

# APPLICATION NOTE

# LD16-10



## Measurement of trace Ar-Kr and N<sub>2</sub> in a bulk gas Oxygen



▲ MultiDetek2

▲ PlasmaDetek2

Detecting and measuring trace Ar-Kr and N<sub>2</sub> in a bulk gas Oxygen without the need of a cryogenic system, or a trapping adsorbent or an extra long column as generally used to measure trace ppb/ppm Argon as impurity from bulk Oxygen and for separating Krypton and Nitrogen.

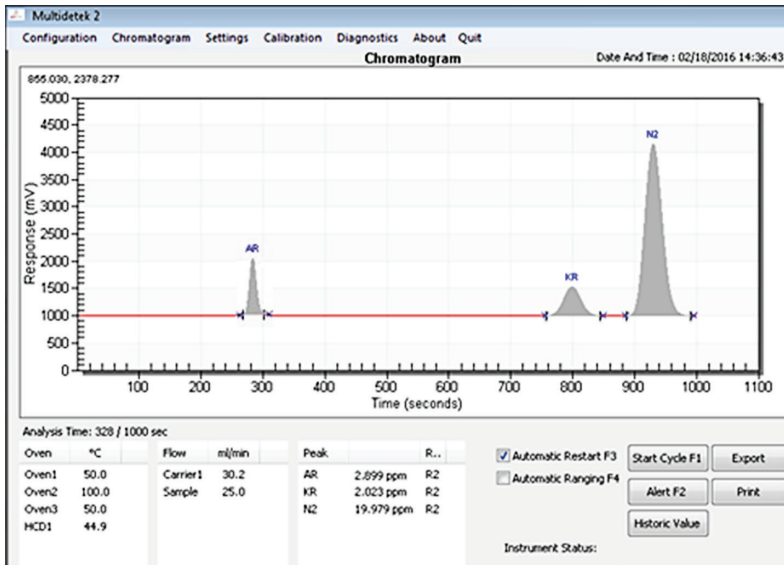
### LDETEK SOLUTION:

Using the compact MultiDetek2 gas chromatograph, with a dual channel mode merging in one PlasmaDetek2 (PED) detector, the analysis of trace Ar-Kr and N<sub>2</sub> can be realized easily in a robust and maintenance free system.

- ▶ **Channel#1:** Used for measuring trace Argon in bulk Oxygen with the Argotek\* column. The sample gas is injected using a standard 6 ports diaphragm valve directly in the packed type column that operates at isothermal temperature and with a fix carrier flow rate.
- ▶ **Channel#2:** Used for measuring trace Krypton and Nitrogen in bulk Oxygen with the HSR-Etek\* column. The sample gas is injected using a standard 6 ports diaphragm valve directly in the packed type column that operates at isothermal temperature and with a fix carrier flow rate.

\*ArgoTek column is manufactured by LDetek to offer the trace argon separation from matrix Oxygen. The column is packed type operating at 45Celsius/20sccm helium carrier flow rate. With these conditions, the column offers the desired separation for measuring part per billion argon in oxygen. (more details appear in application note LD12-3)

\*HSR-Etek column is manufactured by LDetek to offer the trace Krypton and Nitrogen separation from matrix Oxygen. The column is packed type operating at 45Celsius/20sccm helium carrier flow rate. With these conditions, the column offers the desired separation for Kr/N<sub>2</sub>. (more details appear in application note LD12-7)



Figures 1 and 2 show an example of results that such configuration can achieve for measuring low ppb/ppm concentrations in bulk oxygen.

**Figure 1:** chromatogram of trace impurities in Oxygen

COMPONENT	CONCENTRATION	PEAK HEIGHT	NOISE	LDL (3X NOISE)
Ar	2.899 ppm	1091 mV	0.7 mV	5.6 ppb
Kr	2.023 ppm	503 mV	0.8 mV	9.6 ppb
N2	19.979 ppm	3211 mV	0.7 mV	13.0 ppb

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

**Figure 2**

## CONCLUSION:

The analysis of specific trace impurities in bulk Oxygen can be performed using this LDetek solution that combines a selective plasma detector with the right chromatography solution. It gives a robust and maintenance free system. Other impurities can be added to this system simply by adding extra channels.



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