GLOBAL™ ANALYSER SOLUTIONS G·A·S

ANALYSIS OF IMPURITIES IN ARGON USING COMPACTGC WITH PLASMADETEK-2

Due to Helium shortage, gas suppliers see an increased request for alternative gases. Their clients demand high purity with exact specification for various applications like instrumental use and industrial production. Often PDD (Pulsed Discharge Detector) is used for measuring impurities in bulk gases. But in case of determining the purity of Argon, separation problems arise with this detector because Helium is used as carrier gas and the bulk Argon elutes close to Oxygen. The Plasmadetek-2 from LDetek offers the perfect solution here, since Argon is used as carrier gas, and therefore the bulk peak is not seen at all.

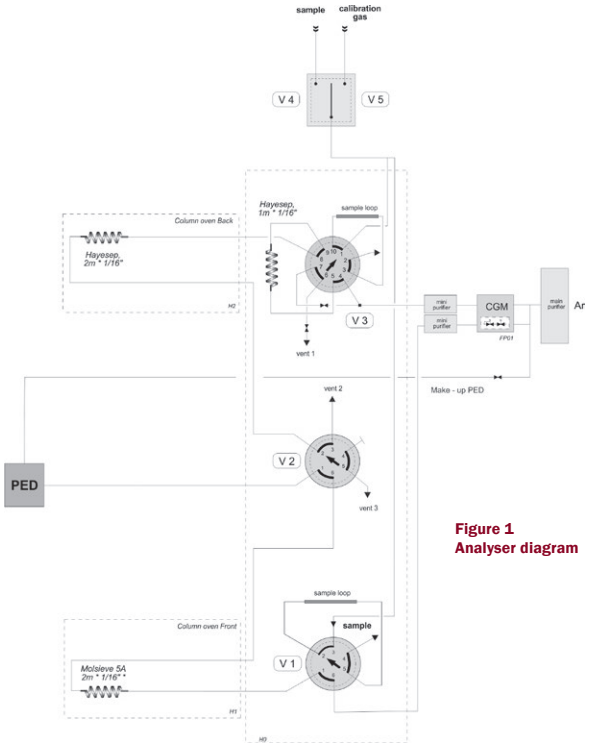

Figure 1
Analyser diagram

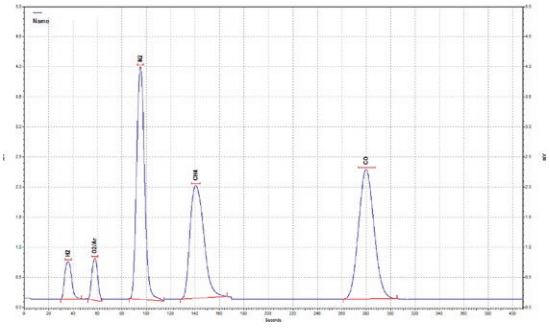

Figure 2
Chromatogram
Molsieve column

Agilent 35900E Inte...	H2	O2/Ar	N2	CH4	CO
Sample ID	Area	Area	Area	Area	Area
molsieve testFATHel...	203067.00	194281.00	1452795.00	1218724.00	1591571.00
molsieve testFATHel...	202392.00	195591.00	1452917.00	1219249.00	1590896.00
molsieve testFATHel...	205617.00	194085.00	1455726.00	1216440.00	1592798.00
molsieve testFATHel...	204789.00	195496.00	1455690.00	1223070.00	1582777.00
molsieve testFATHel...	205039.00	193859.00	1455817.00	1227535.00	1587183.00
molsieve testFATHel...	205447.00	195147.00	1455831.00	1220549.00	1584348.00
molsieve testFATHel...	205320.00	196256.00	1454897.00	1224674.00	1592919.00
molsieve testFATHel...	203894.00	195299.00	1455741.00	1226357.00	1573995.00
molsieve testFATHel...	206239.00	196406.00	1456723.00	1225968.00	1590468.00
molsieve testFATHel...	205231.00	194874.00	1457012.00	1227555.00	1587986.00
Min:	202392.00	193859.00	1452795.00	1216440.00	1573995.00
Max:	206239.00	196406.00	1457012.00	1227555.00	1592919.00
Mean:	204703.50	195129.40	1455314.90	1223012.10	1587494.10
Std Dev:	1211.05	887.00	1419.98	4022.07	5862.43
%RSD:	0.59	0.44	0.10	0.33	0.37

Figure 3 - Repeatability

Figure 1 shows a two-channel analyser with single Plasma Emission Detector. Valve V1 and Molsieve column analyse H_2, N_2, O_2, CH_4 and CO in Ar. A second channel around valve V3 is present for analysing CH_4, CO_2, N_2O and Ethane in Ar. For analysis of impurities in N_2, a fore-flush column switching option is added to this channel to vent the bulk N_2. Figure 2 shows the Molsieve chromagram of an 11 ppm calibration standard. Figure 3 demonstrates the obtained repeatability, which is excellent. Valve V2 combines both channels to a single PlasmaDetect-2 detector, which contains up to four optical sensors for optimal sensitivity for each individual component, see figure 4. Figure 5 shows the integrated analyser using CompactGC$^{4.0}$.

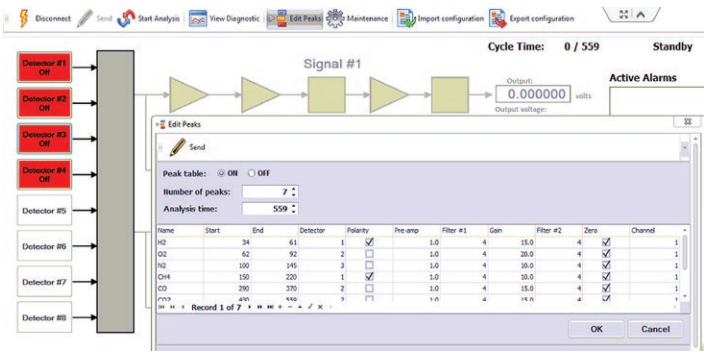

Figure 4 - programming 4 optical sensors in one PlasmaDetect-2 detector

Figure 5 - CompactGC$^{4.0}$

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