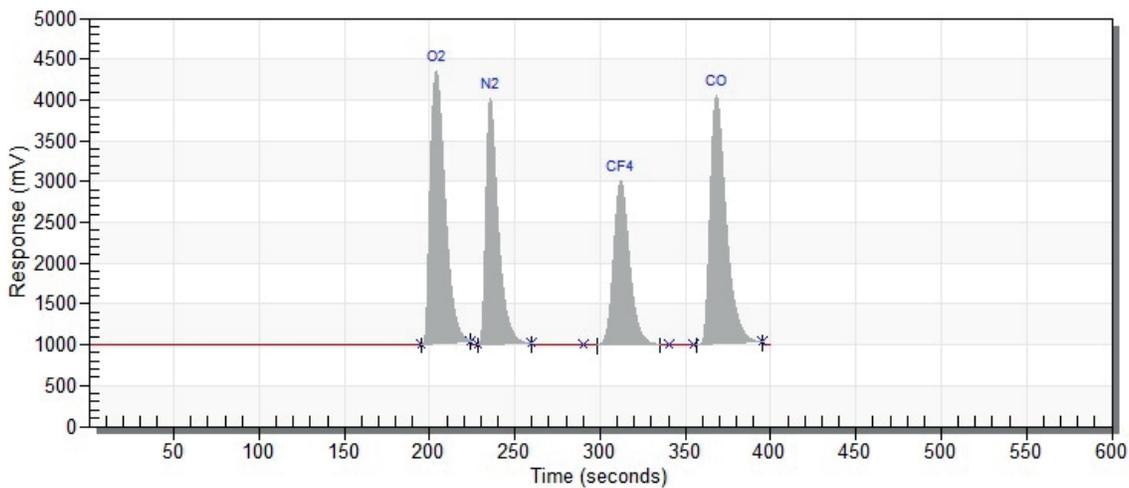


Figure 1: Chromatogram of trace impurities in balance SF6

COMPONENT	CONCENTRATION	PEAK HEIGHT	NOISE	LDL (3X NOISE)
O ₂	1701 ppm	4425 mV	2 mV	2.3 ppm
N ₂	1446 ppm	4101 mV	0.2 mV	0.6 ppm
CF ₄	64 ppm	3055 mV	10 mV	0.6 ppm
CO	196 ppm	4170 mV	5 mV	0.7 ppm

Note: other LDL could be obtained with different injection volume and chromatographic conditions

Figure 2: LDL based on 3 times noise ratio

CONCLUSION:

Using a solution combining the PlasmaDetek 2 and the MultiDetek 2 is the best way to achieve sensitivity, robustness and speed in a compact GC system for sulfur hexafluoride purity analysis for the energy market.



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