APPLICATION NOTE

LD26-01

Analysis of trace impurities in UHP Methane (CH4)

▲ MultiDetek3

Measuring trace impurities, specifically hydrocarbons and permanent gases, in methane (CH4) production is essential for ensuring product quality, maintaining process efficiency, safety, and compliance with strict industry standards. These impurities (such as H2, O2, N2, CO, CO2 and heavier hydrocarbons) can, even at low concentrations, degrade catalysts, cause equipment corrosion, and reduce the calorific value of the produced fuel.

LDETEK SOLUTION

The purity CH4 quality control solution proposed here with the MultiDetek3 gas chromatograph is for the analysis of trace impurities C3H8, C2H6, C3H6, C2H4, H2, O2, N2, CO and CO2 in UHP CH4. The MultiDetek3 has been configured with 2 x PED detectors both using Argon as carrier gas. Having one unique low-cost carrier gas source combined with no other supporting gas makes this GC configuration ideal for measuring trace impurities in CH4.

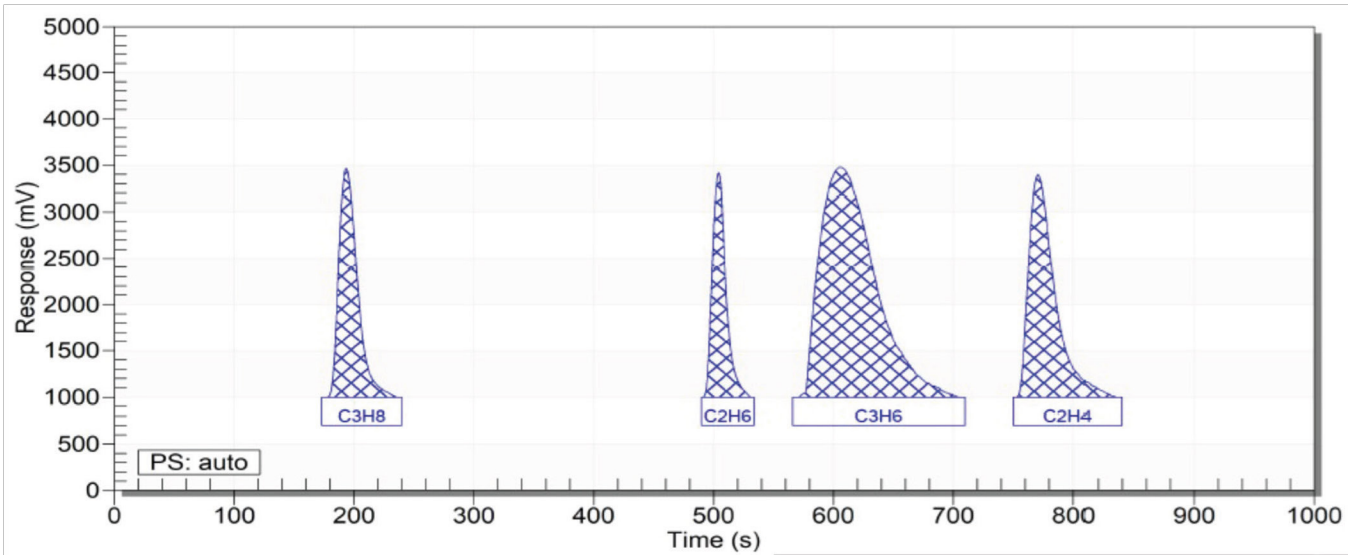
Components	Range (ppm)	LDL (ppb)	Instrument	LDL (3x Noise) (ppb)
C3H8	0-5	50	MultiDetek3	Plasma emission detector
C2H6	0-5	50	MultiDetek3	Plasma emission detector
C3H6	0-5	50	MultiDetek3	Plasma emission detector
C2H4	0-5	50	MultiDetek3	Plasma emission detector
H2	0-5	50	MultiDetek3	Plasma emission detector
O2	0-5	50	MultiDetek3	Plasma emission detector
N2	0-5	50	MultiDetek3	Plasma emission detector
CO	0-5	50	MultiDetek3	Plasma emission detector
CO2	0-5	50	MultiDetek3	Plasma emission detector

Note: Other configurations with more/less impurities to measure and different ranges/ldl are possible on request.

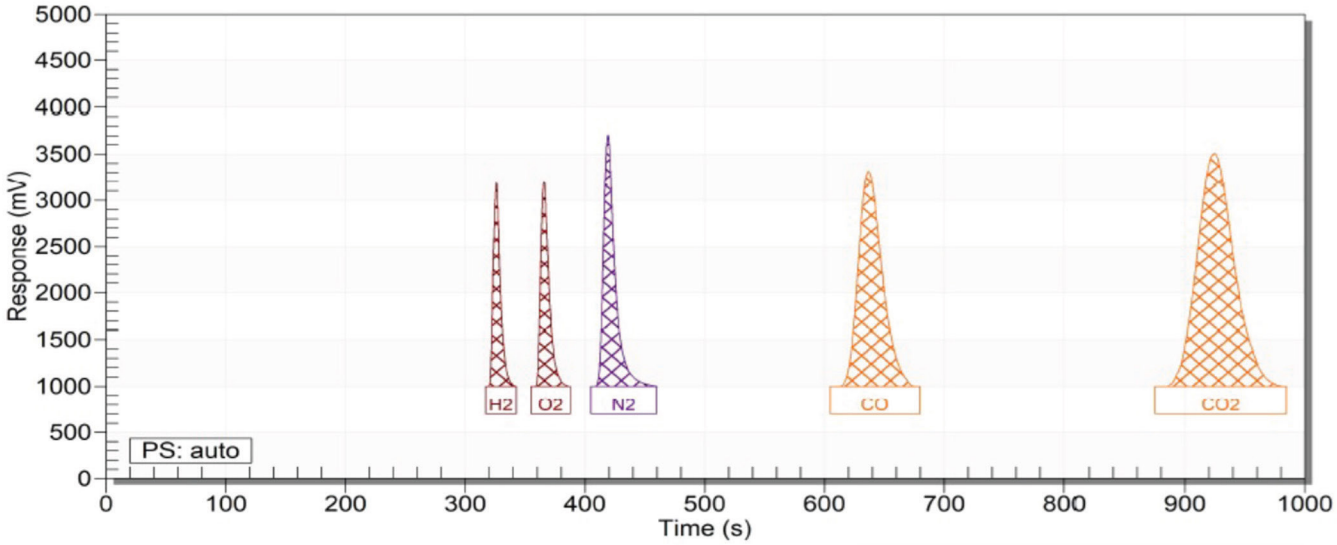
RESULTS

See the typical chromatograms (Span calibration) of trace impurities C3H8, C2H6, C3H6, C2H4, H2, O2, N2, CO and CO2 in balance gas CH4. Each of the chromatogram has been performed in a balance gas methane.

Peak	Unit	Calibration Value	_Area Counts
C3H8	ppm	4.94	13546
C2H6	ppm	4.89	12408
C3H6	ppm	4.96	11363
C2H4	ppm	4.79	9614



Peak	Unit	Calibration Value	_Area Counts
H2	ppm	4.36	3358
O2	ppm	4.40	14927
N2	ppm	5.41	7008
CO	ppm	4.64	6110
CO2	ppm	4.98	9641



CONCLUSION

The MultiDetek3 configured with Argon carrier gas and 2 units plasma emission detectors all in one instrument is a great solution for measuring trace impurities in methane. Other GC instruments brand will generally propose FID detector for measuring hydrocarbons which requires fuel and air as supporting gas a much as Helium as carrier gas for measuring other impurities like H2-O2-N2-CO-CO2. In our solution, only Argon is used as carrier gas combined with our PED detector.

It makes our GC solution simple with a low operating cost. The simplicity of the configuration makes it robust over years.

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