

APPLICATION NOTE

LD20-04



MultiDetek2 with PlasmaDetek2 configured as online analyser for fast Crude Argon analysis



LDETEK SOLUTION:

In continuity to our application note LD12-06 that explains the benefit of measuring the trace N₂ in Crude Argon to improve the Argon production in ASU, this document will show the benefit of using our online trace N₂ in Crude Argon analyser for such type of application.

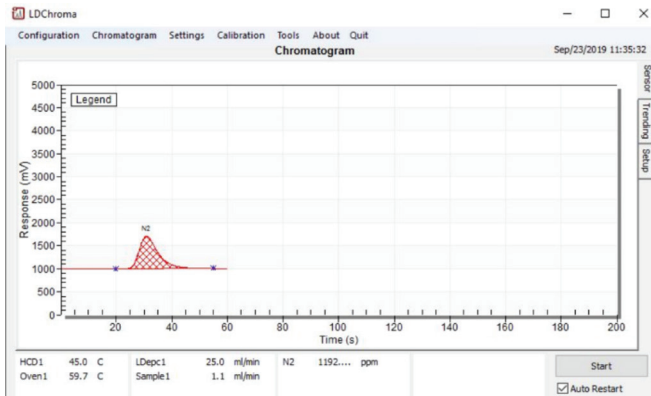
In some cases, when the oxygen concentration stays below a maximum level of 5%, it is strongly suggested to refer to our LD8000MG instrument that can measure trace nitrogen in such low percent oxygen level. Our application note LD13-03 well describes what our LD8000MG series with PED technology can offer.

When the Crude Argon analysis requires an oxygen level being over 5% up to 80-100%, then the use of our MultiDetek2 analyser with the PlasmaDetek2 detector mounted as an online gas analyser instrument is strongly suggested. Conventional gas analyser for such type of application will use a basic gas chromatograph which requires a certain analysis time and GC columns. In most cases, the analysis time isn't quick enough to be able to control and improve the Argon production level. Our MD2 analyser combined with the PED in a selective and sensitive mode can performs the nitrogen analysis in a crude argon sample gas without the need of having a GC column.

The MD2 uses a diaphragm injection valve with a micro sampling loop to inject through a straight copper catalyst-based bed. The combination of the highly selective/sensitive PED with the absorption bed makes the N₂ analysis possible within 50 seconds. With this quick analysis time, the Argon production can be improved to reduce the cost of production.

RESULTS

Chromatogram of trace ppm impurity N2 in Crude Argon sample gas (sample contains 90% Oxygen, balance Argon)



LDL is identified based on three times the noise level

| COMPONENT | CONCENTRATION | PEAK HEIGHT | NOISE | LDL (3X NOISE) |
|----------------|---------------|-------------|--------|----------------|
| N ₂ | 1192 ppm | 765 mV | 1.3 mV | 6,07 ppm |

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

Repeatability is demonstrated here by running 12 consecutive cycles at a concentration of 1200ppm N2 in a sample gas containing 90% Oxygen balance Argon.

| Start | N2 |
|------------------|--------------|
| 2019-09-21 04:04 | 1203.670 ppm |
| 2019-09-21 04:03 | 1202.633 ppm |
| 2019-09-21 04:02 | 1201.522 ppm |
| 2019-09-21 04:01 | 1201.335 ppm |
| 2019-09-21 03:59 | 1202.315 ppm |
| 2019-09-21 03:58 | 1203.796 ppm |
| 2019-09-21 03:57 | 1203.044 ppm |
| 2019-09-21 03:56 | 1203.868 ppm |
| 2019-09-21 03:55 | 1203.715 ppm |
| 2019-09-21 03:54 | 1203.070 ppm |
| 2019-09-21 03:53 | 1201.403 ppm |
| 2019-09-21 03:52 | 1201.770 ppm |

CONCLUSION:

The MultiDetek2 gas analyser combined with the PlasmaDetek2 detector offers the requirements for such type of application. The analysis time is quick enough to reduce the production cost of Argon in ASU. Compared to a conventional GC method, the MultiDetek2 online method here allows a straight and fast crude argon analysis. The method proposed in this document is rackmount, robust and industrial as required by this market. The system also offers a full remote control. The industrial communication protocols are all built in and must simply be selected specifically for your requirements.

