

L'Detek CHROMATOmag

FOURTH EDITION

A collage of various gases and their applications, including:

- PETROCHEMICAL
- SAFETY
- FOOD
- ENVIRONMENT
- INDUSTRIAL GASES
- PHARMACEUTICAL
- GREENHOUSE GASES
- MEDECINE
- BEVERAGE
- INDUSTRIAL GASES
- AGRICULTURE
- HEALTH

Specific gases listed include:

- FORMALDEHYDE
- AMMONIA
- NITRIC OXIDE
- ETHANE
- PROPYNE
- PROPANE
- ISOBUTANE
- ACETONE
- ARGON
- KRYPTON
- OXYGEN
- PHOSPHINE
- NEON
- HYDROGEN
- XENON
- 1-BUTENE
- CARBON DIOXIDE
- NITROGEN
- WATER
- CARBON MONOXIDE
- DIFLUOROETHANE
- METHYL CHLORIDE
- TETRAFLUOROMETHANE
- NITRIC DIOXYDE
- ACETYLENE
- AIR
- ARSINE
- ACETAL DEHYDE
- METHYL CHLORIDE
- CARBONYL SULFIDE
- HYDROGEN SULFIDE
- PROPYLENE
- SULFUR DIOXIDE
- PROPYNE
- SILANE
- METHANE
- HELIUM



In constant innovation,

LDetek can now offer the
PlasmaDetek series and MultiDetek2
with Argon, Helium or Nitrogen
as carrier gas to achieve
ppm/ ppb detection.



LDetek

Where innovation leads to success

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ENVIRONMENT



NATURAL GAS



INDUSTRIAL GAS



HYDROCARBONS PROCESSING



PETROCHEMICAL



FOOD AND BEVERAGE



AGRICULTURE



PHARMACEUTICAL AND MEDICINE



ELECTRONIC GASES & SEMICONDUCTOR



HEALTH AND SAFETY



ENERGY



INTELLIGENT PLASMA EMISSION DETECTOR SYSTEM FOR GAS CHROMATOGRAPH

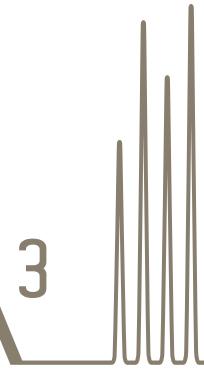


This microprocessor based plasma emission detector system gives all the tools to the GC integrator, manufacturer and user to integrate a plug and play detection system. With its customizable configuration capability, a detector has never been so intelligent.

IN A GLANCE:

- Argon or helium carrier gas
- No dead volume design
- All in one detector by replacing existing technologies commonly used
- Selective and non-selective configuration
- Analog or digital interface
- Wide range of applications
- Easy to interface with any GC and analyzer design
- PPB to % detection
- Very stable signal
- Maintenance free
- Fast installation and tune up
- Configuration software
- Possibility of customizable protocol to control the device
- Detect organic and inorganic compounds, permanent gases and noble gases (including Ne)

PlasmaDETEK₃



HEATED CAPABLE MICRO PLASMA EMISSION DETECTOR WITH INTERCHANGEABLE OPTICS



Flexible plasma emission detector for gas chromatograph. The ideal gas detector for ppb/ppm trace impurities in different gas matrix. The modular philosophy of this detector makes it suitable for lab operations as well as industrial applications.

FEATURES:

- Stand alone detector for any GC
- Heating up to 200 Celsius
- Up to 4 removable/changeable optical filters for a more flexible detector
- Changeable plasma cell
- Possibility to connect a spectrometer fiber optic direct on the cell for specific lab or research project
- Compatible with the PlasmaDetek 2 controller which makes it compatible with any previous installation
- Compatible with Clarity from DataApex
- Ideal for ppb/ppm trace impurities
- Replace ECD-FID-TCD-DID all in one detector
- Compatible with Helium, Argon, Nitrogen as carrier gas
- Selective, sensitive and generic configurable
- Quick switchable carrier gas type



FLEXIBLE COMPACT GAS CHROMATOGRAPH FOR INDUSTRIAL AND LAB APPLICATIONS



With its plug and play philosophy and offering more features than ever, LDetek pushes further the possibilities with its new chromatograph system. It provides an attractive and cost effective solution for the industrial and laboratory market.

Based on the LDetek high performance detection technology, this stand-alone Gas Chromatograph is a flexible and customized platform providing the best solution for any type of gas analysis.

FEATURES & DESIGN:

- One chassis configuration (6U Rackmount)
- Multichannels
- Multimethods
- Multidetectors
- Up to 6 isothermal or 3 programmable oven combination
- Up to 5 high purity proportional diaphragm valves (carrier-sample)
- Easy maintenance with its slide out design and front opening door
- ppt, ppb, ppm and % gas analysis
- Built in PC with 8.4" touch screen LCD & user-friendly interface
- Up to 10 high performance diaphragm valves
- Ethernet connectivity for remote control
- Integrated compact purifier with real end of life monitoring
- Serial/Profibus/Modbus communication protocols
- Fast parallel chromatography
- Multi heated zones to avoid cold points
- Purged & real time monitored zones for hazardous gases
- Multi sample injection techniques



NEW ERA

OF LIGHT HYDROCARBON
MEASUREMENT

Looking for a **SAFE, SENSITIVE, LOW OPERATION COST**
and **MAINTENANCE FREE** system?

The patent pending **PlasmaDetek-E** is the solution



SAFE

No fuel (H_2) and no related safety accessories



SENSITIVE

< 1 ppb lowest detection possible



LOW OPERATING COST

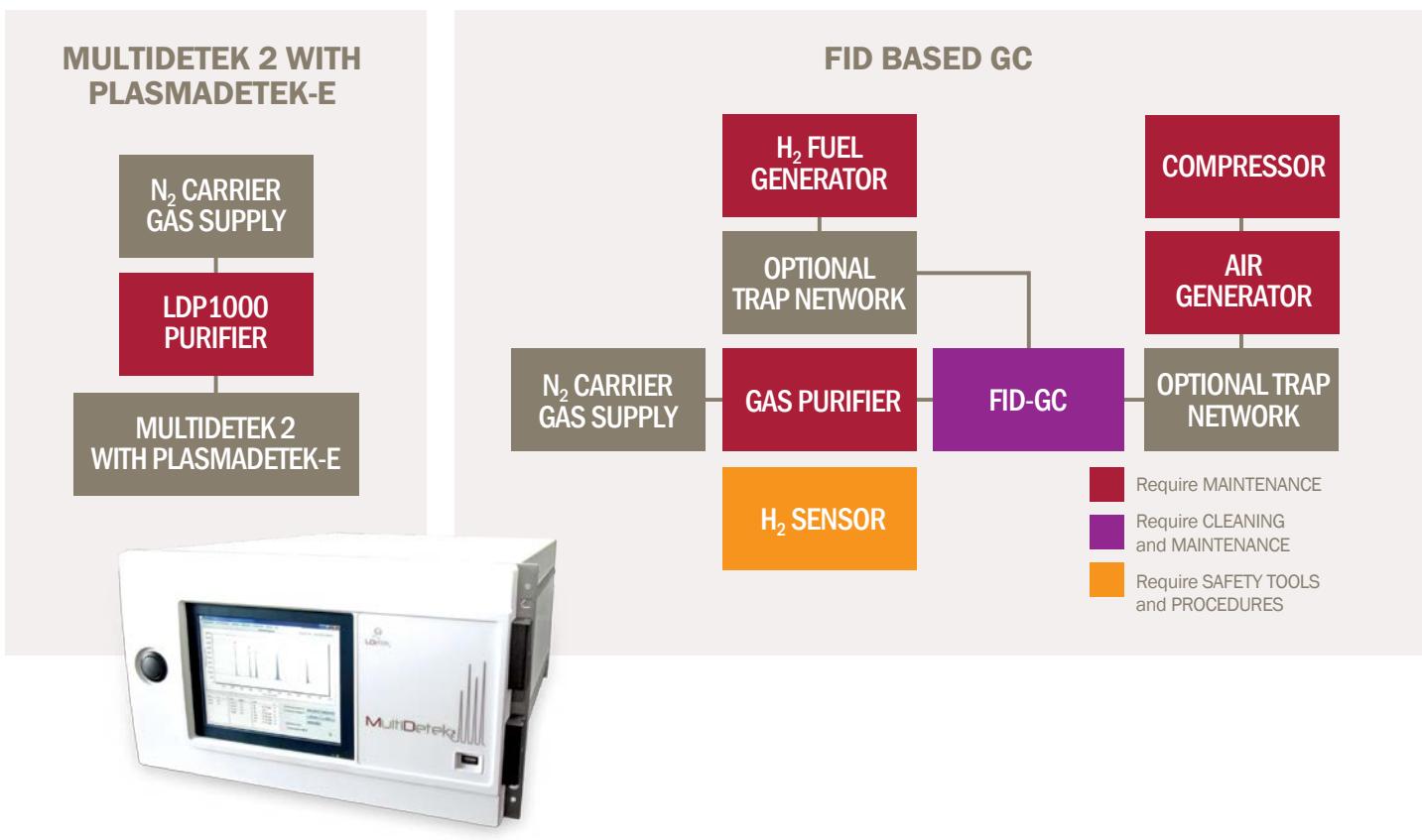
Only N_2 carrier gas supply



MAINTENANCE FREE

No periodic detector cleaning

TYPICAL INSTALLATION FOR LIGHT HYDROCARBON MEASUREMENT



INSTALLATION COST* COMPARISON

Parts	MultiDetek 2 with PlasmaDetek-E	FID-GC
H ₂ generator	N/A	\$7200
Zero air generator	N/A	\$2125
Air compressor	N/A	\$1200
H ₂ safety accessories	N/A	\$1500
2 year maintenance cost	\$2000	\$5000
Total cost*	\$2000	\$17 025

* costs are approximate and may vary for each system

N/A: not applicable

Please consult Application Note LD14-01 on LDetek web site for more technical details.

LDetek is proud to publish its fourth ChromatoMag edition. The goal of this publication is to demonstrate some of the capabilities using the PlasmaDetek series stand alone gas detector system and the compact Industrial & Lab GC MultiDetek2 series.

This magazine shows a variety of chromatograms that have been run in different conditions:

- The chromatograms show analysis of numerous impurities at different concentration level to see the sensitivity level of the PlasmaDetek.
- **The use of Argon, Helium or Nitrogen as carrier gas has been demonstrated to show the extended possibilities of the PlasmaDetek. With the worldwide Helium shortage and continuous Helium price increasing, the use of Argon and Nitrogen as carrier gas is more and more attractive.**
- The components have been analyzed using different types of columns; Capillary, Micro Packed, Packed at different flows and different temperatures. It demonstrates the capacity of the plasma to work easily with low and high carrier flow.
- Some of the analyses have been performed with different matrix gases to show the advantages of using the PlasmaDetek in its selective mode. The selectivity of the detectors can be adjusted depending on the application for being sensitive to desired impurities and block the matrix gas. It simplifies the chromatography configuration and can reduce the analysis time.
- On every chromatogram, the system conditions have been described. It is a good tool for developing method using the PlasmaDetek technology.

If you have an application for which you would like to have a quotation for the PlasmaDetek or the MultiDetek, at the end of the magazine, you will find the PlasmaDetek and the MultiDetek guidelines. Feel free to fill the form with the details about your application and send it back to info@ldetek.com. A LDetek representative will get back to you with a detailed quotation.

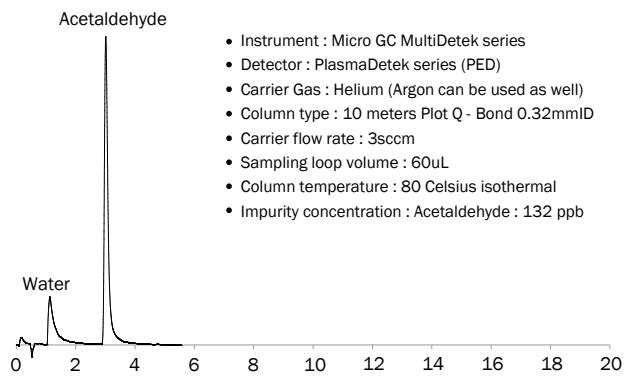
For more information, please contact LDetek at **info@ldetek.com**
or visit our LDetek web site at **www.ldetek.com**.

IMPURITIES

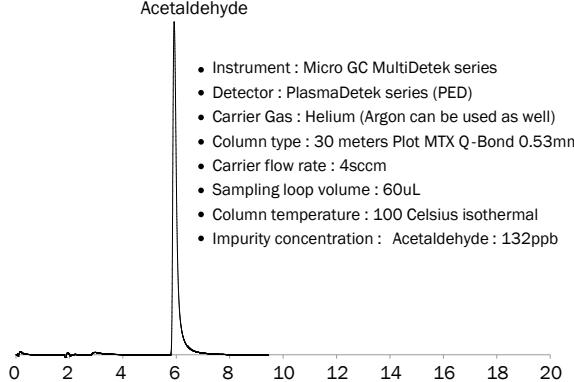
Chromatograms #

1,3-Butadiene (1,3-C4H6)	73
Acetaldehyde	1-2-3-4-76
Acetic acid	5
Acetylene (C2H2)	6-7-8-9-10-11-23-69-73-78-79-83-110-114
Ammonia	13-90
Argon (AR)	14-15-16-17-18-19-71-72-77-80-85-87-97-107-109-113
Arsine	20-21-22
Benzene(C6H6)	76
Butadiene (C4H6)	23
Butane (C4H10)	23
Butylene	6-7-8
Butylene (C4H8)	23
c-2-Butane (C-2-C4H8)	73
Carbon dioxide (CO2)	1-2-4-25-26-27-64-65-30-19-31-32-33-23-34-35-36-37-66-67-71-73-74-75-78-79-80-81-82-83-84-90-96-99-100-105-111-115
Carbon monoxide (CO)	6-25-38-30-19-39-31-40-32-33-41-34-35-36-37-42-66-67-71-73-76-78-79-80-81-82-83-84-88-96-100-105-111-115
Carbonyl sulfide	5-43-44-45-46
Ethane (C2H6)	6-7-8-9-10-23-69-73-78-79-110-114
Ethanol (C2H6O)	74
Ethylene (C2H4)	6-7-8-9-10-23-69-73-78-79-83-110-114
Fluorine	87
Formaldehyde	3-4
Formic acid	5
Freon11	83
Freon113	83
Freon12	83
Freon13	83
Freon22	83
Helium	38-87-91
Hydrogen (H2)	6-25-18-38-30-58-19-39-32-33-34-35-36-37-66-67-78-80-81-82-91-95-105-111-116
Hydrogen sulfide	5-43-44-45-46
iso-Butane (i-C4H10)	73
iso-Butylene (i-C4H8)	73
iso-Pentane (i-C5H12)	73
Krypton	18-47-70-72-77-80-85-87
Methane (CH4)	6-25-7-10-26-27-48-38-30-58-19-39-31-40-32-49-33-19-23-34-35-36-37-66-67-68-69-71-73-75-78-79-80-82-83-88-95-103-105-111-116
n-Pentane (N-C5H12)	73
Neon (NE)	18-19-77-85-112
Nitrogen (N2).....	17-24-6-47-52-53-56-57-38-30-58-19-39-31-40-33-41-34-35-36-37-42-66-67-71-72-73-74-76-78-79-80-81-82-86-91-94-101-105-106-111-117
Nitrous oxide (N2O)	11-27-48-54-49-23-5-75-81-83-106
Non-methane hydrocarbons (NMHC)	19-33-34-35-36-37-67-68-69-71-80-83-93-102
Oxygen (O2)	6-25-56-57-30-38-58-19-39-31-32-42-66-67-71-73-79-81-82-88-90-95-103-107-111-116
Phosphine	59-60-61
Propane	6-7-8-9-10-23
Propylene	6-7-8-9-10-23
Sulfur hexafluoride (SF6)	42-62-75-81-92-108
t-2-butane (T-2-C4H8)	73
Tetrafluoromethane (CF4)	42-63-81-82-98-99-108
Tetrahydrothiophene	89
Trichloroethane	83
Trichloroethylene	83
Water	1-8-13-20-21-3-44-45-61-64-65
Xenon (XE)	70-77-80-85-88-104

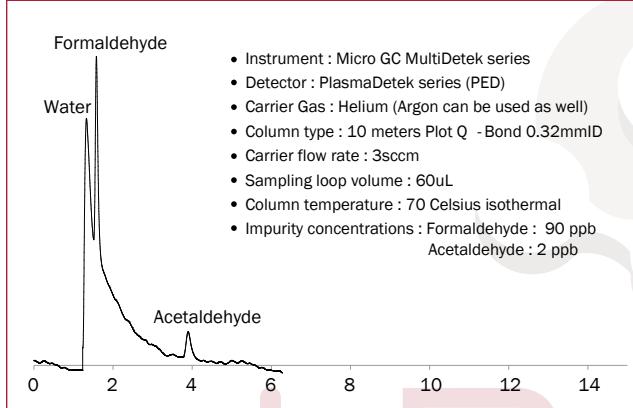
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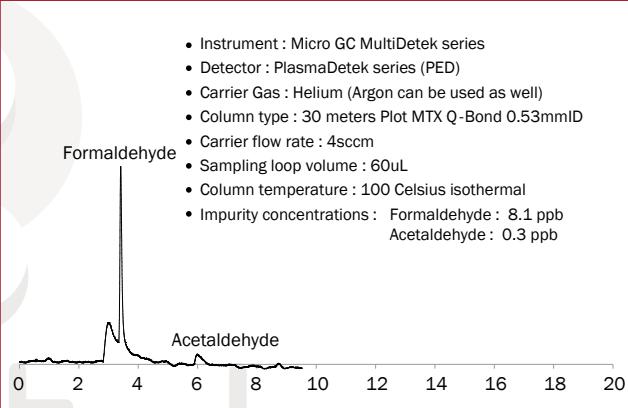
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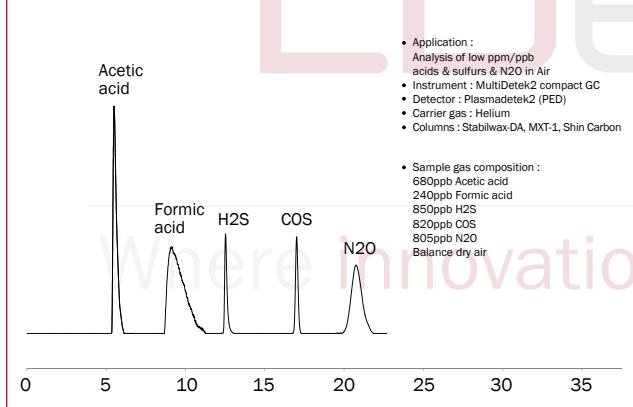
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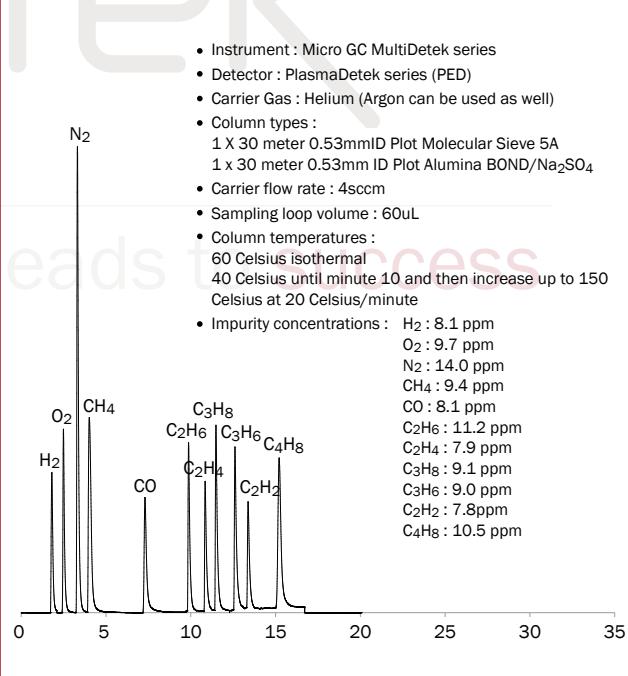
CHROMATOGRAM #4



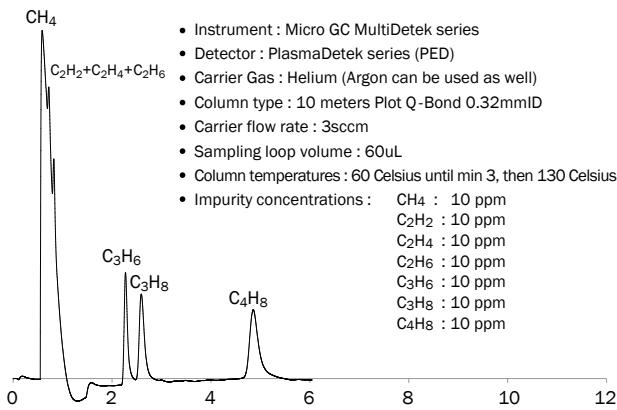
CHROMATOGRAM #5



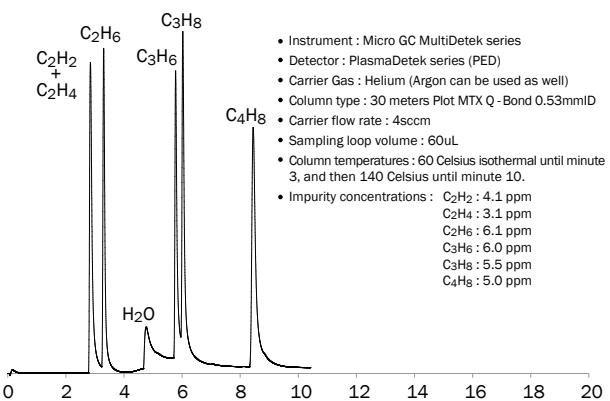
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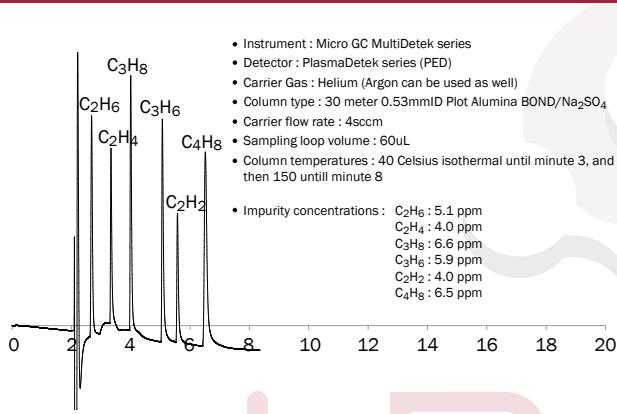
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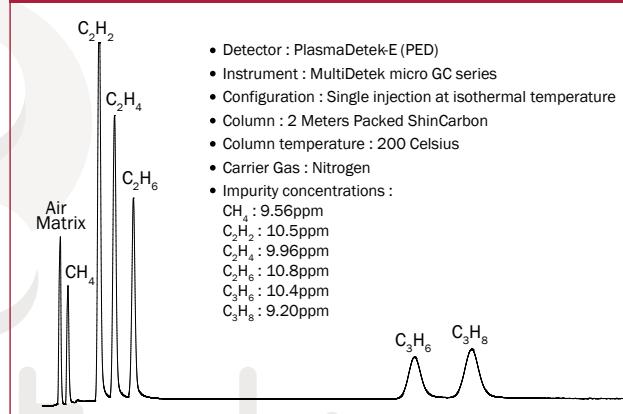
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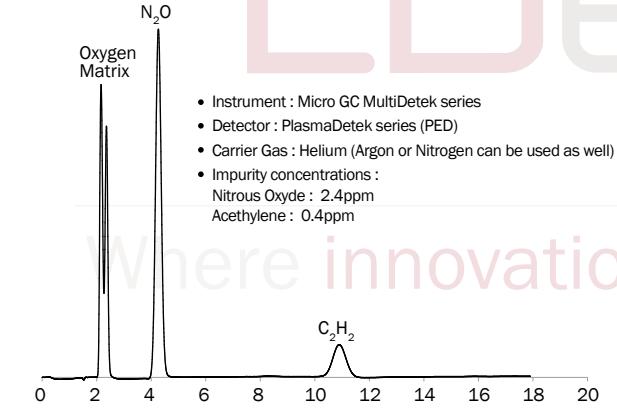
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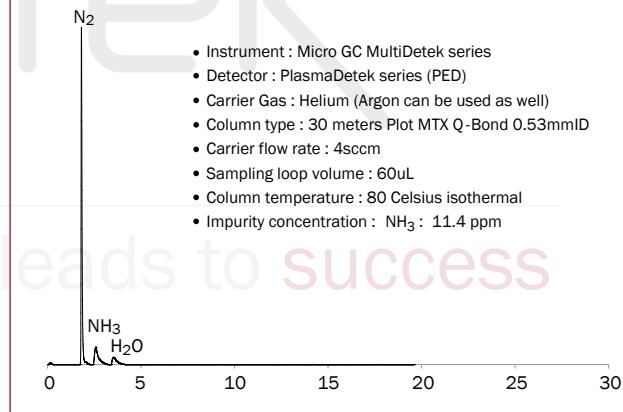
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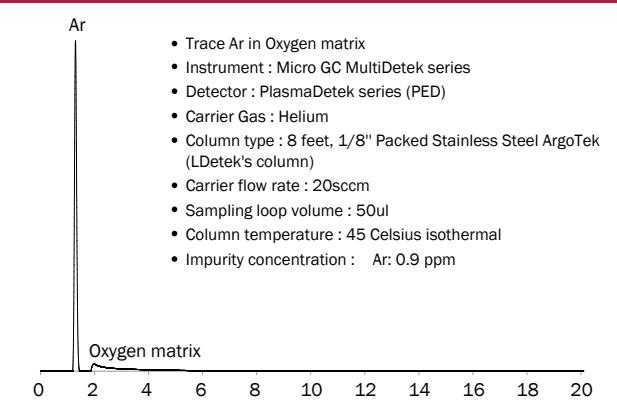
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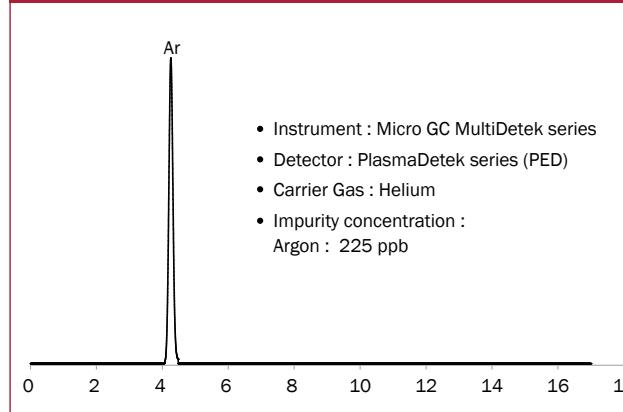
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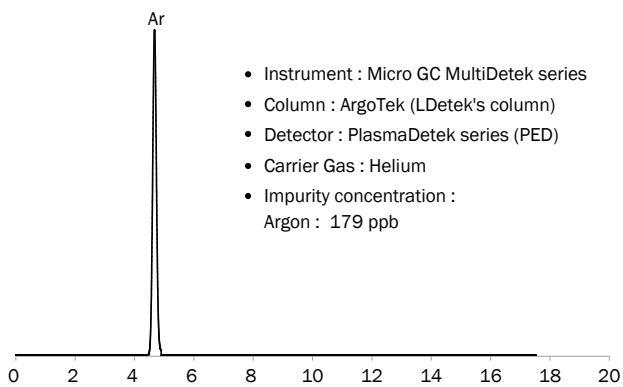
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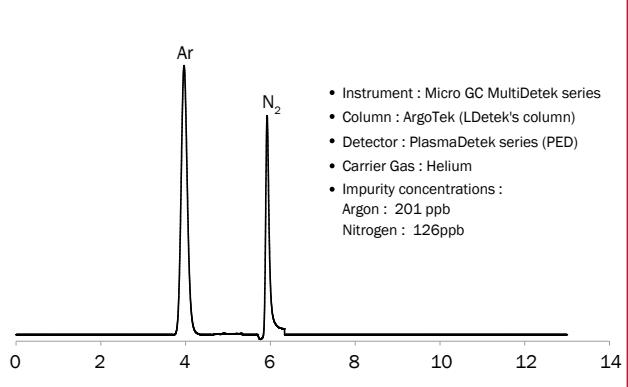
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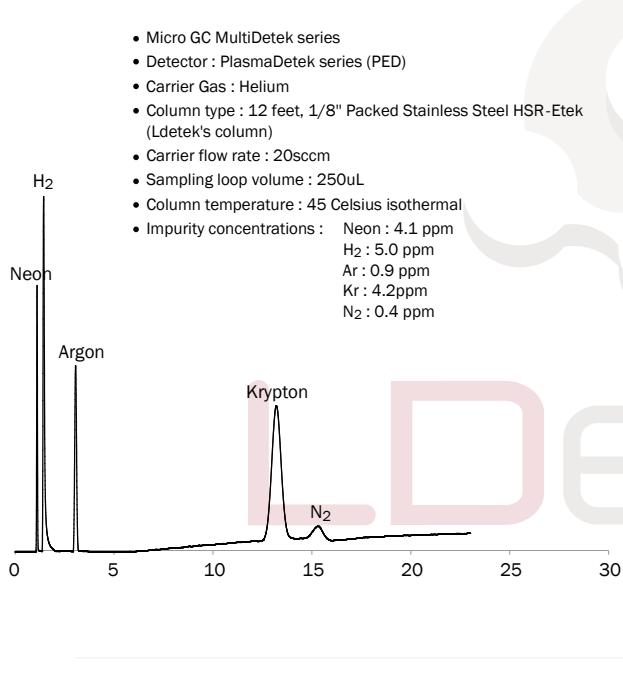
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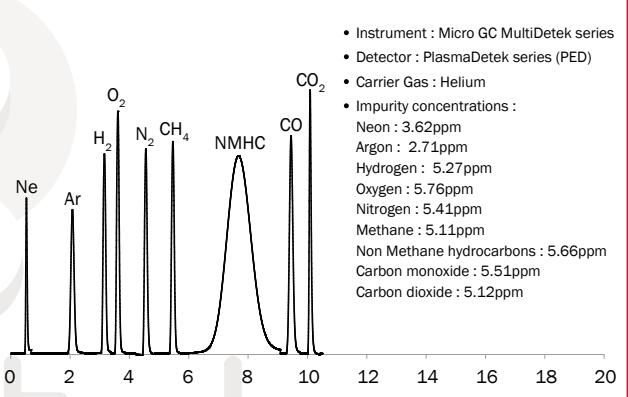
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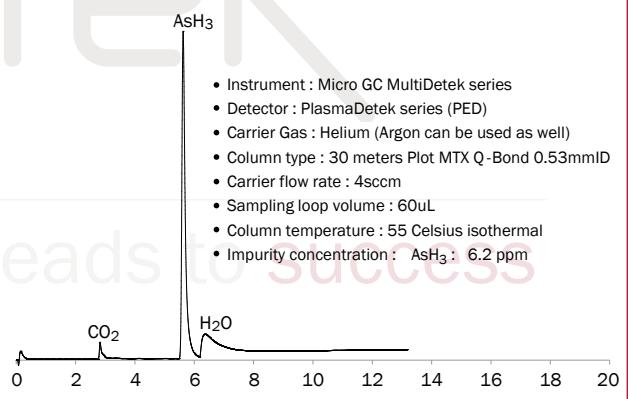
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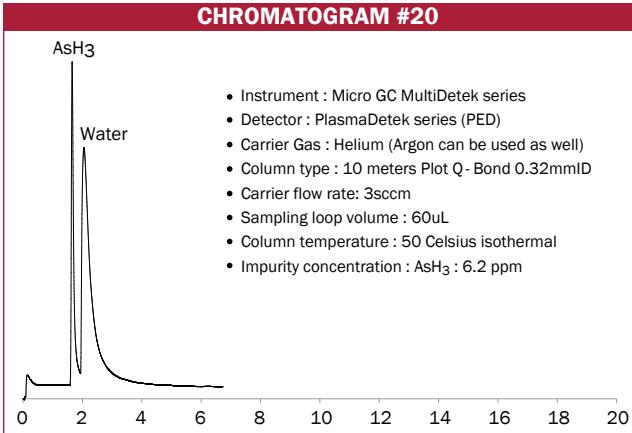
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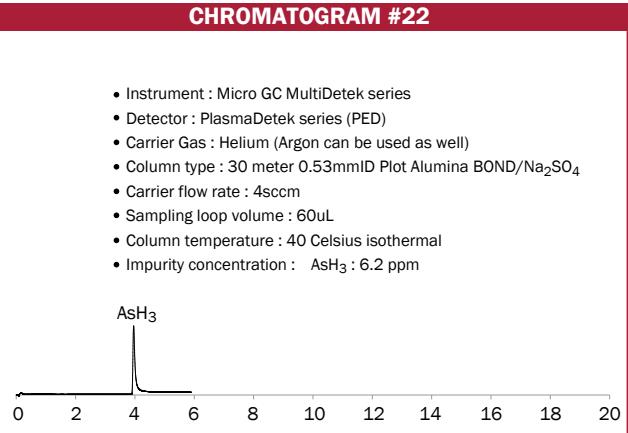
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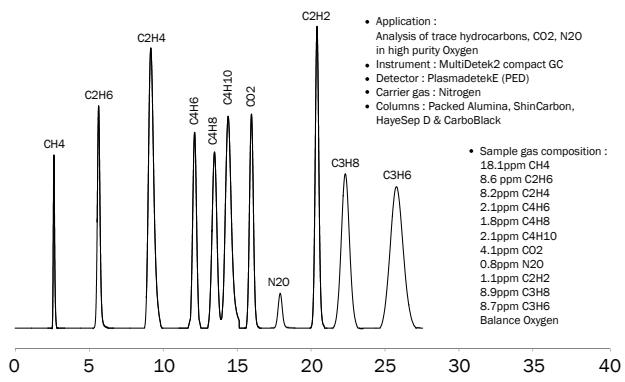
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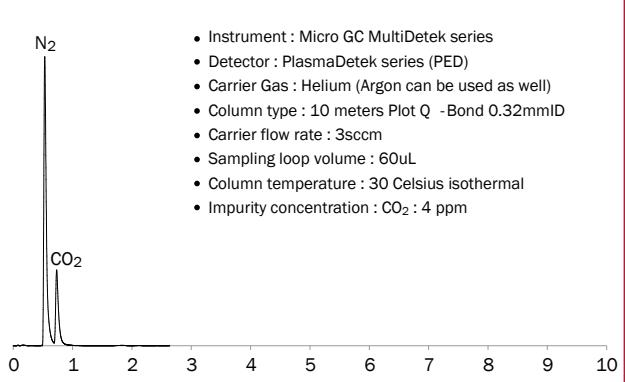
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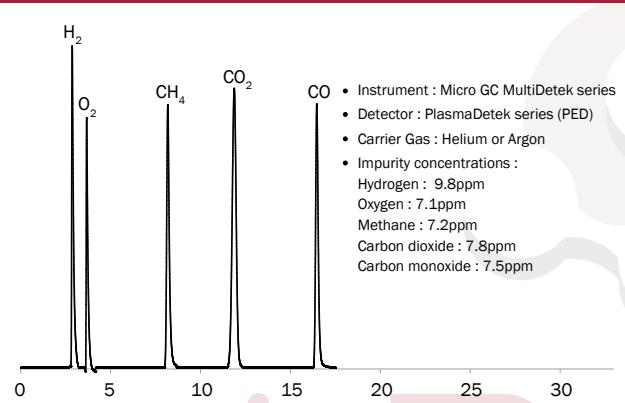
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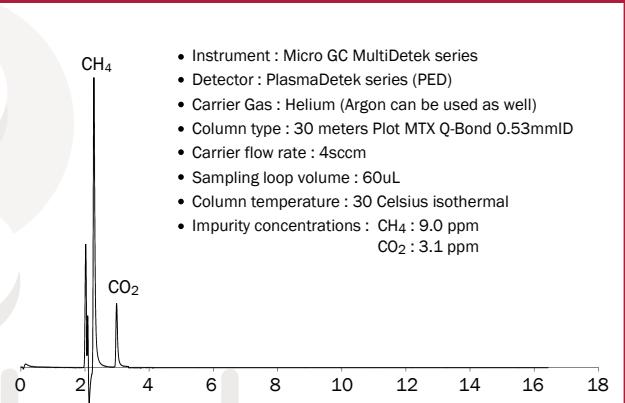
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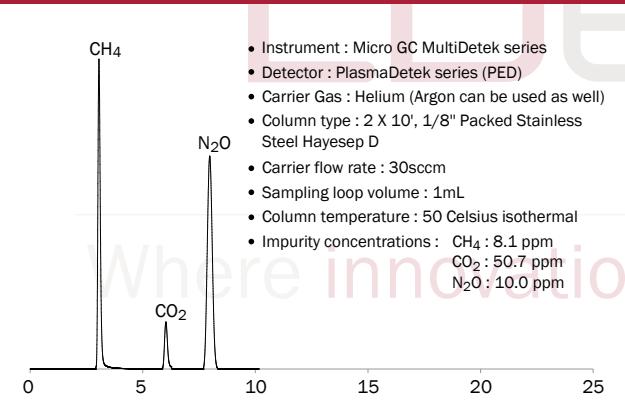
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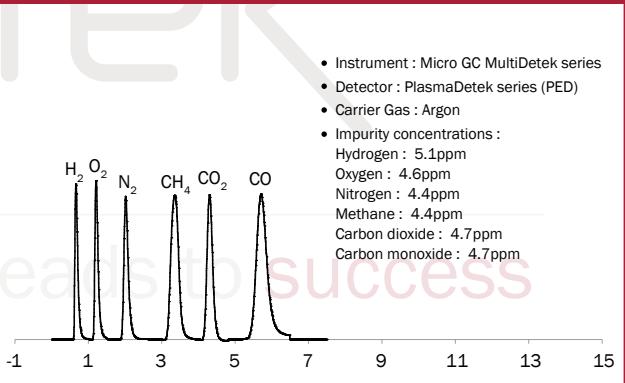
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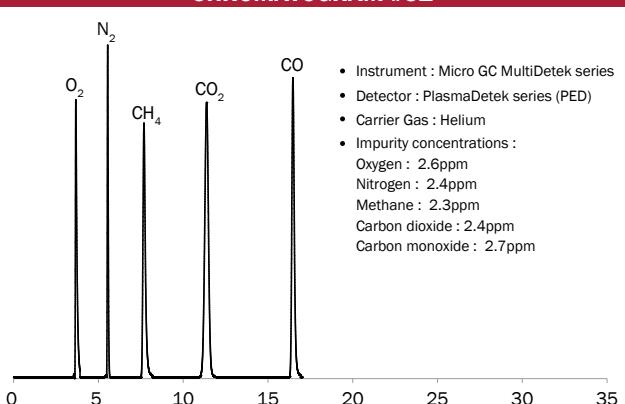
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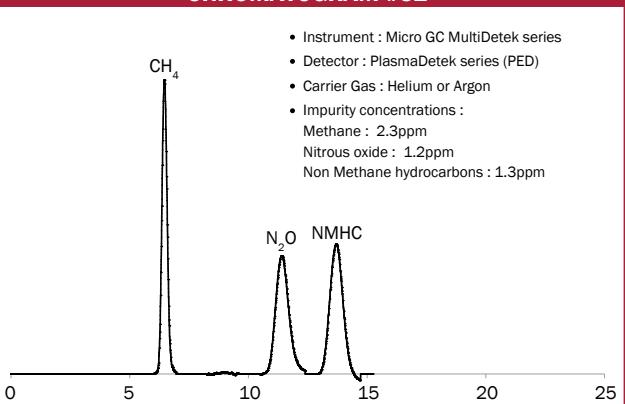
CHROMATOGRAM #30



CHROMATOGRAM #31

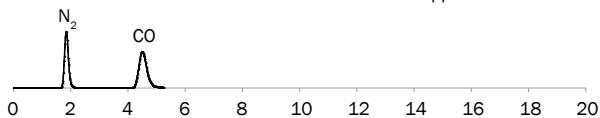


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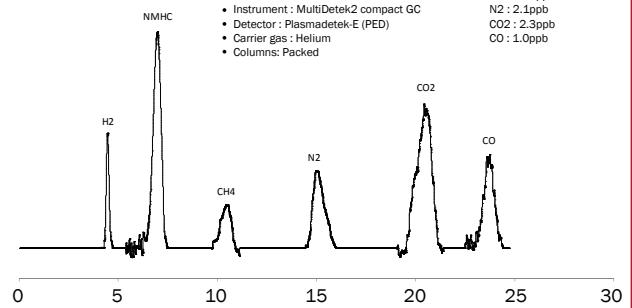
CHROMATOGRAM #33

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Argon
- Impurity concentrations :
 - Nitrogen : 0.9ppm
 - Carbon monoxide : 0.7ppm



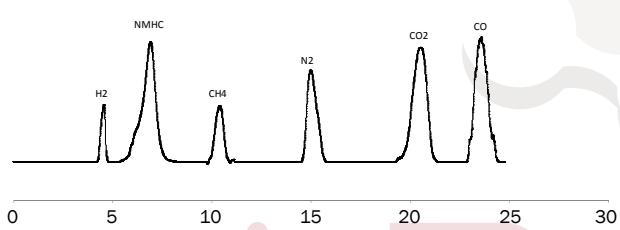
CHROMATOGRAM #34

- Application : Analysis of low ppb H₂-NMHC-CH₄-N₂-CO₂-CO in electronic grade gas Oxygen
- Instrument : MultiDetek2 compact GC
- Detector : Plasmadetek-E (PED)
- Carrier gas : Helium
- Columns : Packed
- Sample gas composition :
 - H₂ : 3.1ppb
 - NMHC : 3.2ppb
 - CH₄ : 0.9ppb
 - N₂ : 2.1ppb
 - CO₂ : 2.3ppb
 - CO : 1.0ppb



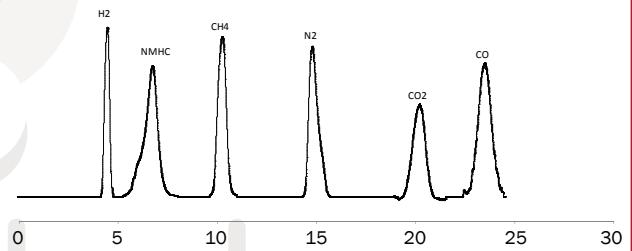
CHROMATOGRAM #35

- Application : Analysis of low ppb H₂-NMHC-CH₄-N₂-CO₂-CO in electronic grade gas Oxygen
- Instrument : MultiDetek2 compact GC
- Detector : Plasmadetek-E (PED)
- Carrier gas : Helium
- Columns : Packed
- Sample gas composition :
 - H₂= 7.5ppb
 - NMHC : 9.1ppb
 - CH₄= 6.1ppb
 - N₂= 7.2 ppb
 - CO₂ =5.9ppb
 - CO= 4.1ppb



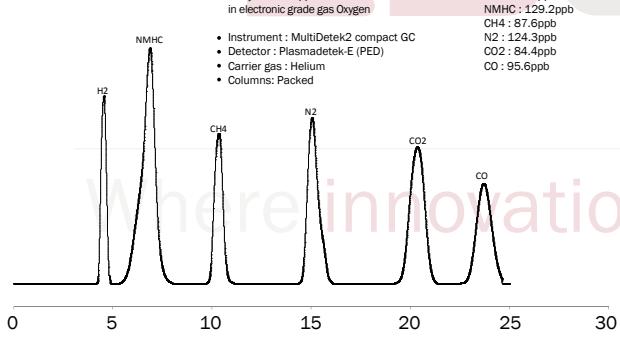
CHROMATOGRAM #36

- Application : Analysis of low ppb H₂-NMHC-CH₄-N₂-CO₂-CO in electronic grade gas Oxygen
- Instrument : MultiDetek2 compact GC
- Detector : Plasmadetek-E (PED)
- Carrier gas : Helium
- Columns : Packed
- Sample gas composition :
 - H₂ : 38.2ppb
 - NMHC : 25.2ppb
 - CH₄ : 36.8 ppb
 - N₂ : 36.9 ppb
 - CO₂= 26.4 ppb
 - CO : 36.4 ppb



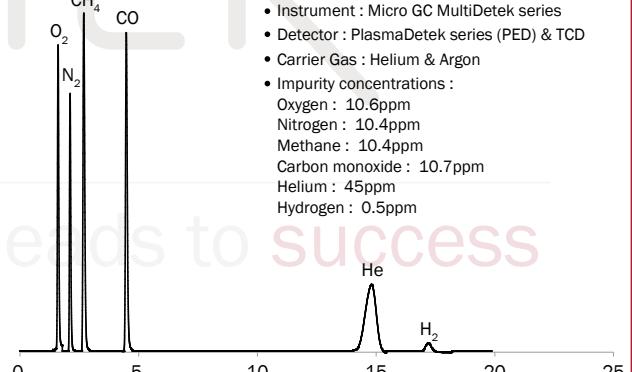
CHROMATOGRAM #37

- Application : Analysis of low ppb H₂-NMHC-CH₄-N₂-CO₂-CO in electronic grade gas Oxygen
- Instrument : MultiDetek2 compact GC
- Detector : Plasmadetek-E (PED)
- Carrier gas : Helium
- Columns: Packed
- Sample gas composition :
 - H₂ : 111.9ppb
 - NMHC : 129.2ppb
 - CH₄ : 87.6ppb
 - N₂ : 124.3ppb
 - CO₂ : 84.4ppb
 - CO : 95.6ppb



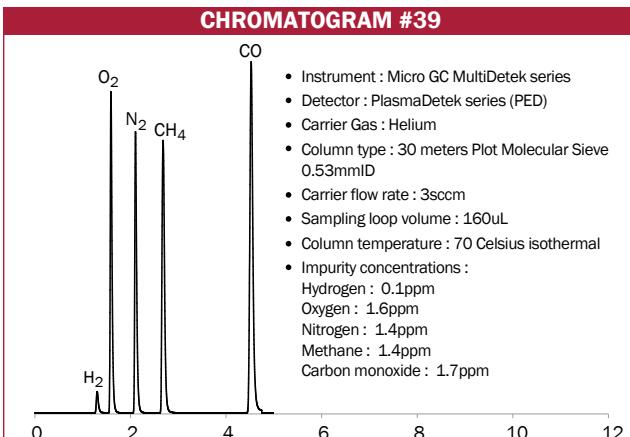
CHROMATOGRAM #38

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED) & TCD
- Carrier Gas : Helium & Argon
- Impurity concentrations :
 - Oxygen : 10.6ppm
 - Nitrogen : 10.4ppm
 - Methane : 10.4ppm
 - Carbon monoxide : 10.7ppm
 - Helium : 45ppm
 - Hydrogen : 0.5ppm



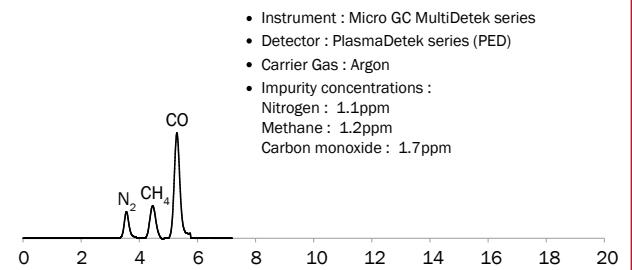
CHROMATOGRAM #39

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Column type : 30 meters Plot Molecular Sieve 0.53mmID
- Carrier flow rate : 3scsm
- Sampling loop volume : 160µL
- Column temperature : 70 Celsius isothermal
- Impurity concentrations :
 - Hydrogen : 0.1ppm
 - Oxygen : 1.6ppm
 - Nitrogen : 1.4ppm
 - Methane : 1.4ppm
 - Carbon monoxide : 1.7ppm

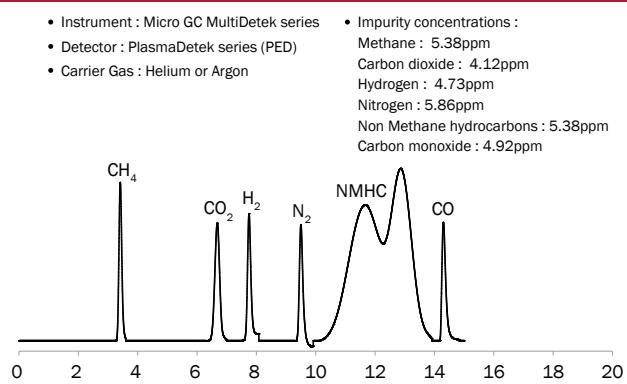


CHROMATOGRAM #40

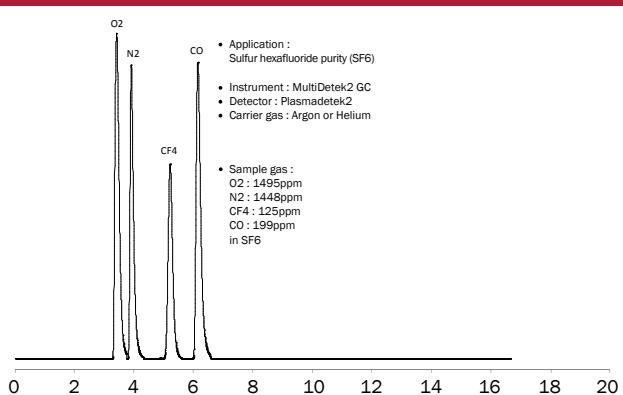
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Argon
- Impurity concentrations :
 - Nitrogen : 1.1ppm
 - Methane : 1.2ppm
 - Carbon monoxide : 1.7ppm



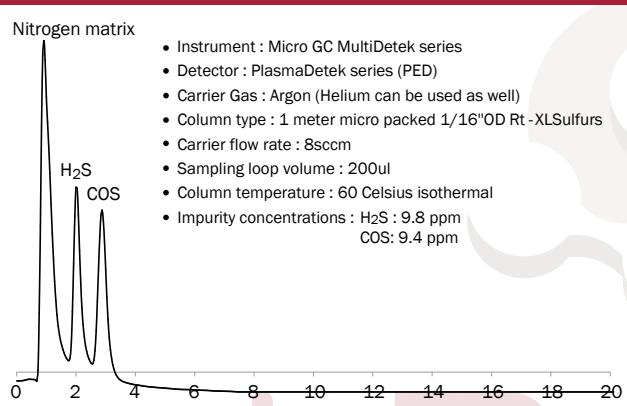
CHROMATOGRAM #41



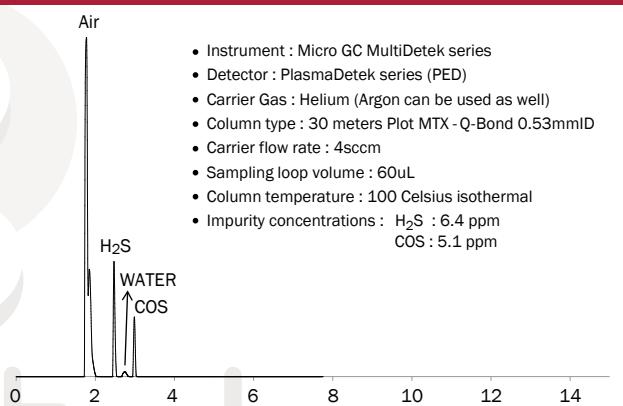
CHROMATOGRAM #42



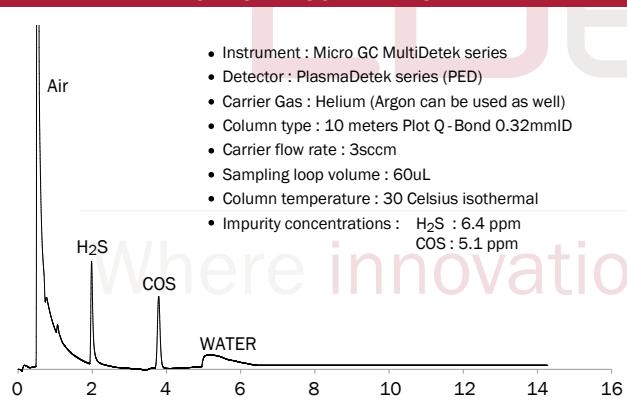
CHROMATOGRAM #43



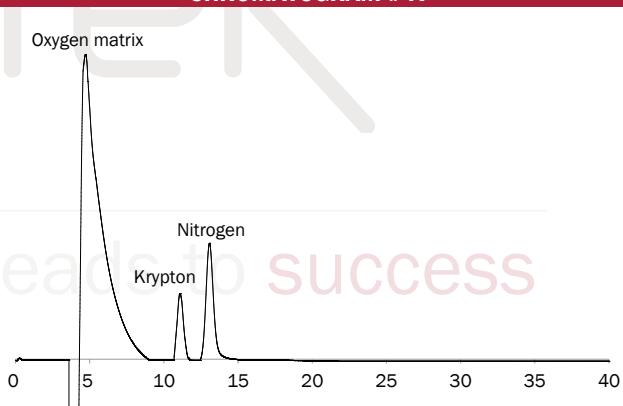
CHROMATOGRAM #44



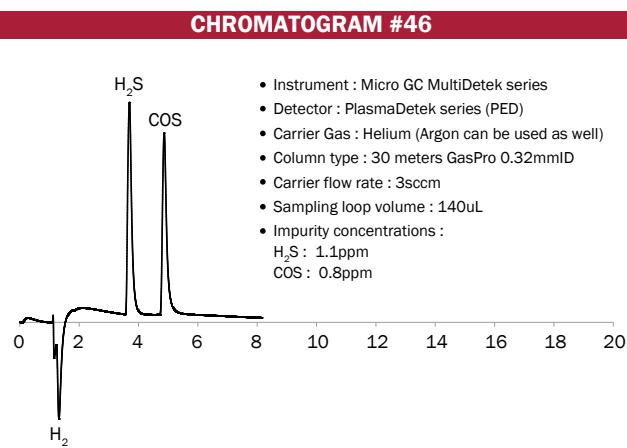
CHROMATOGRAM #45



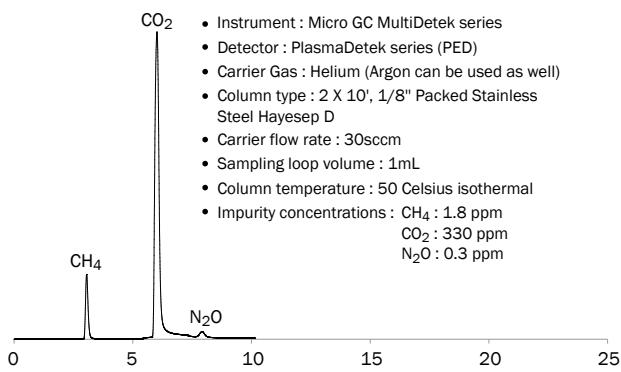
CHROMATOGRAM #47



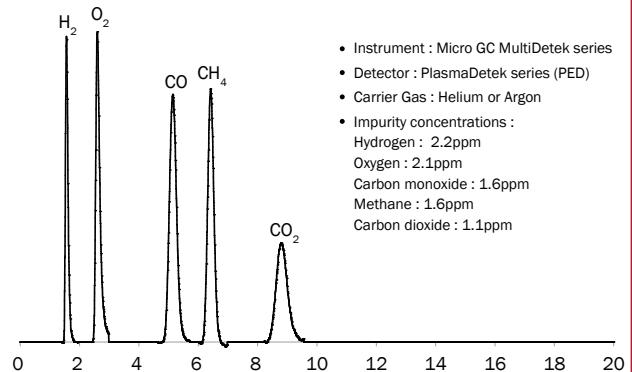
CHROMATOGRAM #46



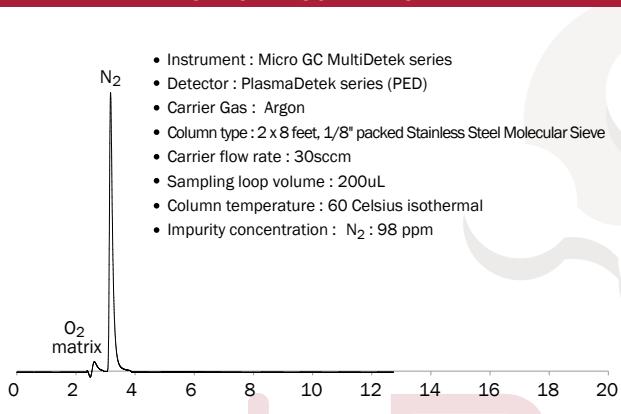
CHROMATOGRAM #48



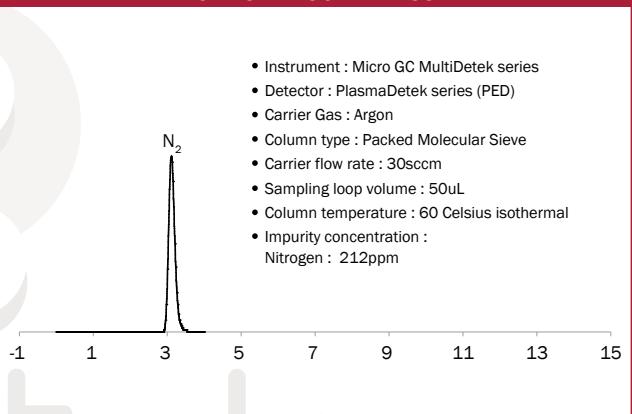
CHROMATOGRAM #49



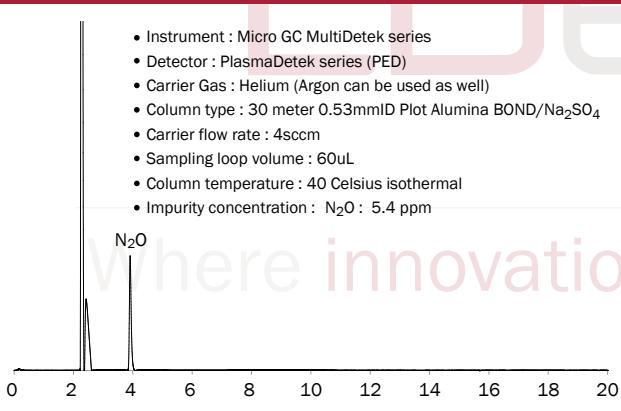
CHROMATOGRAM #52



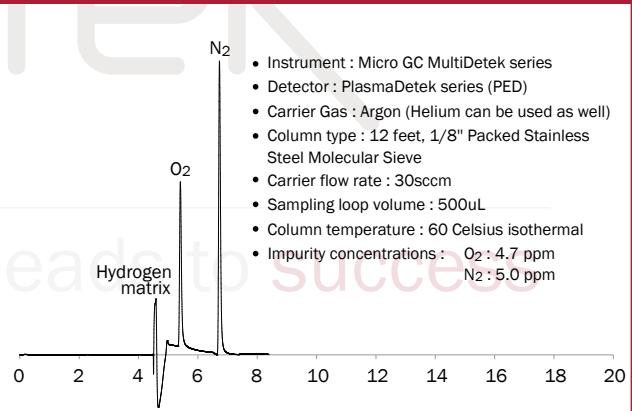
CHROMATOGRAM #53



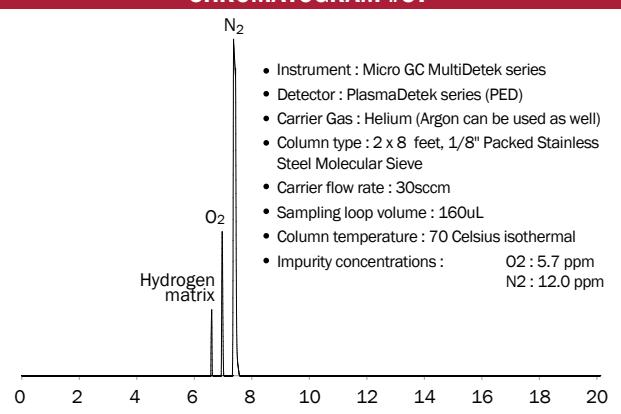
CHROMATOGRAM #54



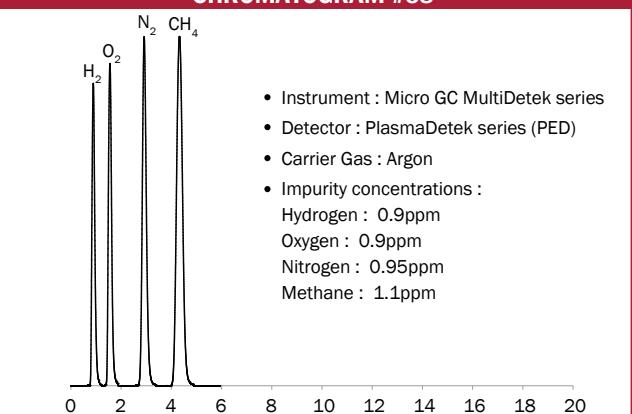
CHROMATOGRAM #56



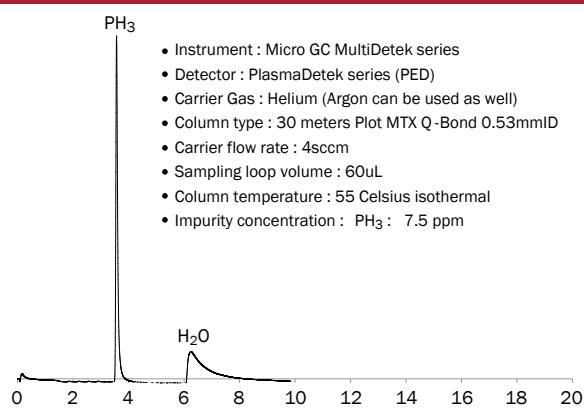
CHROMATOGRAM #57



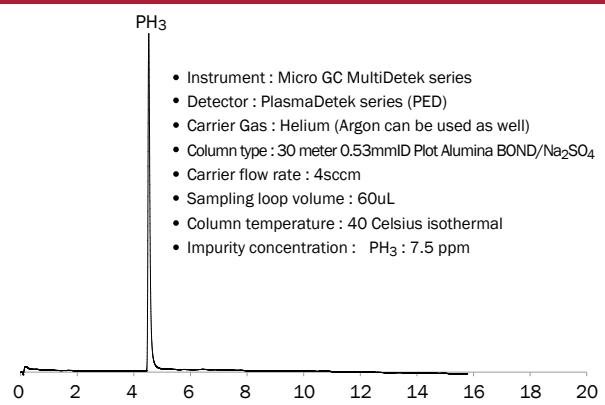
CHROMATOGRAM #58



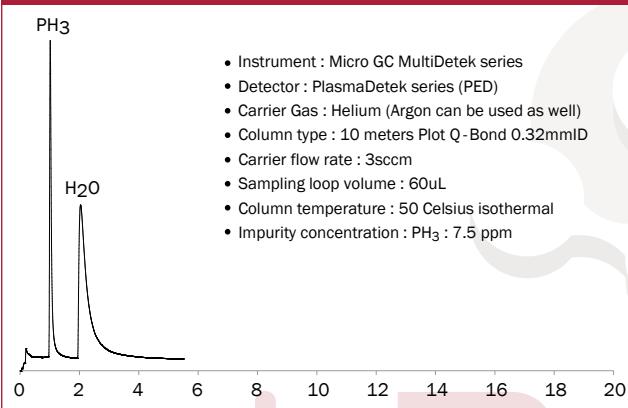
CHROMATOGRAM #59



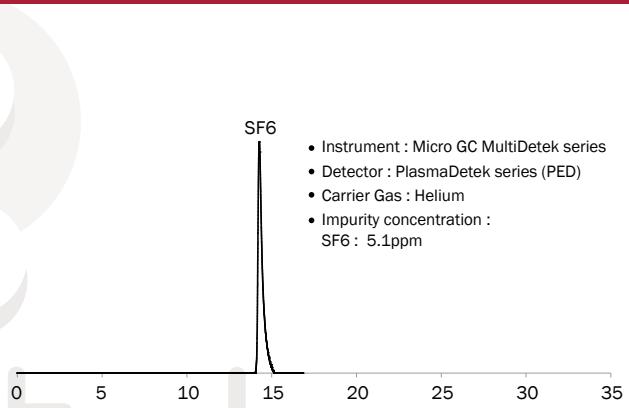
CHROMATOGRAM #60



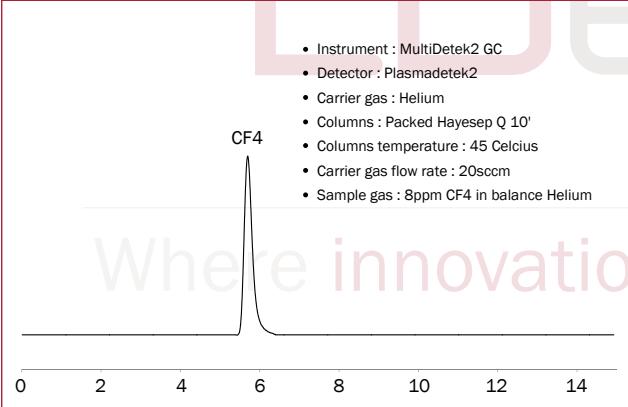
CHROMATOGRAM #61



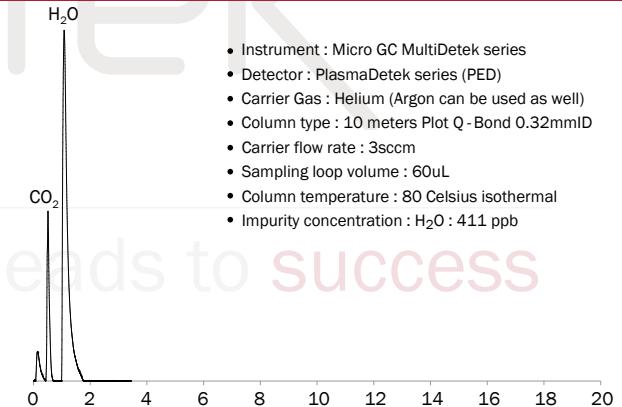
CHROMATOGRAM #62



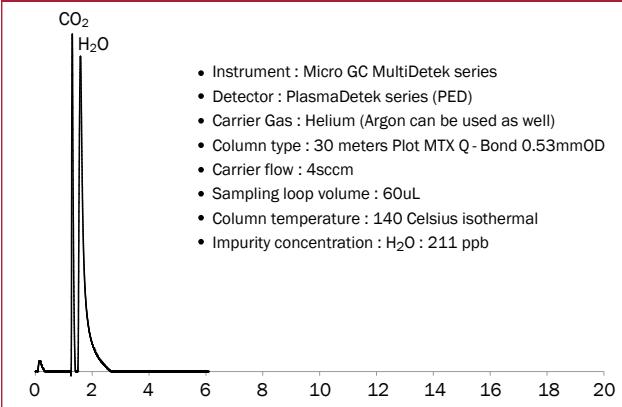
CHROMATOGRAM #63



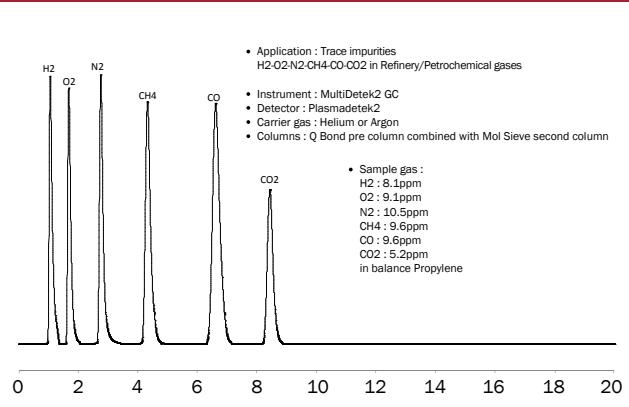
CHROMATOGRAM #64



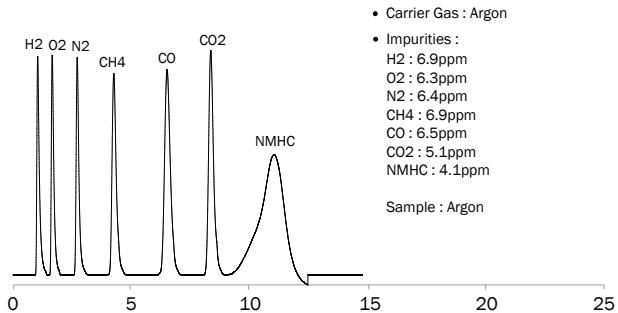
CHROMATOGRAM #65



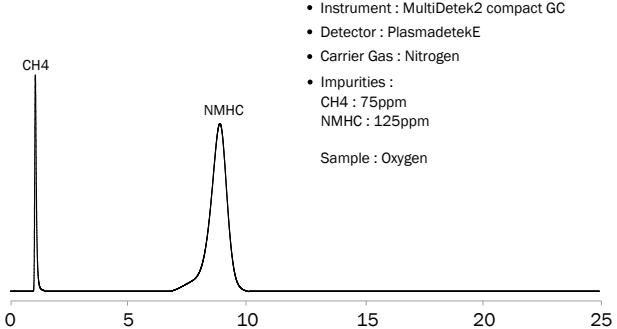
CHROMATOGRAM #66



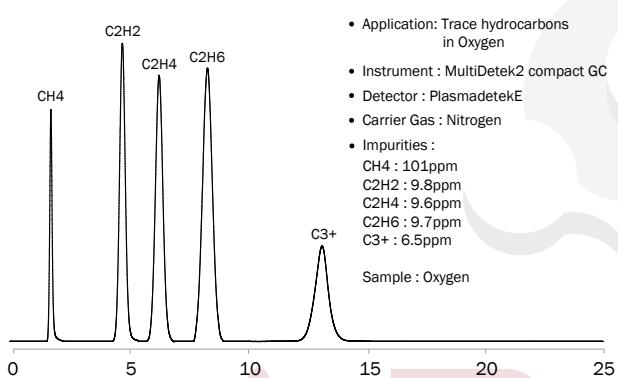
CHROMATOGRAM #67



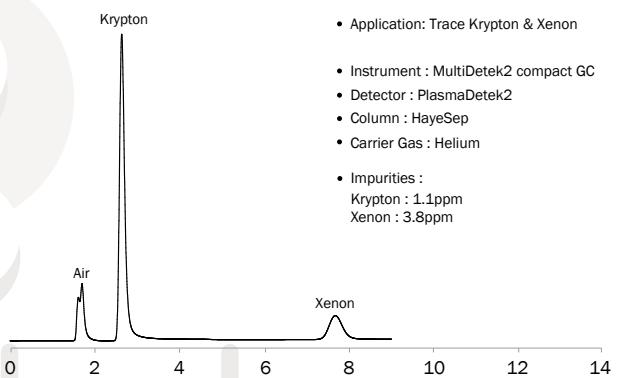
CHROMATOGRAM #68



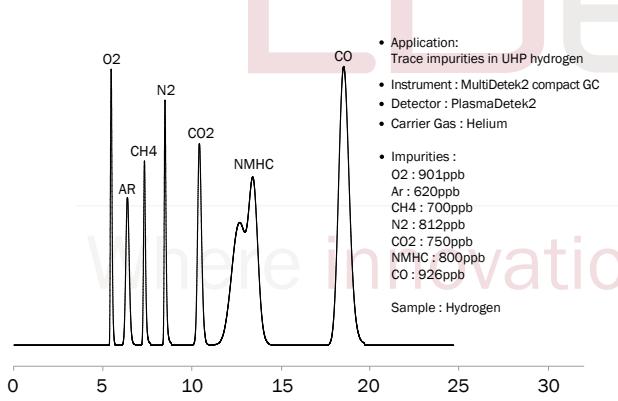
CHROMATOGRAM #69



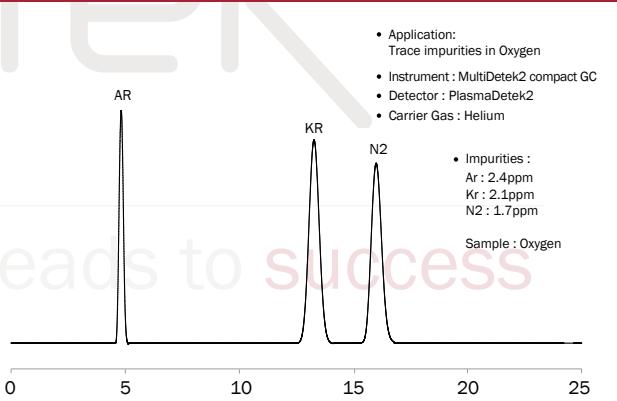
CHROMATOGRAM #70



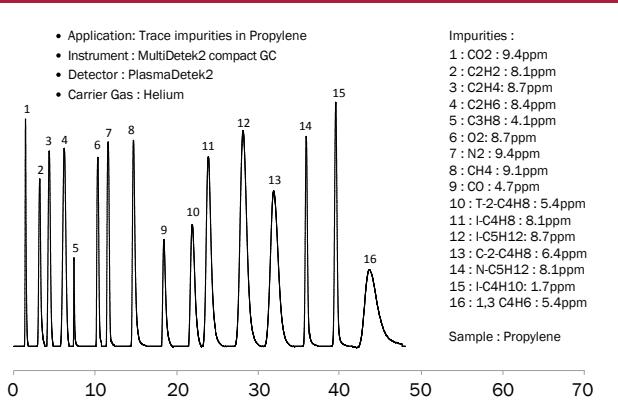
CHROMATOGRAM #71



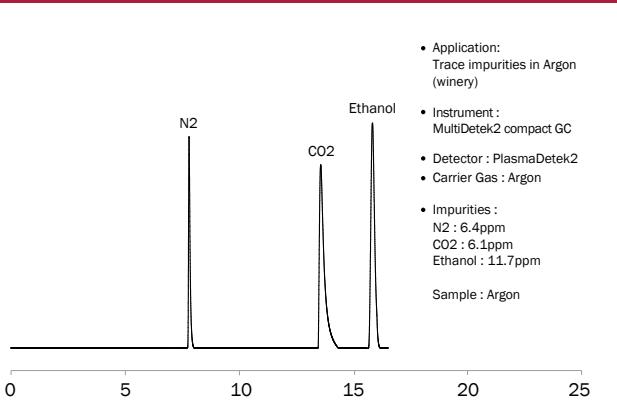
CHROMATOGRAM #72

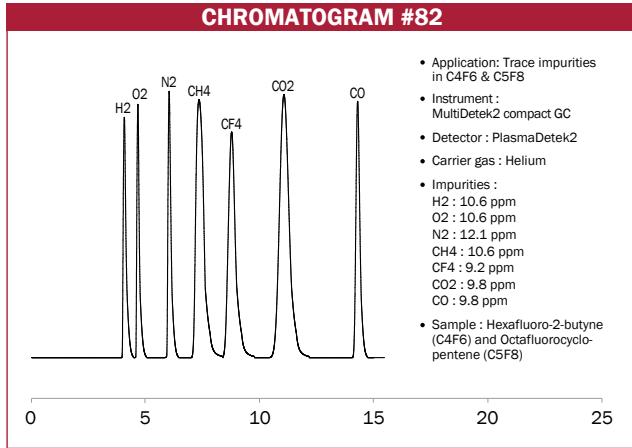
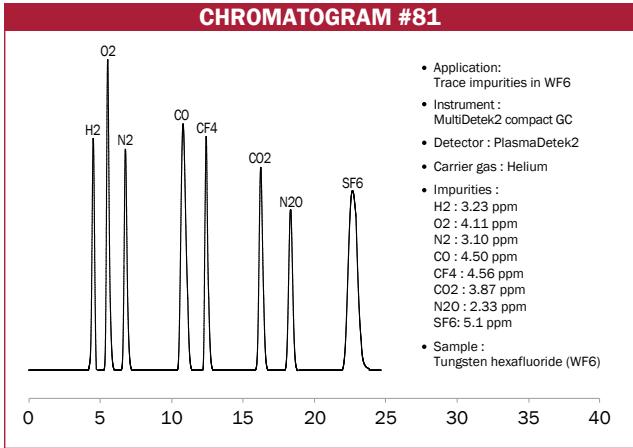
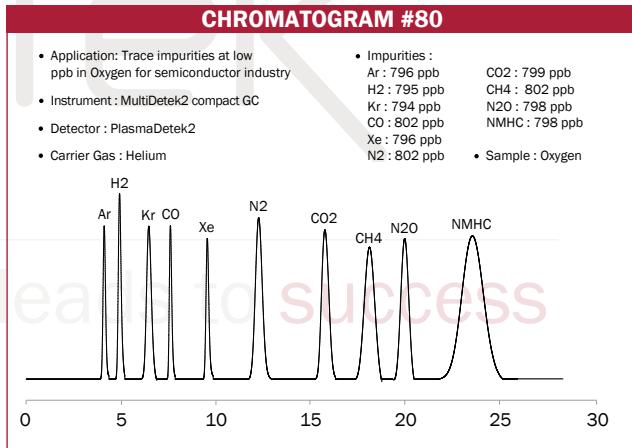
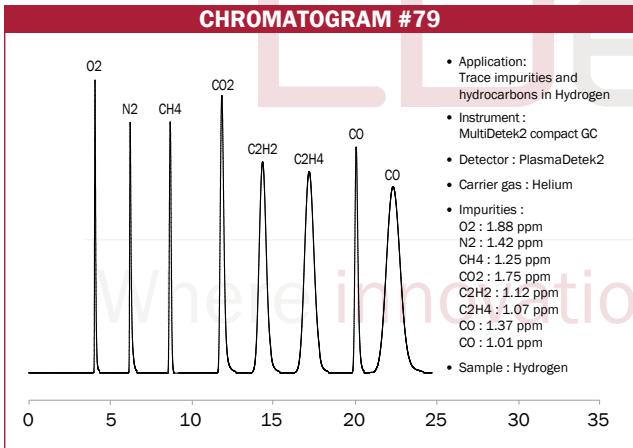
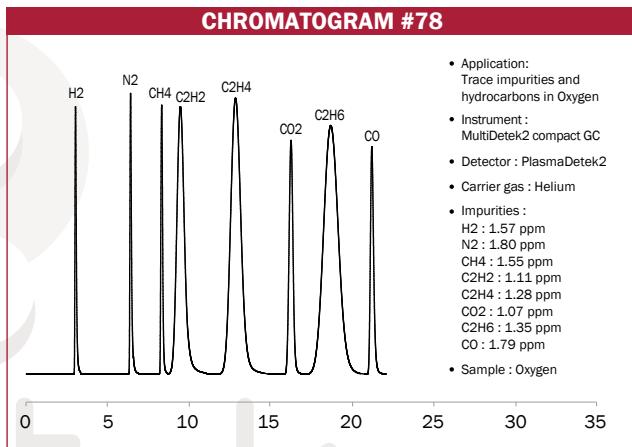
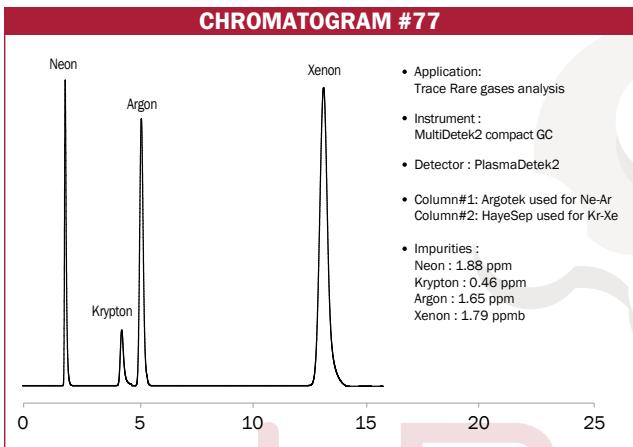
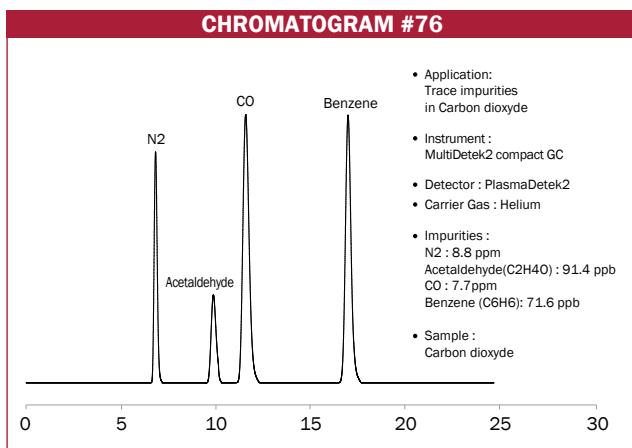
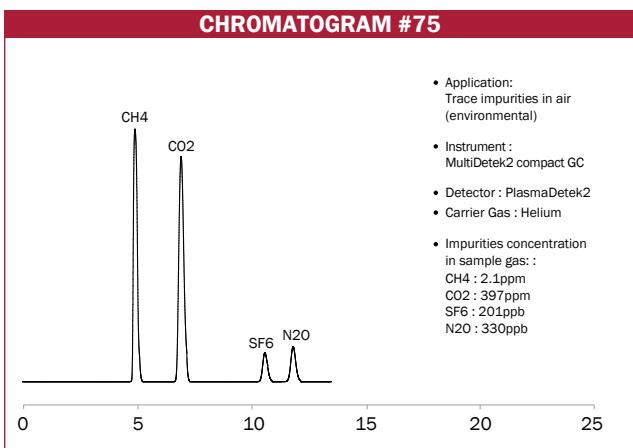


CHROMATOGRAM #73

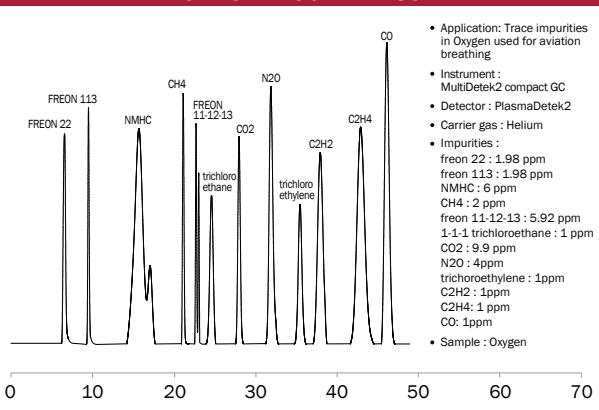


CHROMATOGRAM #74

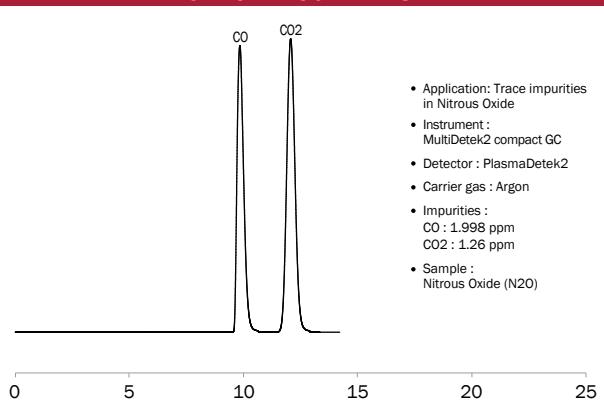




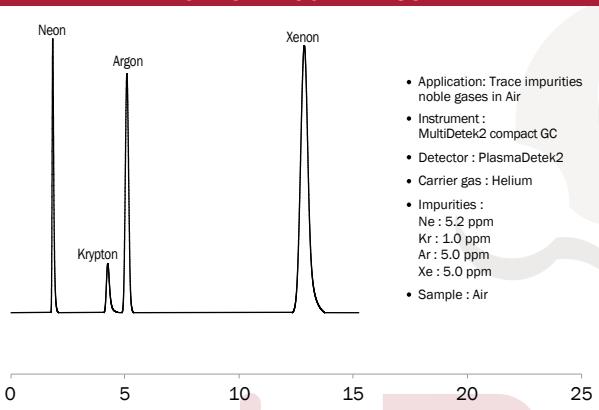
CHROMATOGRAM #83



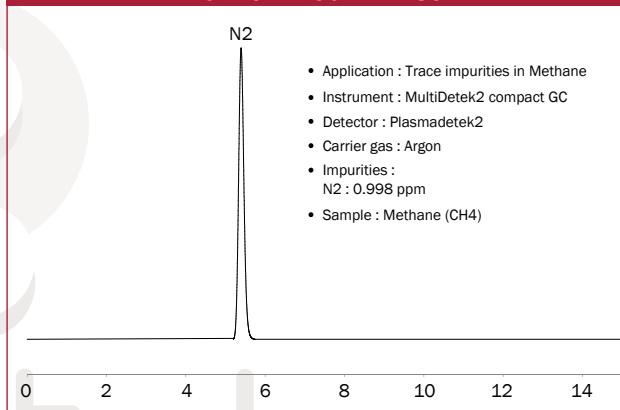
CHROMATOGRAM #84



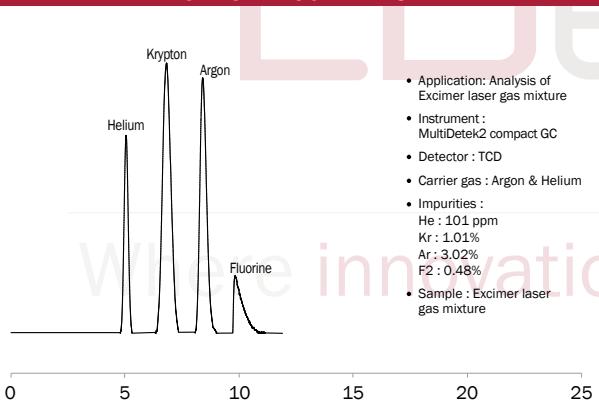
CHROMATOGRAM #85



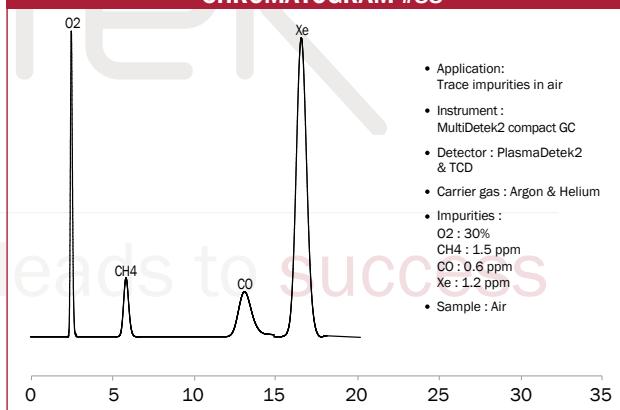
CHROMATOGRAM #86



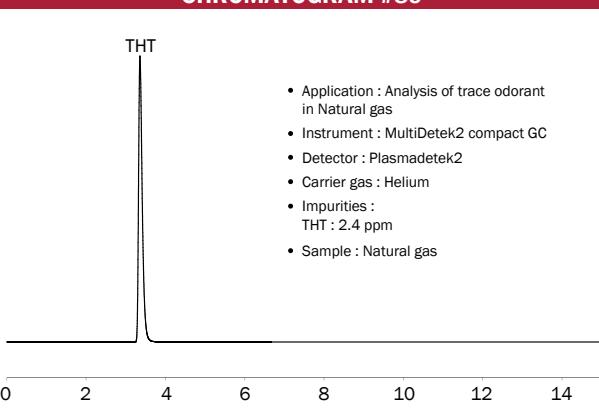
CHROMATOGRAM #87



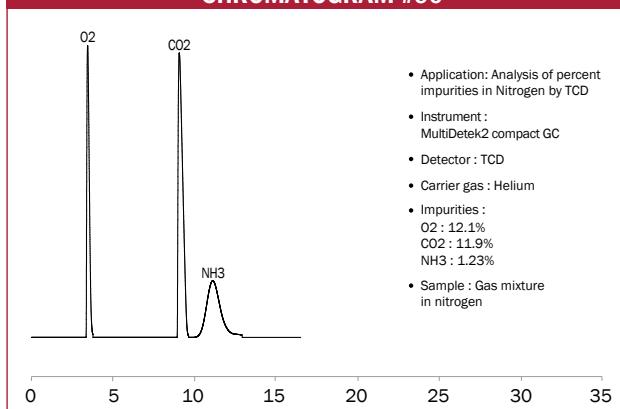
CHROMATOGRAM #88



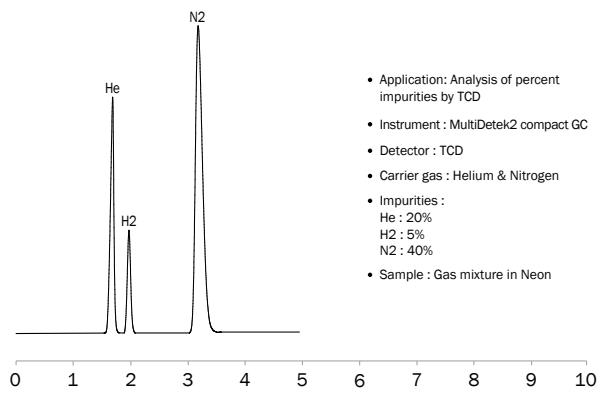
CHROMATOGRAM #89



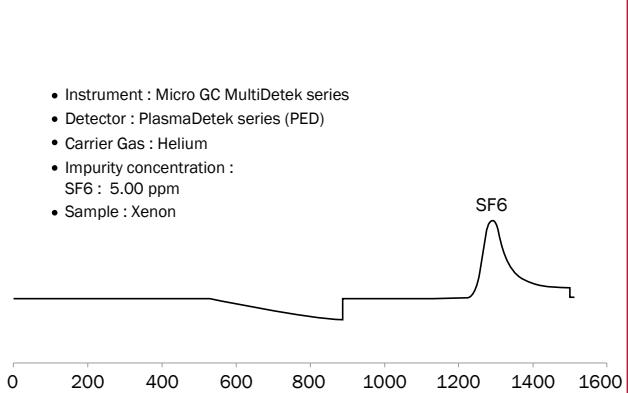
CHROMATOGRAM #90



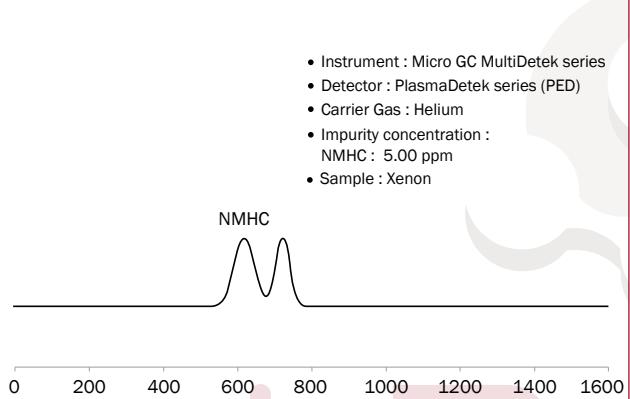
CHROMATOGRAM #91



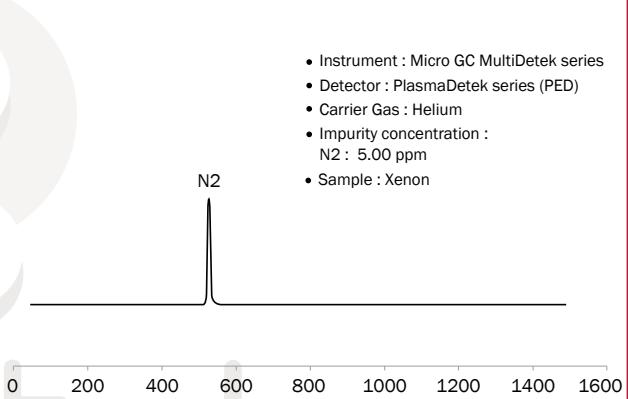
CHROMATOGRAM #92



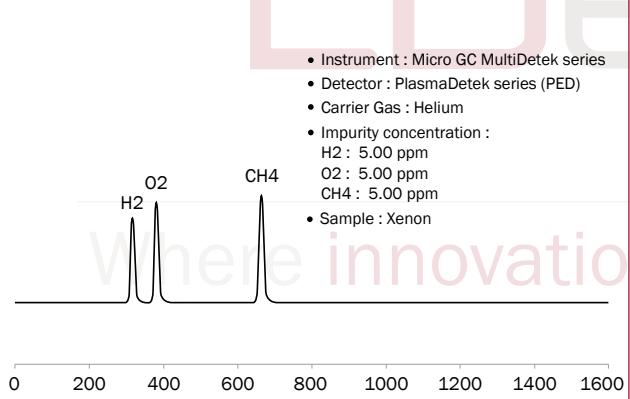
CHROMATOGRAM #93



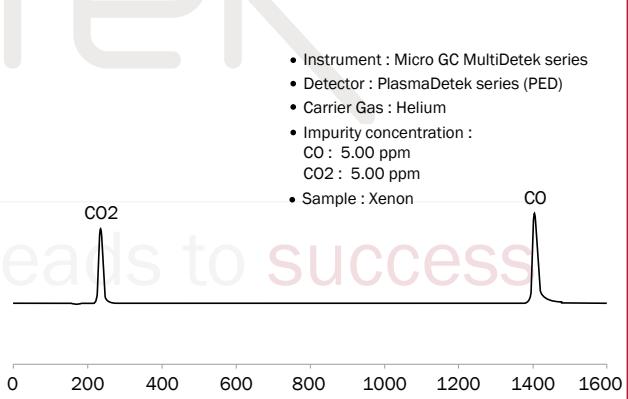
CHROMATOGRAM #94



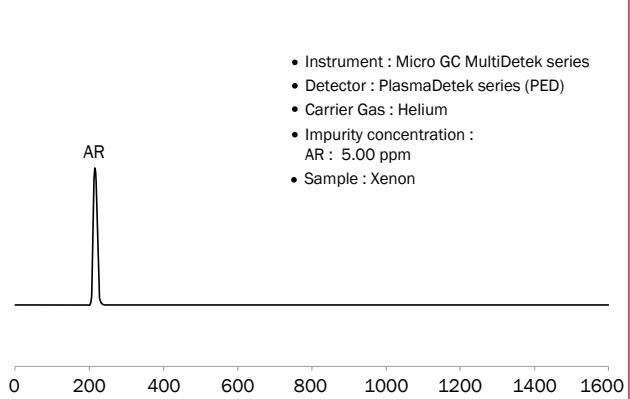
CHROMATOGRAM #95



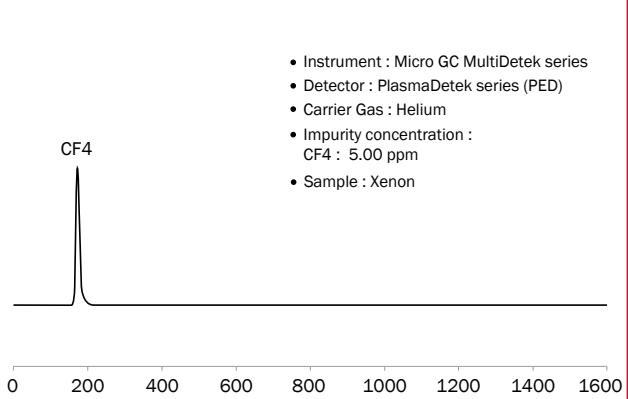
CHROMATOGRAM #96



CHROMATOGRAM #97

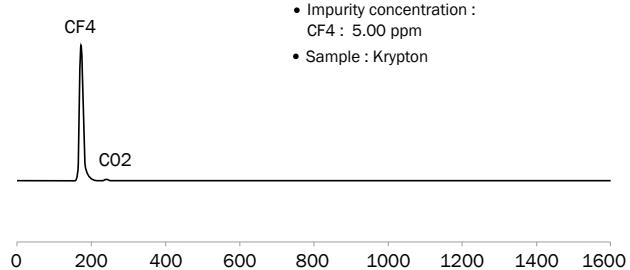


CHROMATOGRAM #98



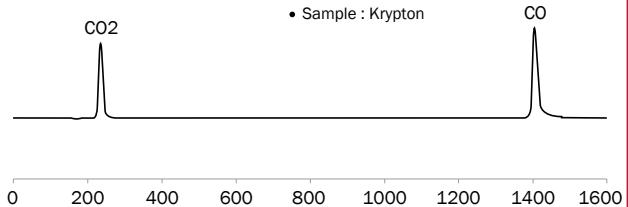
CHROMATOGRAM #99

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CF4 : 5.00 ppm
- Sample : Krypton



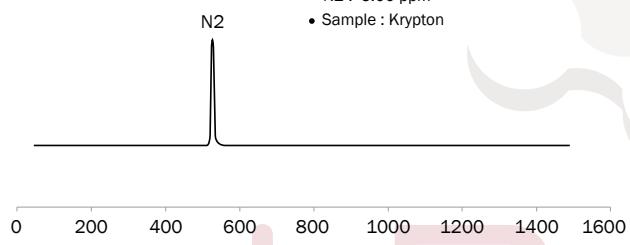
CHROMATOGRAM #100

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CO : 5.00 ppm
- CO2 : 5.00 ppm
- Sample : Krypton



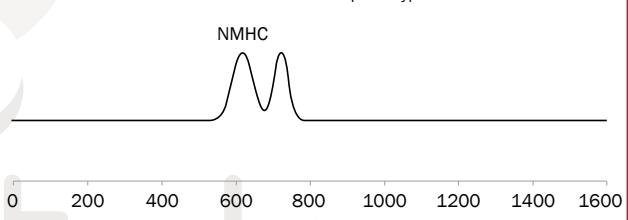
CHROMATOGRAM #101

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : N2 : 5.00 ppm
- Sample : Krypton



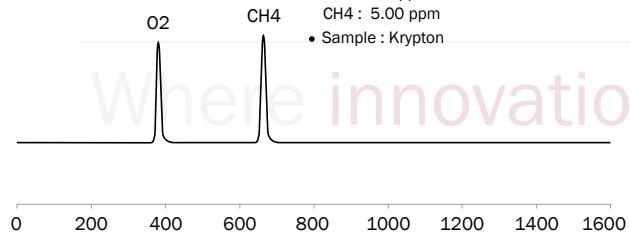
CHROMATOGRAM #102

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : NMHC : 5.00 ppm
- Sample : Krypton



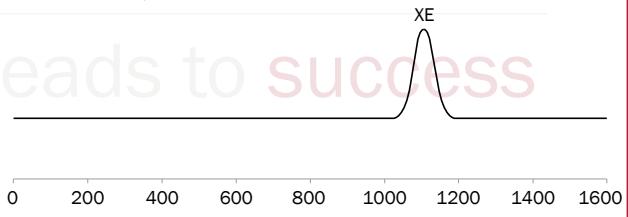
CHROMATOGRAM #103

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : O2 : 5.00 ppm
- CH4 : 5.00 ppm
- Sample : Krypton



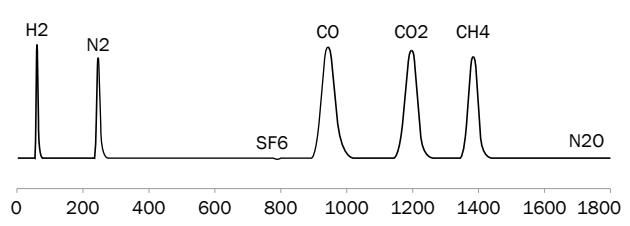
CHROMATOGRAM #104

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : XE : 5.00 ppm
- Sample : Krypton



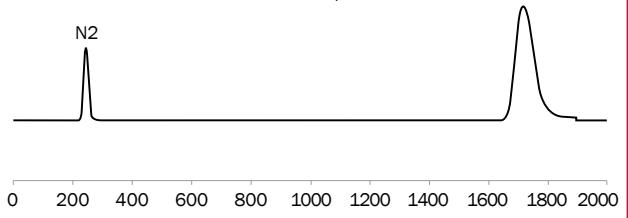
CHROMATOGRAM #105

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CO2 : 5.00 ppm N2 : 5.00 ppm CH4 : 5.00 ppm
- H2 : 5.00 ppm CO : 5.00 ppm
- Sample : NF3

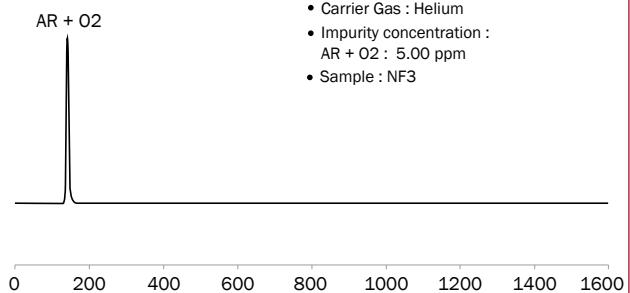


CHROMATOGRAM #106

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : N2O : 4.90 ppm
- Sample : NF3

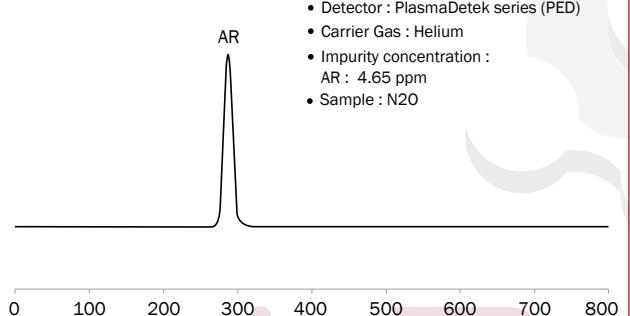


CHROMATOGRAM #107



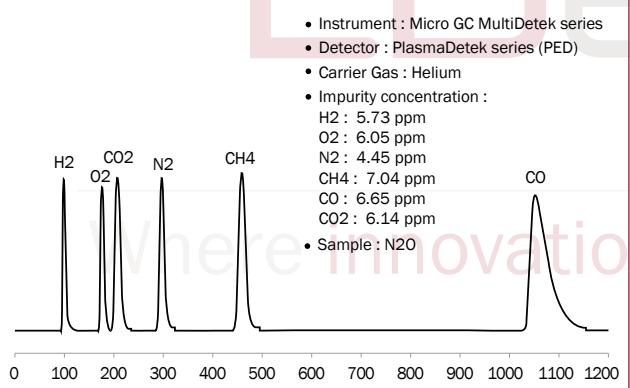
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : AR + O₂ : 5.00 ppm
- Sample : NF3

CHROMATOGRAM #109



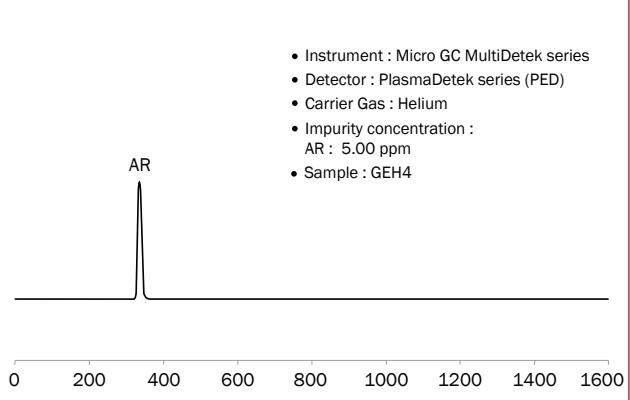
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : AR : 4.65 ppm
- Sample : N2O

CHROMATOGRAM #111



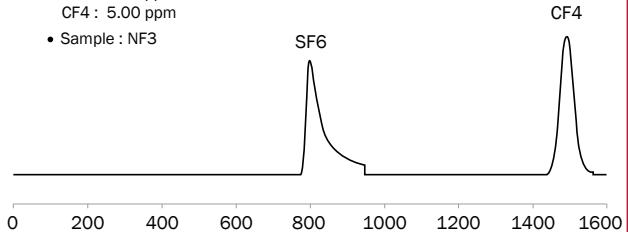
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : H₂ : 5.73 ppm
O₂ : 6.05 ppm
N₂ : 4.45 ppm
CH₄ : 7.04 ppm
CO : 6.65 ppm
CO₂ : 6.14 ppm
- Sample : N2O

CHROMATOGRAM #113



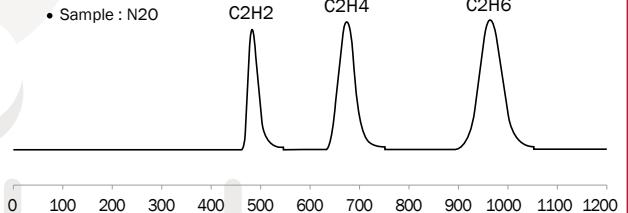
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : AR : 5.00 ppm
- Sample : GEH4

CHROMATOGRAM #108



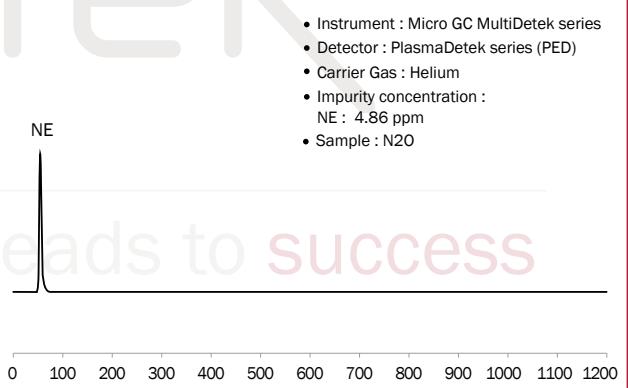
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : SF6 : 5.00 ppm
CF4 : 5.00 ppm
- Sample : NF3

CHROMATOGRAM #110



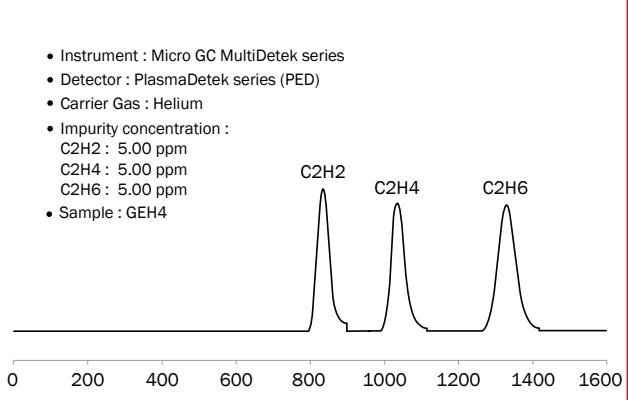
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : C₂H₂ : 3.72 ppm
C₂H₄ : 4.62 ppm
C₂H₆ : 4.55 ppm
- Sample : N2O

CHROMATOGRAM #112



- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : NE : 4.86 ppm
- Sample : N2O

CHROMATOGRAM #114

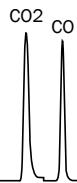


- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : C₂H₂ : 5.00 ppm
C₂H₄ : 5.00 ppm
C₂H₆ : 5.00 ppm
- Sample : GEH4

CHROMATOGRAM #115

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
 - CO : 5.00 ppm
 - CO₂ : 5.00 ppm
- Sample : GEH4

CO₂

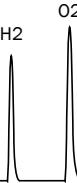


0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #116

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
 - H₂ : 5.00 ppm
 - CH₄ : 5.00 ppm
 - O₂ : 5.00 ppm
- Sample : GEH4

H₂



0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #117

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
 - N₂ : 5.00 ppm
- Sample : GEH4

N₂



0 200 400 600 800 1000 1200 1400 1600

Ld²etek

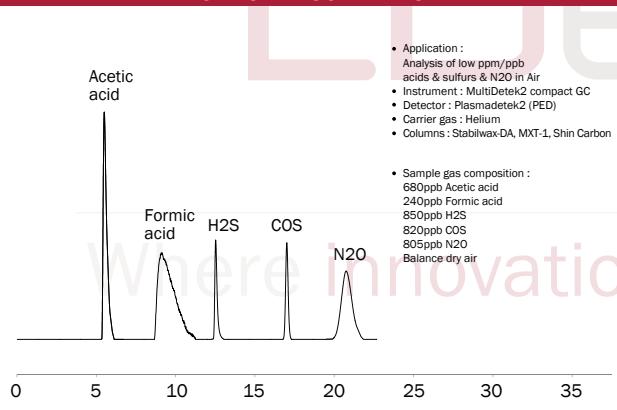
Where innovation leads to success

SAMPLES

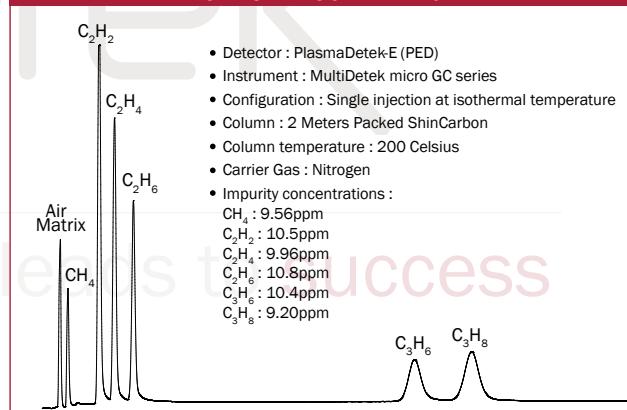
Chromatograms

Air	5-10-44-45-48-75-85-88
Argon	30-54-58-67-74
Carbon Dioxide	76
Crude Argon	52-53
Ethylene	66
Excimer laser gas mixture	87
Germane (GeH ₄)	113-114-115-116-117
Helium	19-39
Hexafluoro-2-butyne	82
Hydrogen	15-31-40-46-56-57-71-79
Hydrogen Chloride	25
Krypton	99-100-101-102-103-104
Methane	86
Natural gas	50-51-89
Neon	38-91
Nitrogen	9-13-16-32-43-49-90
Nitrogen trifluoride (NF ₃)	105-106-107-108
Nitrous oxide (N ₂ O)	84-109-110-111-112
Octafluorocyclopentene	82
Oxygen	11-14-17-23-33-34-35-36-37-41-47-68-69-72-78-80-83
Propylene	66-73
Sulfur hexafluoride	42-63
Syngas	44-45
Tungsten hexafluoride	81
Xenon	62-92-93-94-95-96-97-98

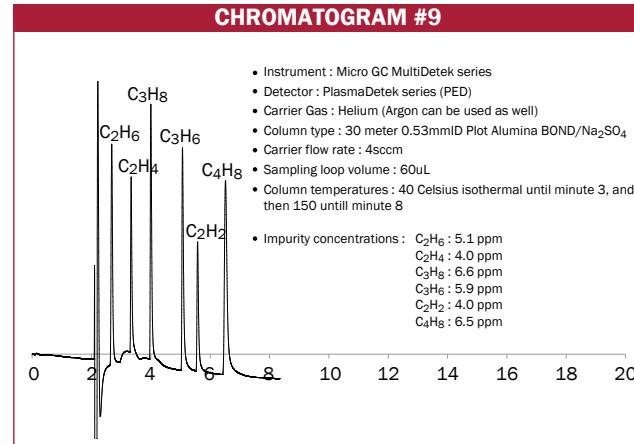
CHROMATOGRAM #5



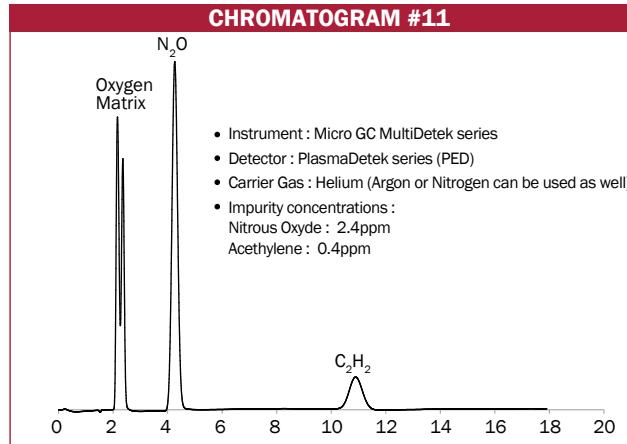
CHROMATOGram #10



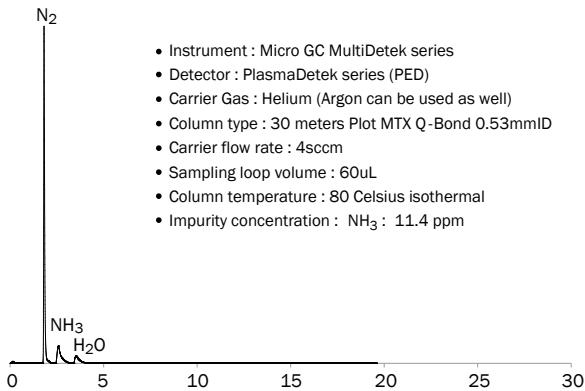
CHROMATOGRAM #9



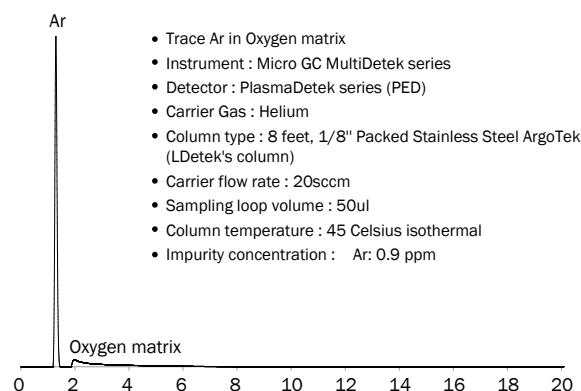
CHROMATOGRAM #11



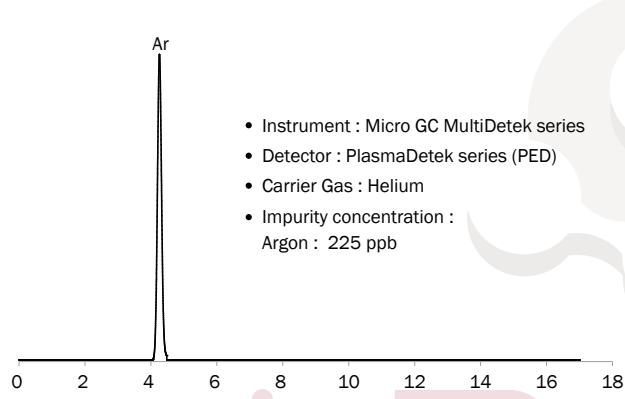
CHROMATOGRAM #13



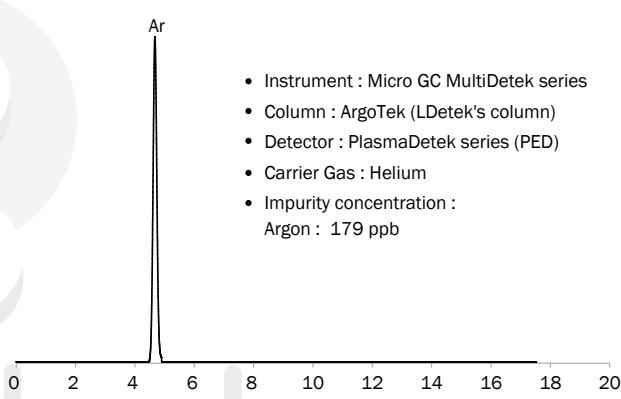
CHROMATOGRAM #14



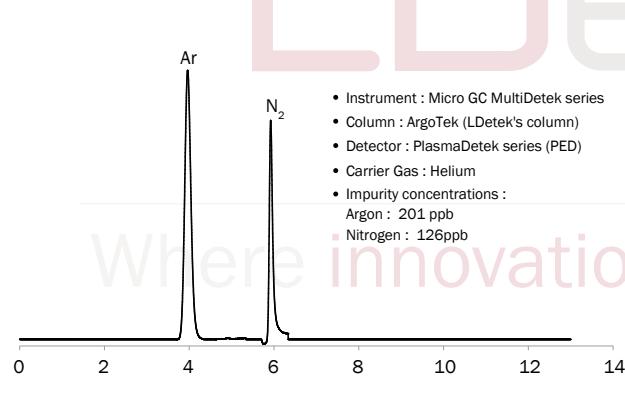
CHROMATOGRAM #15



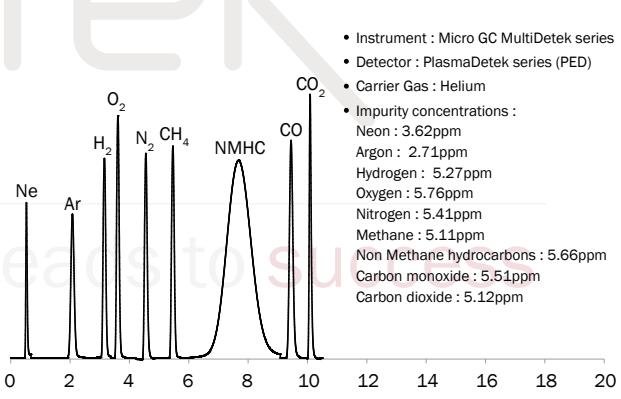
CHROMATOGRAM #16



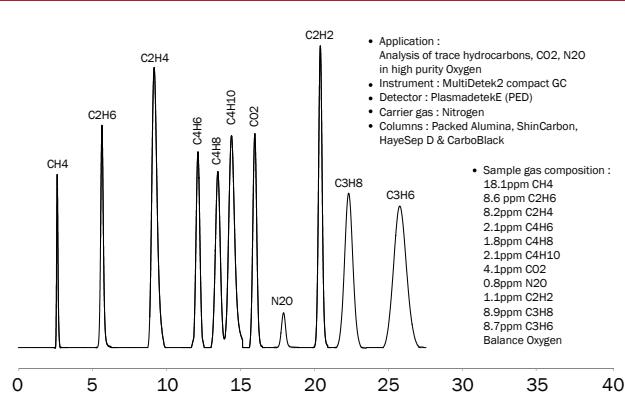
CHROMATOGRAM #17



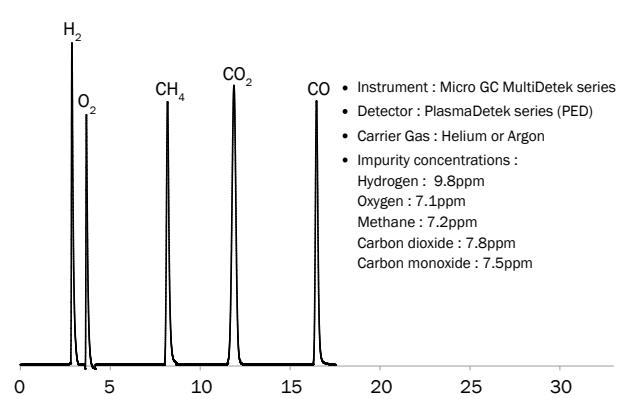
CHROMATOGRAM #19



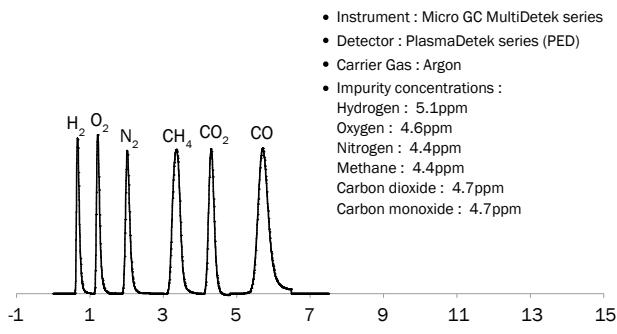
CHROMATOGRAM #23



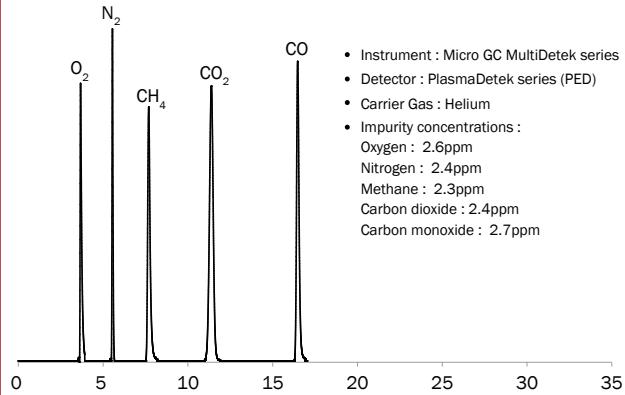
CHROMATOGRAM #25



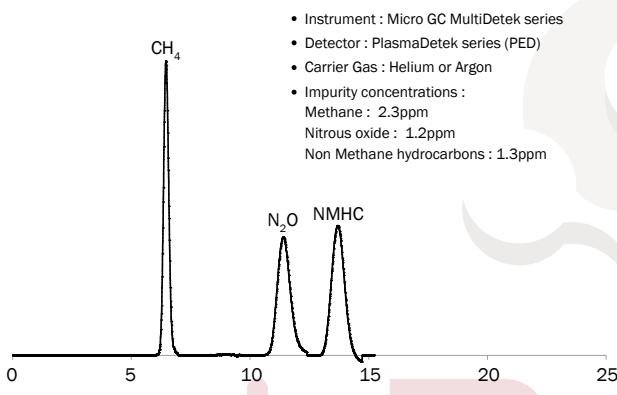
CHROMATOGRAM #30



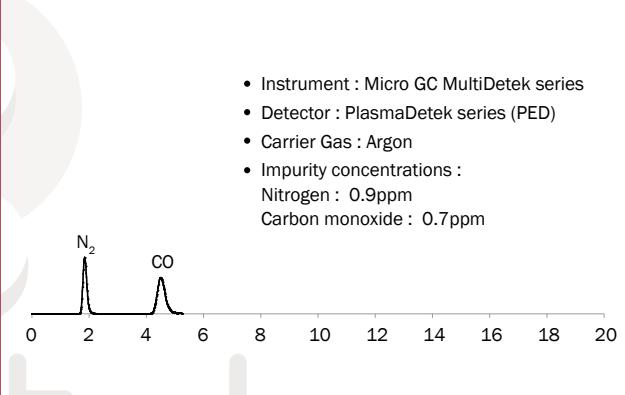
CHROMATOGRAM #31



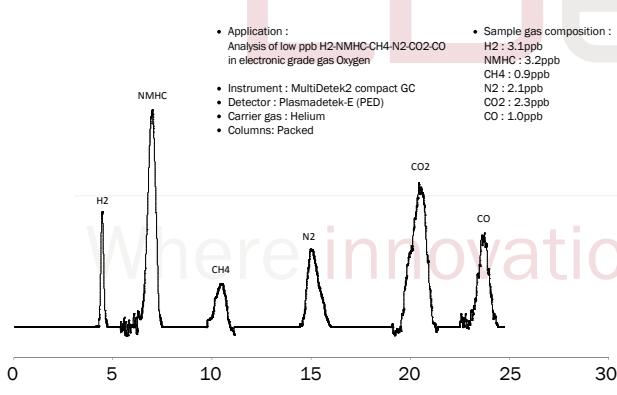
CHROMATOGRAM #32



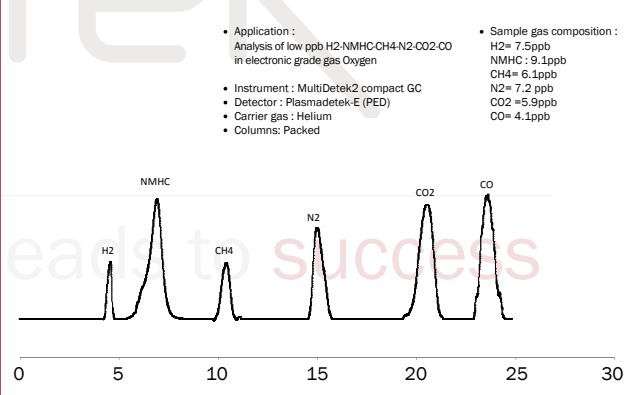
CHROMATOGRAM #33



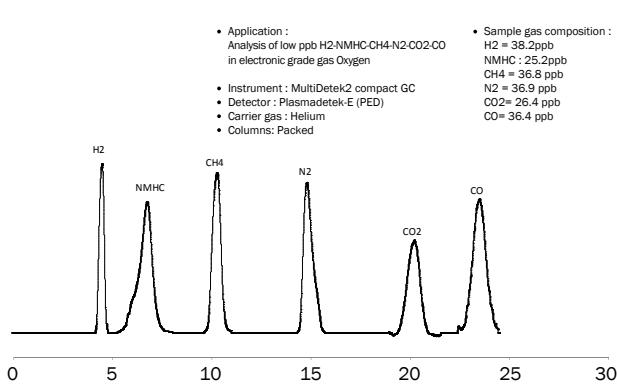
CHROMATOGRAM #34



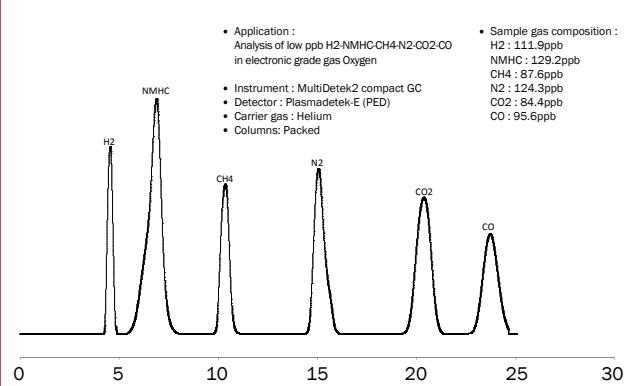
CHROMATOGRAM #35



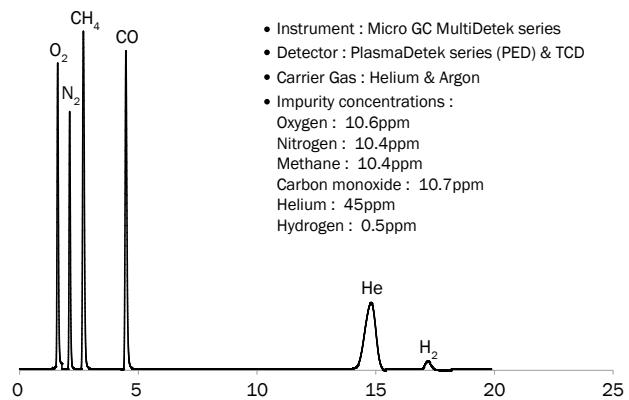
CHROMATOGRAM #36



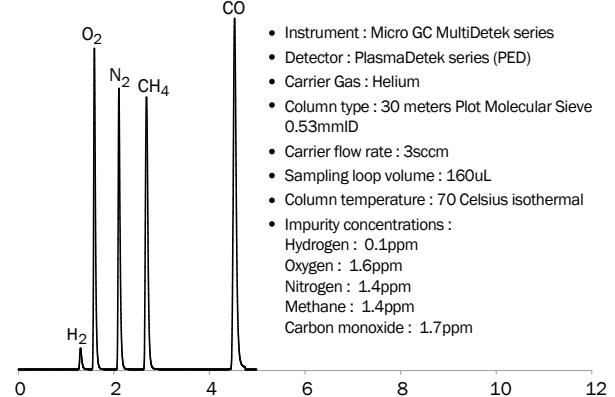
CHROMATOGRAM #37



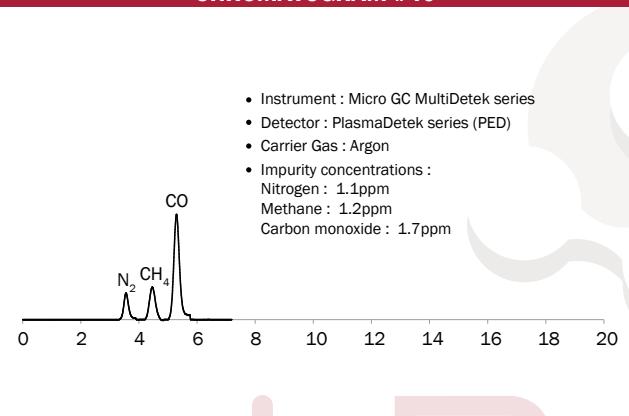
CHROMATOGRAM #38



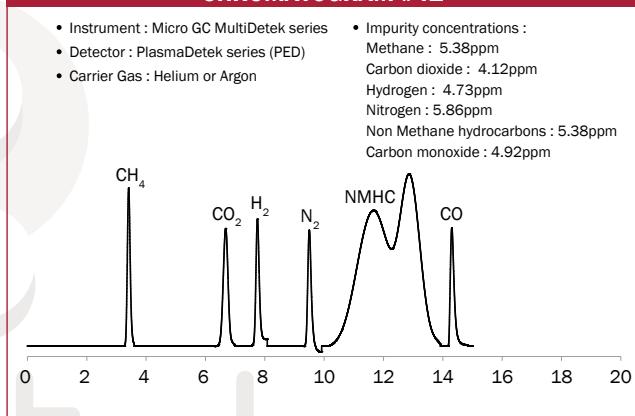
CHROMATOGRAHM #39



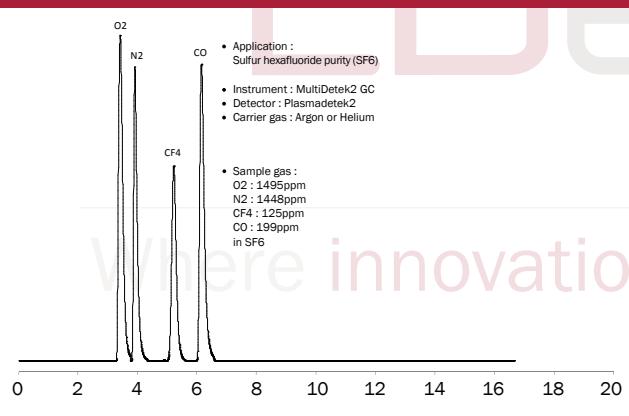
CHROMATOGRAM #40



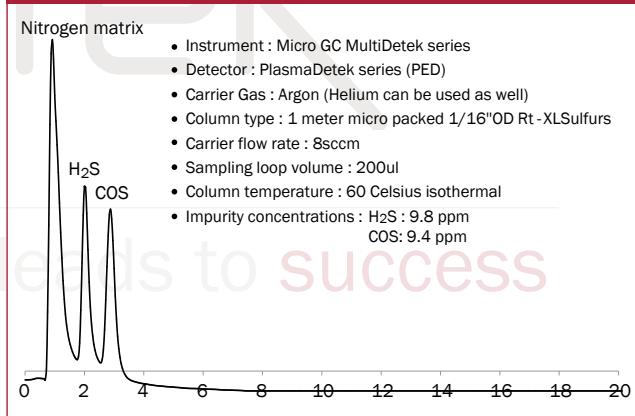
CHROMATOGRAM #41



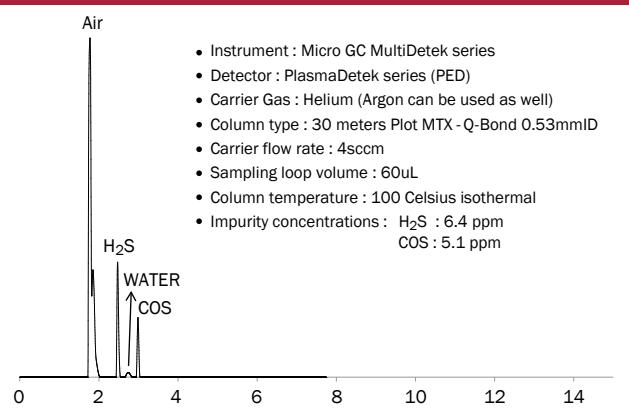
CHROMATOGRAM #42



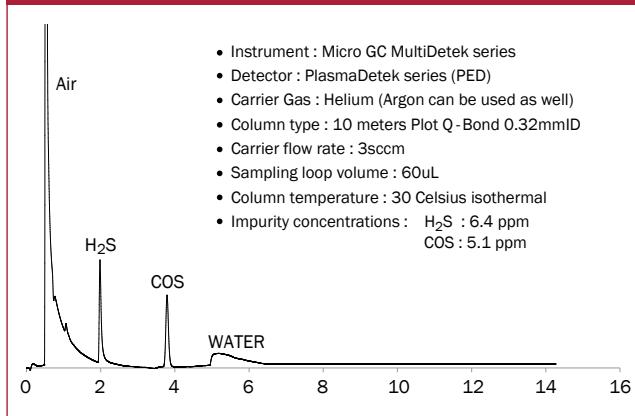
CHROMATOGRAM #43



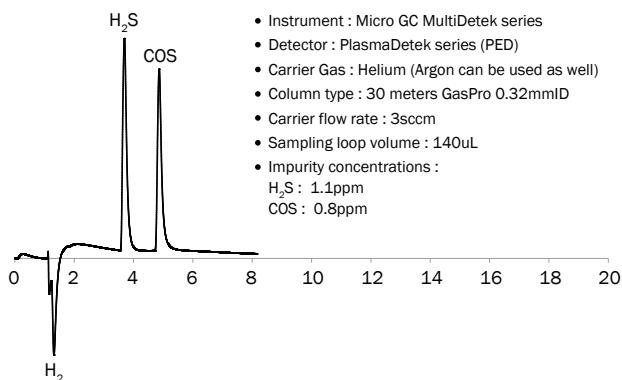
CHROMATOGRAM #44



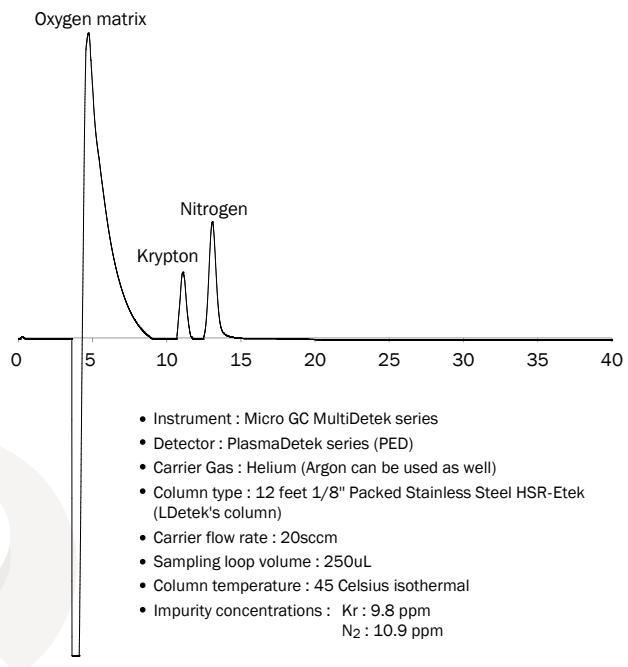
CHROMATOGRAM #45



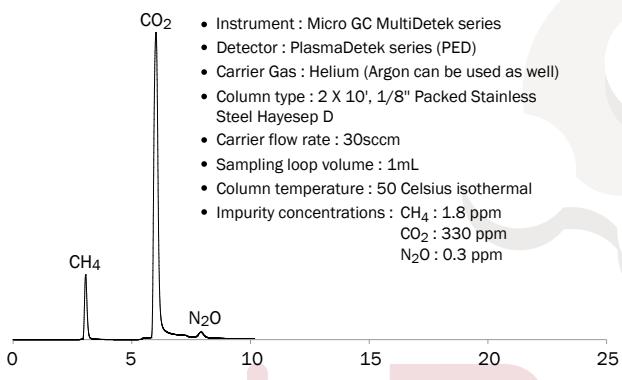
CHROMATOGRAM #46



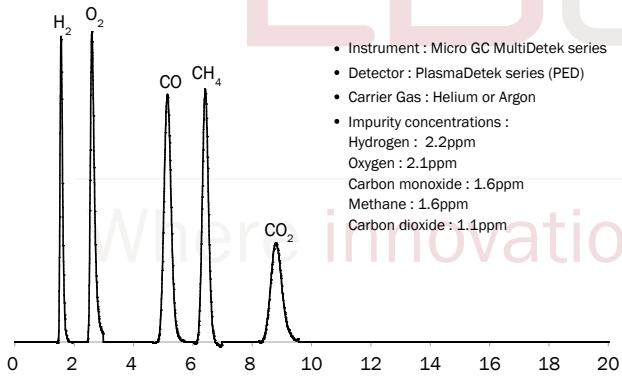
CHROMATOGRAM #47



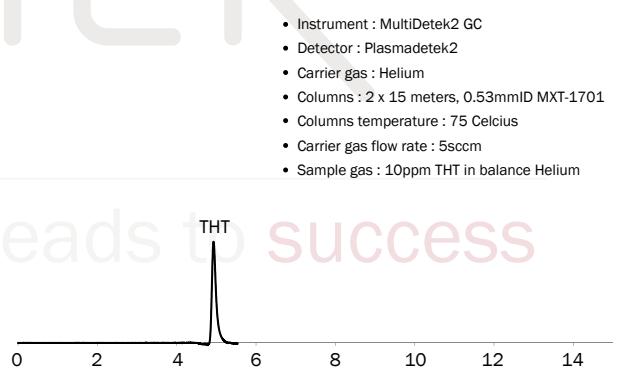
CHROMATOGRAM #48



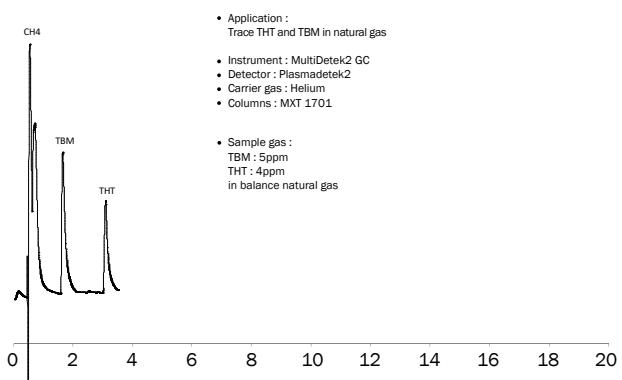
CHROMATOGRAM #49



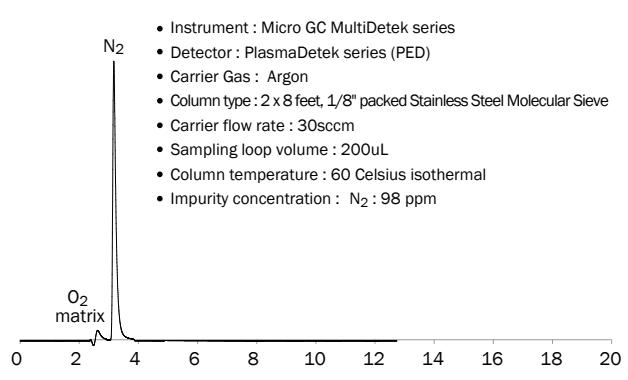
CHROMATOGRAM #50



CHROMATOGRAM #51

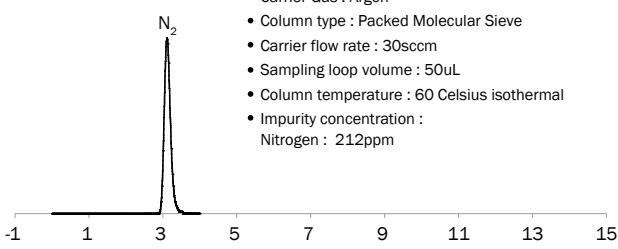


CHROMATOGRAM #52



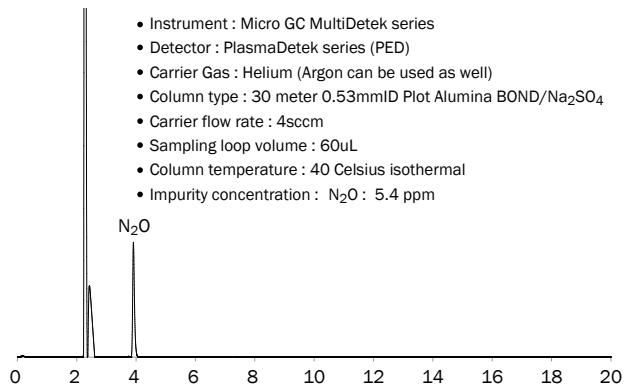
CHROMATOGRAM #53

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Argon
- Column type : Packed Molecular Sieve
- Carrier flow rate : 30sccm
- Sampling loop volume : 50uL
- Column temperature : 60 Celsius isothermal
- Impurity concentration : Nitrogen : 212ppm



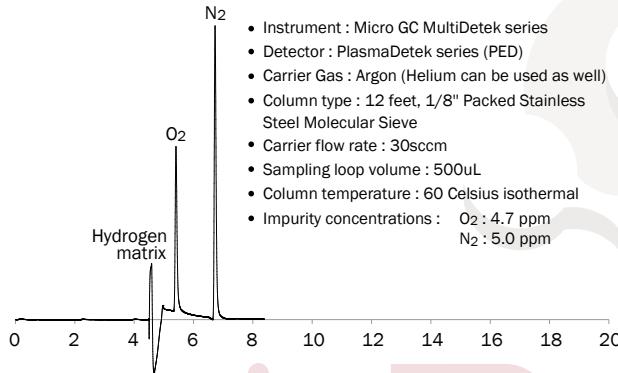
CHROMATOGRAM #54

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium (Argon can be used as well)
- Column type : 30 meter 0.53mmID Plot Alumina BOND/ Na_2SO_4
- Carrier flow rate : 4sccm
- Sampling loop volume : 60uL
- Column temperature : 40 Celsius isothermal
- Impurity concentration : N_2O : 5.4 ppm



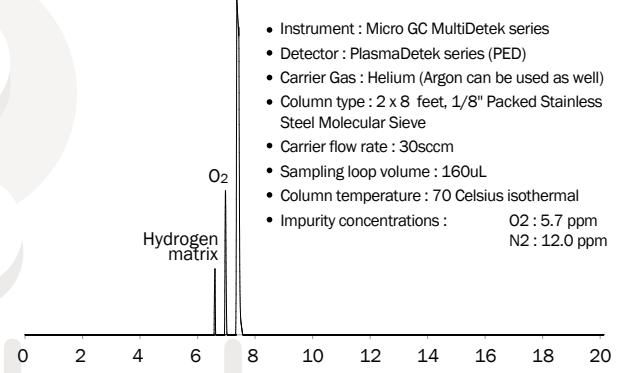
CHROMATOGRAM #56

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Argon (Helium can be used as well)
- Column type : 12 feet, 1/8" Packed Stainless Steel Molecular Sieve
- Carrier flow rate : 30sccm
- Sampling loop volume : 500uL
- Column temperature : 60 Celsius isothermal
- Impurity concentrations : O_2 : 4.7 ppm
 N_2 : 5.0 ppm



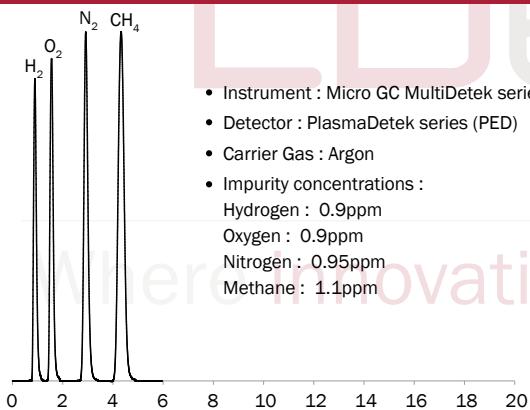
CHROMATOGRAM #57

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium (Argon can be used as well)
- Column type : 2 x 8 feet, 1/8" Packed Stainless Steel Molecular Sieve
- Carrier flow rate : 30sccm
- Sampling loop volume : 160uL
- Column temperature : 70 Celsius isothermal
- Impurity concentrations : O_2 : 5.7 ppm
 N_2 : 12.0 ppm



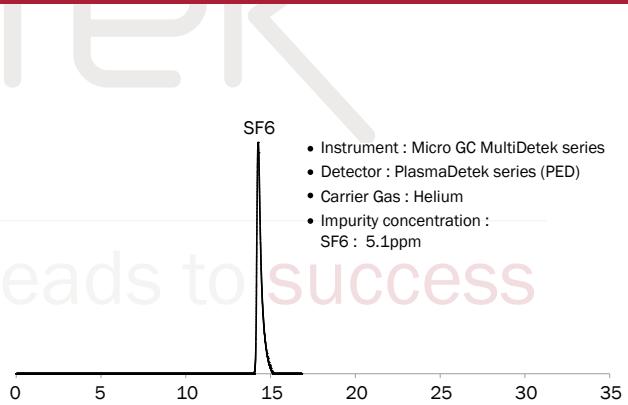
CHROMATOGRAM #58

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Argon
- Impurity concentrations :
Hydrogen : 0.9ppm
Oxygen : 0.9ppm
Nitrogen : 0.95ppm
Methane : 1.1ppm



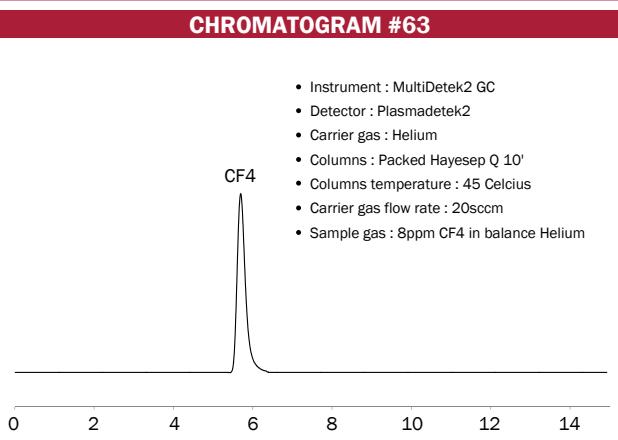
CHROMATOGRAM #62

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : SF_6 : 5.1ppm



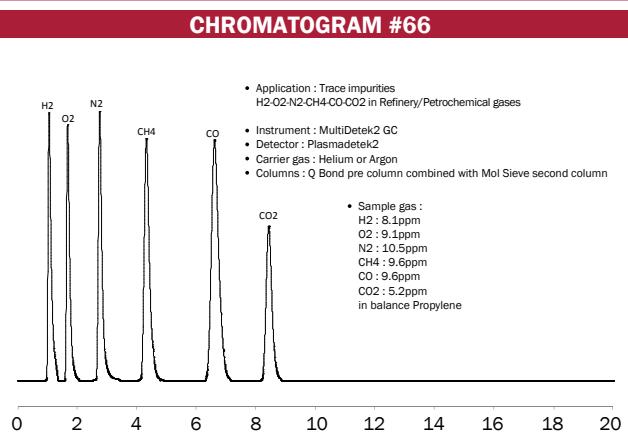
CHROMATOGRAM #63

- Instrument : MultiDetek2 GC
- Detector : Plasmadetek2
- Carrier gas : Helium
- Columns : Packed Hayesep Q 10'
- Columns temperature : 45 Celcius
- Carrier gas flow rate : 20sccm
- Sample gas : 8ppm CF_4 in balance Helium

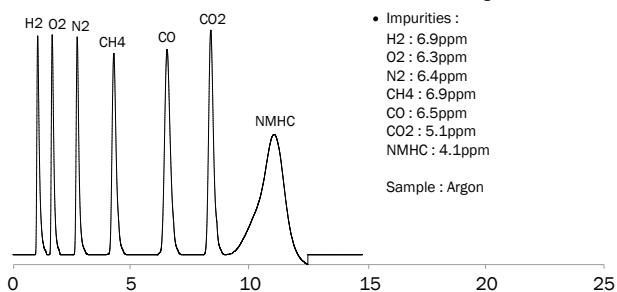


CHROMATOGRAM #66

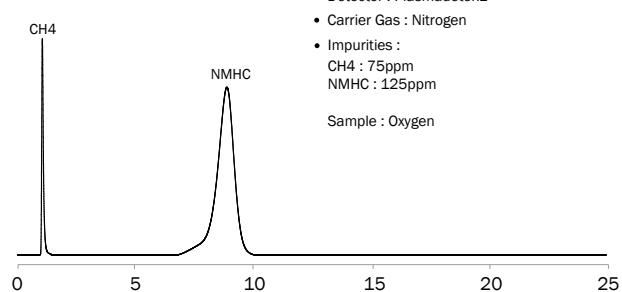
- Application : Trace impurities H_2 - O_2 - N_2 - CH_4 - CO - CO_2 in Refinery/Petrochemical gases
 - Instrument : MultiDetek2 GC
 - Detector : Plasmadetek2
 - Carrier gas : Helium or Argon
 - Columns : Q Bond pre column combined with Mol Sieve second column
- Sample gas :
 H_2 : 8.1ppm
 O_2 : 9.1ppm
 N_2 : 10.5ppm
 CH_4 : 9.6ppm
 CO : 9.6ppm
 CO_2 : 5.2ppm
in balance Propylene



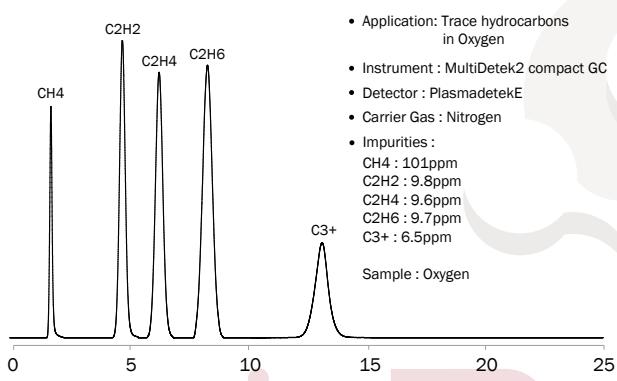
CHROMATOGRAM #67



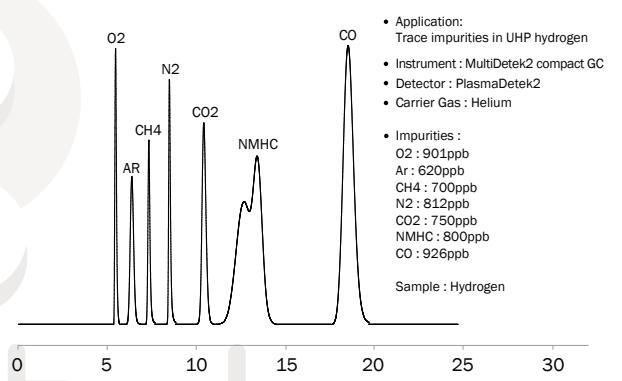
CHROMATOGRAM #68



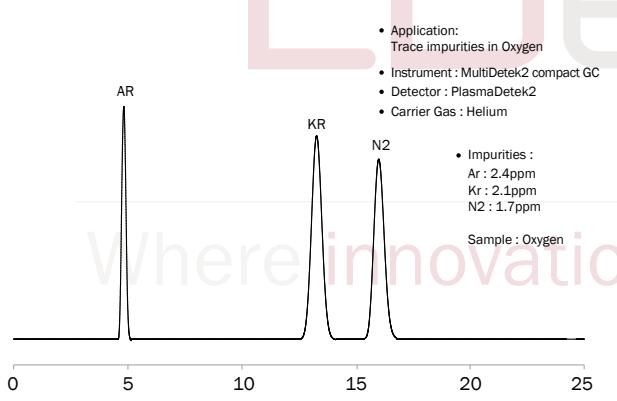
CHROMATOGRAM #69



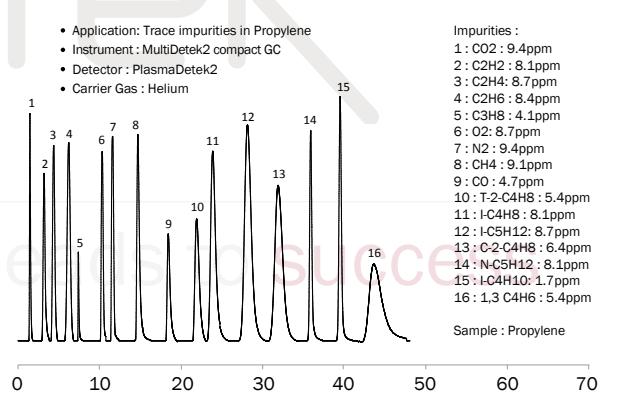
CHROMATOGRAM #71



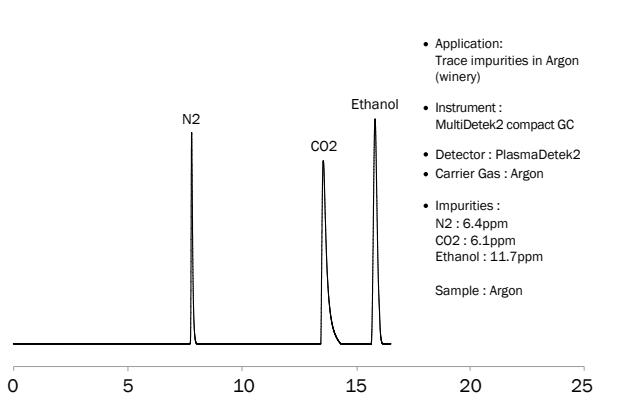
CHROMATOGRAM #72



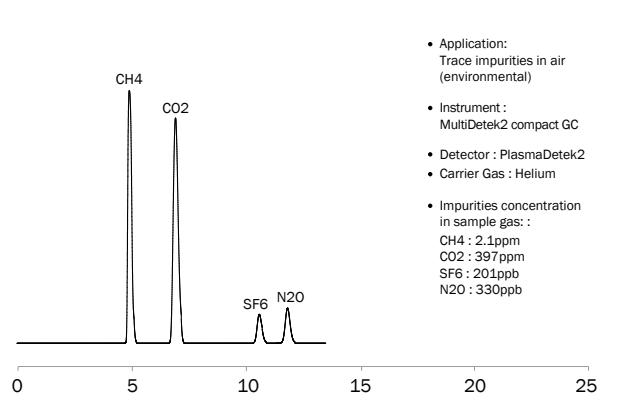
CHROMATOGRAM #73

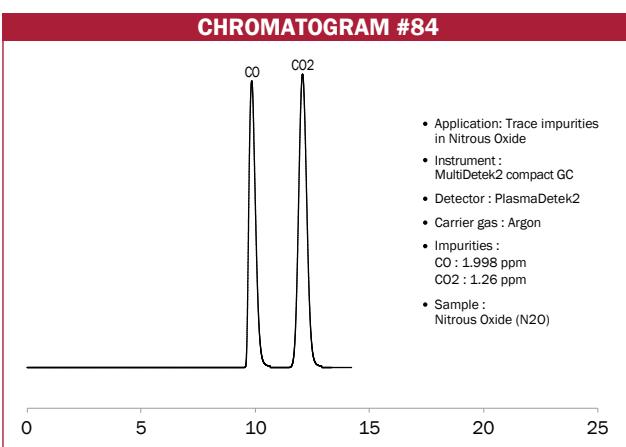
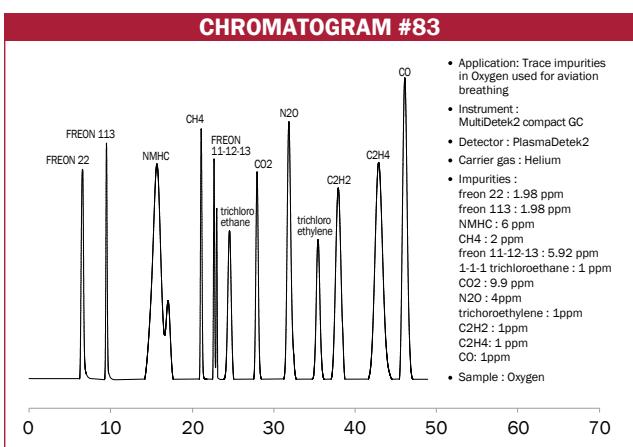
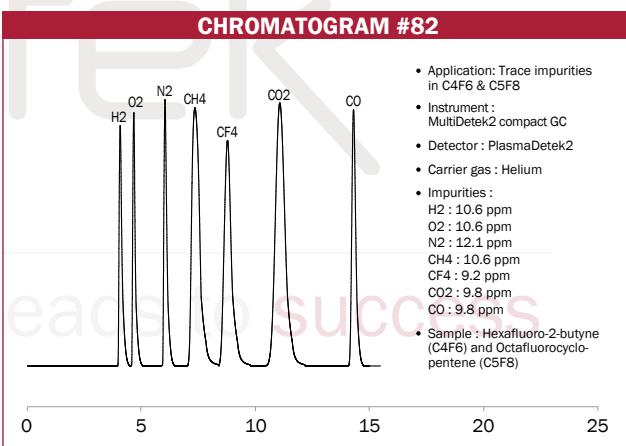
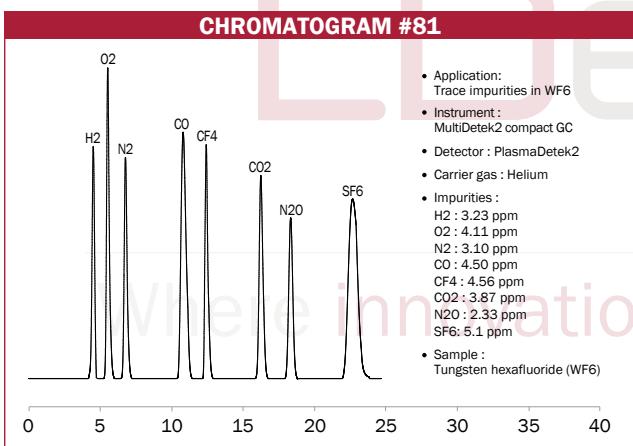
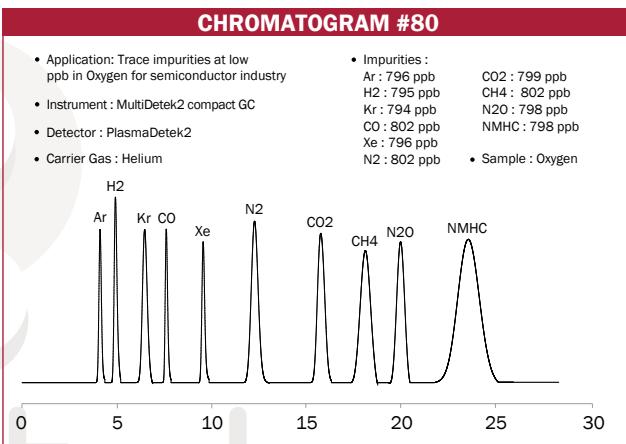
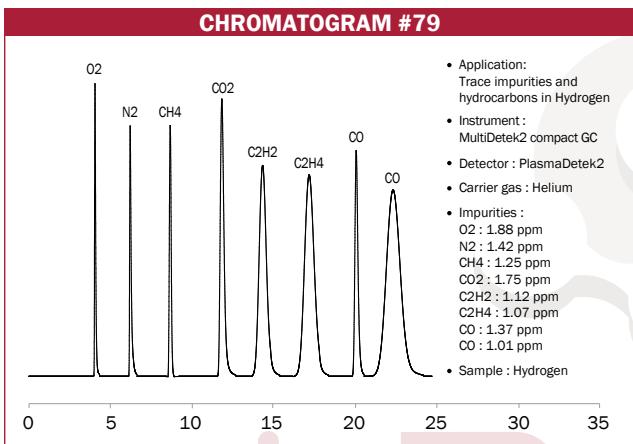
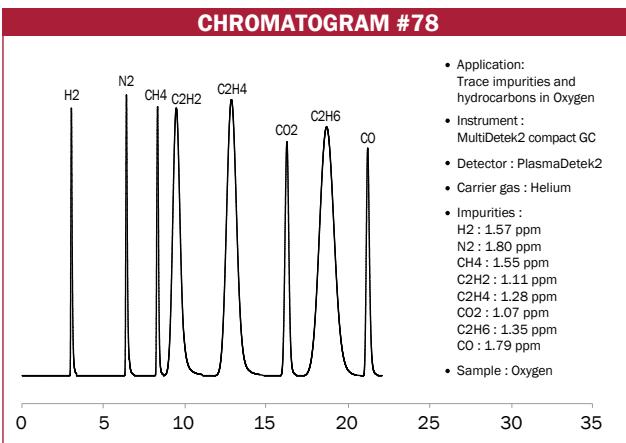
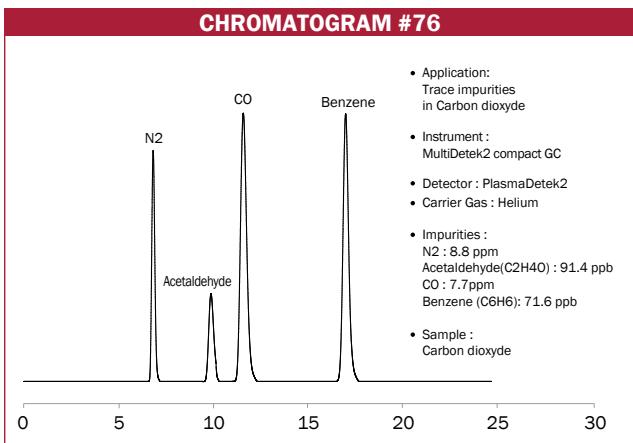


CHROMATOGRAM #74

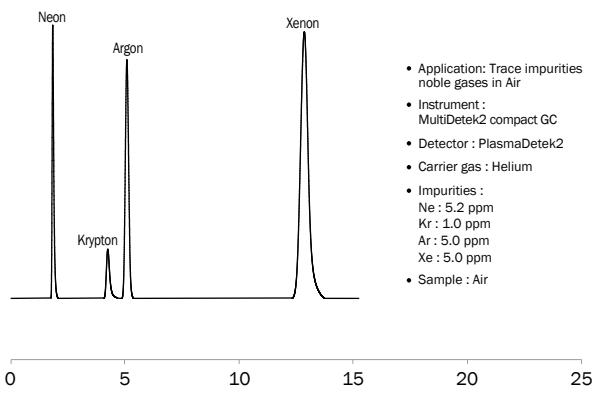


CHROMATOGRAM #75

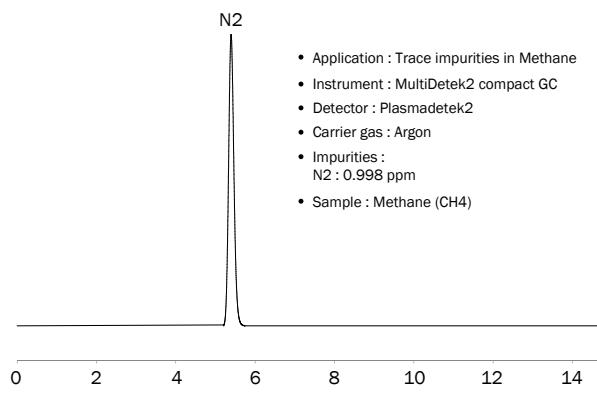




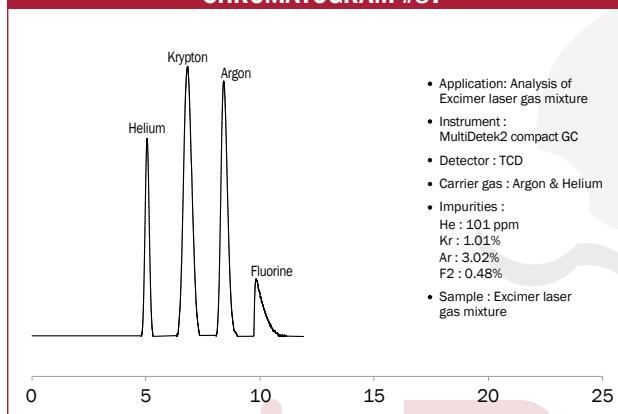
CHROMATOGRAM #85



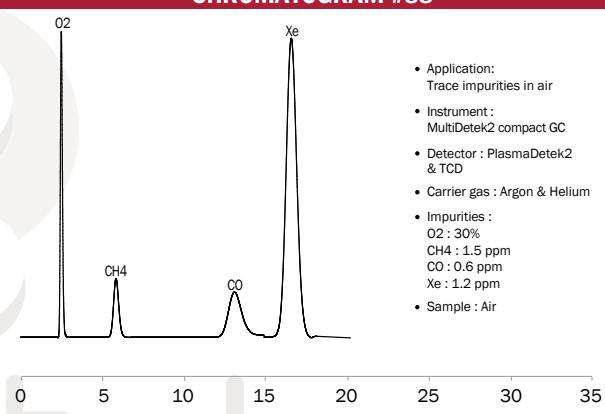
CHROMATOGRAH #86



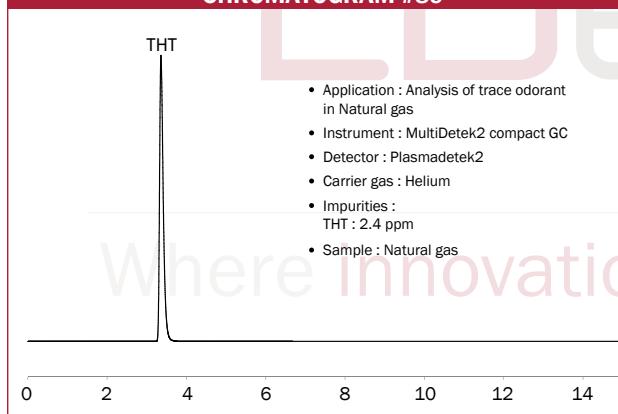
CHROMATOGRAM #87



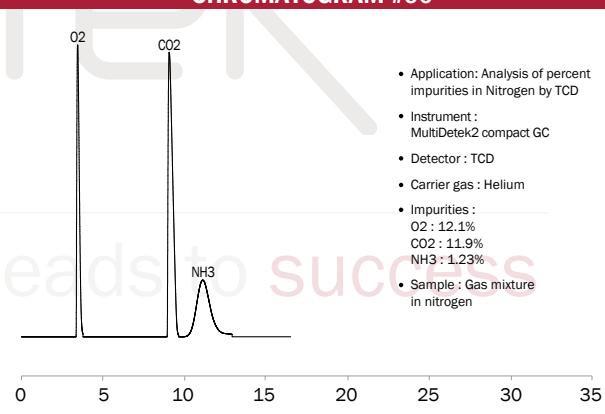
CHROMATOGRAM #88



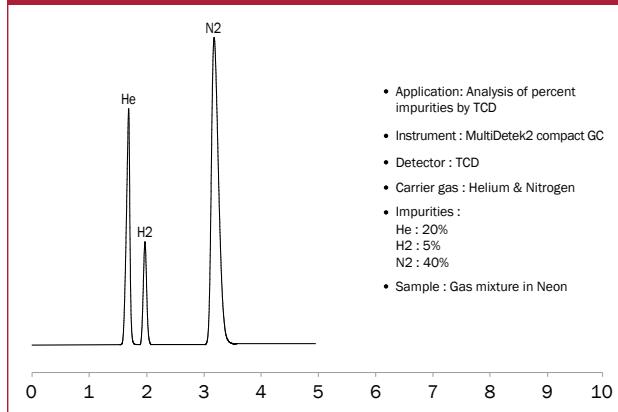
CHROMATOGRAM #89



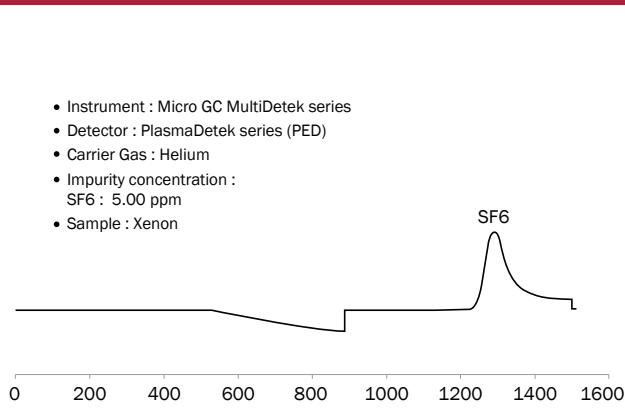
CHROMATOGRAM #90



CHROMATOGRAM #91



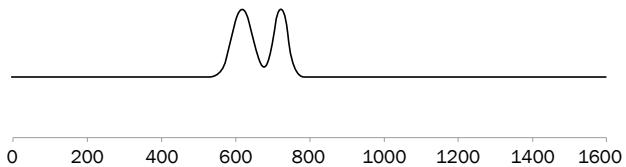
CHROMATOGRAM #92



CHROMATOGRAM #93

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : NMHC : 5.00 ppm
- Sample : Xenon

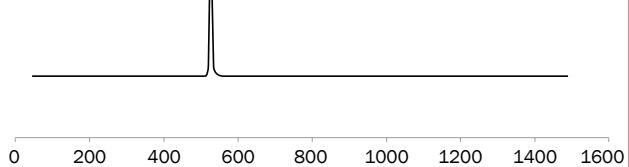
NMHC



CHROMATOGRAM #94

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : N2 : 5.00 ppm
- Sample : Xenon

N2



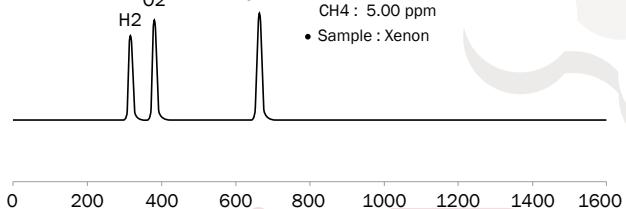
CHROMATOGRAM #95

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : H2 : 5.00 ppm
O2 : 5.00 ppm
CH4 : 5.00 ppm
- Sample : Xenon

H2

O2

CH4

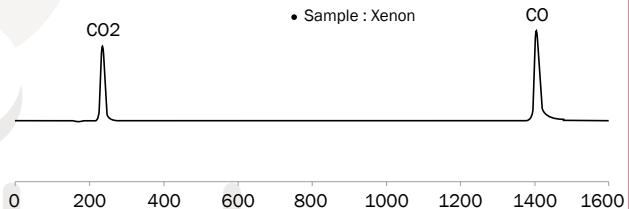


CHROMATOGRAM #96

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CO : 5.00 ppm
CO2 : 5.00 ppm
- Sample : Xenon

CO2

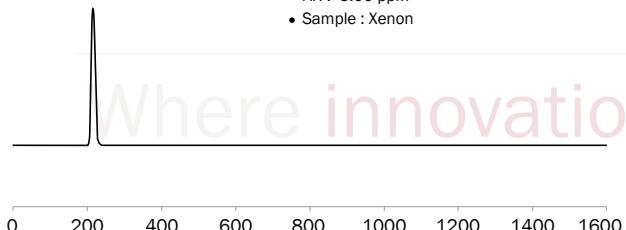
CO



CHROMATOGRAM #97

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : AR : 5.00 ppm
- Sample : Xenon

AR

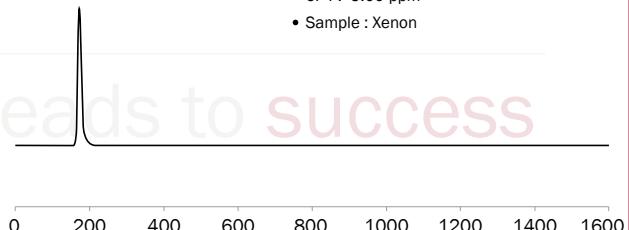


CHROMATOGRAM #98

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CF4 : 5.00 ppm
- Sample : Xenon

CF4

CF

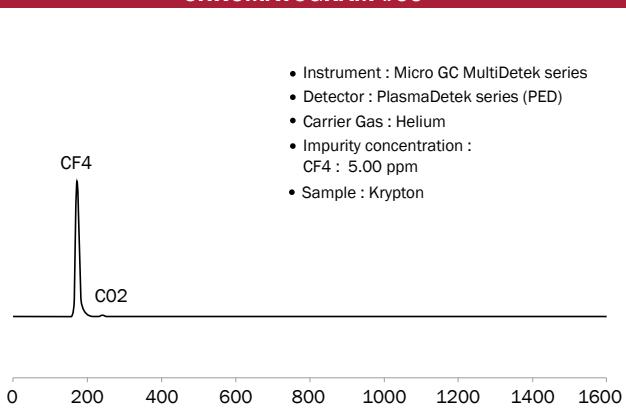


CHROMATOGRAM #99

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CF4 : 5.00 ppm
- Sample : Krypton

CF4

CO2

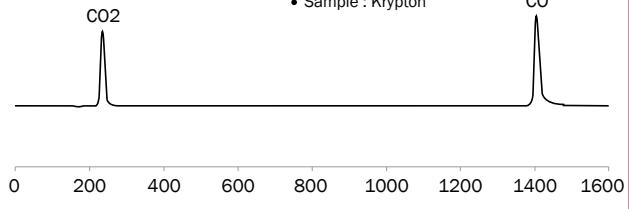


CHROMATOGRAM #100

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CO : 5.00 ppm
CO2 : 5.00 ppm
- Sample : Krypton

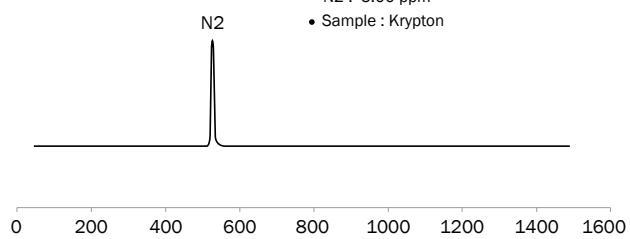
CO2

CO



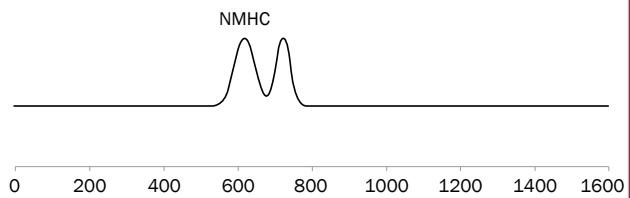
CHROMATOGRAM #101

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : N2 : 5.00 ppm
- Sample : Krypton



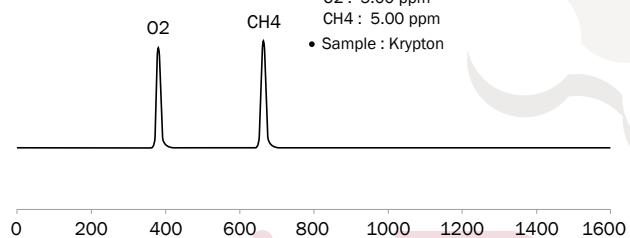
CHROMATOGRAM #102

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : NMHC : 5.00 ppm
- Sample : Krypton



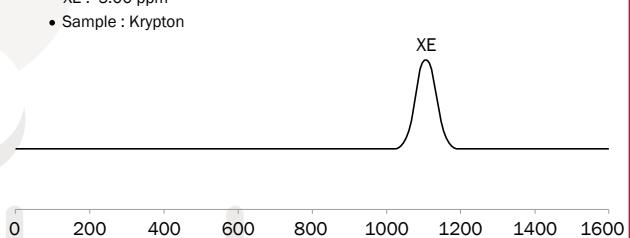
CHROMATOGRAM #103

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : O2 : 5.00 ppm
CH4 : 5.00 ppm
- Sample : Krypton



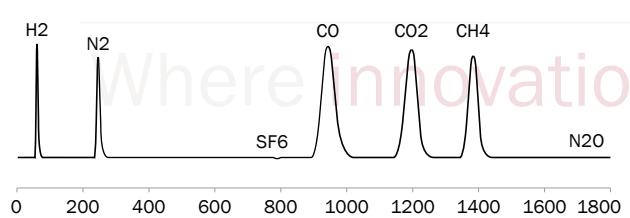
CHROMATOGRAM #104

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : XE : 5.00 ppm
- Sample : Krypton



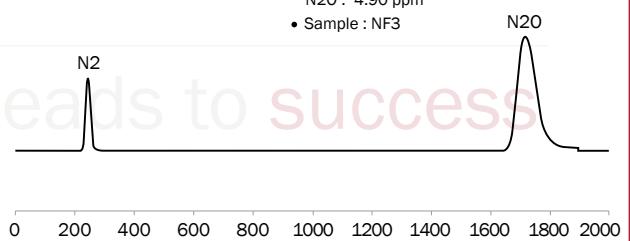
CHROMATOGRAM #105

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : CO2 : 5.00 ppm N2 : 5.00 ppm CH4 : 5.00 ppm
H2 : 5.00 ppm CO : 5.00 ppm
- Sample : NF3



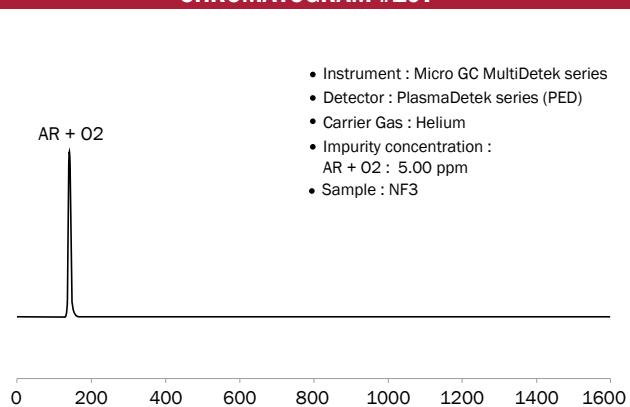
CHROMATOGRAM #106

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : N2O : 4.90 ppm
- Sample : NF3



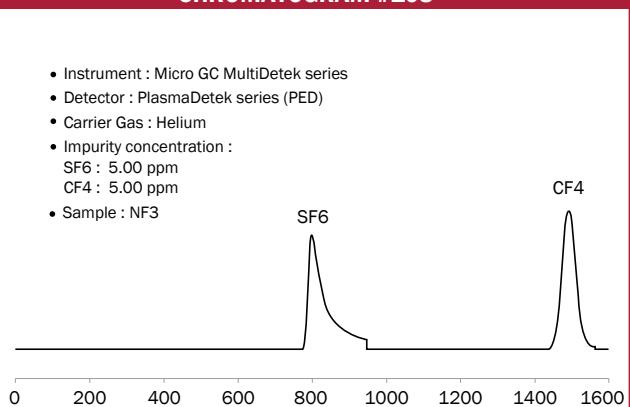
CHROMATOGRAM #107

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : AR + O2 : 5.00 ppm
- Sample : NF3



CHROMATOGRAM #108

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration : SF6 : 5.00 ppm
CF4 : 5.00 ppm
- Sample : NF3



CHROMATOGRAM #109

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
AR : 4.65 ppm
- Sample : N2O

AR

0 100 200 300 400 500 600 700 800

CHROMATOGRAM #110

CHROMATOGRAM #110

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
C2H2 : 3.72 ppm
C2H4 : 4.62 ppm
C2H6 : 4.55 ppm
- Sample : N2O

C2H2 C2H4 C2H6

0 100 200 300 400 500 600 700 800 900 1000 1100 1200

CHROMATOGRAM #111

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
H2 : 5.73 ppm
O2 : 6.05 ppm
N2 : 4.45 ppm
CH4 : 7.04 ppm
CO : 6.65 ppm
CO2 : 6.14 ppm
- Sample : N2O

H2 O2 CO2 N2

CH4

CO

0 100 200 300 400 500 600 700 800 900 1000 1100 1200

CHROMATOGRAM #112

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
NE : 4.86 ppm
- Sample : N2O

NE

0 100 200 300 400 500 600 700 800 900 1000 1100 1200

CHROMATOGRAM #113

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
AR : 5.00 ppm
- Sample : GEH4

AR

0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #114

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
C2H2 : 5.00 ppm
C2H4 : 5.00 ppm
C2H6 : 5.00 ppm
- Sample : GEH4

C2H2 C2H4 C2H6

0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #115

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
CO : 5.00 ppm
CO2 : 5.00 ppm
- Sample : GEH4

CO2

CO

0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #116

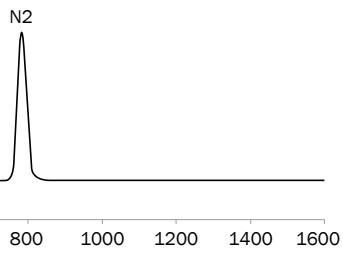
- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
H2 : 5.00 ppm
CH4 : 5.00 ppm
O2 : 5.00 ppm
- Sample : GEH4

H2 O2 CH4

0 200 400 600 800 1000 1200 1400 1600

CHROMATOGRAM #117

- Instrument : Micro GC MultiDetek series
- Detector : PlasmaDetek series (PED)
- Carrier Gas : Helium
- Impurity concentration :
N2 : 5.00 ppm
- Sample : GEH4



LDetek

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INTELLIGENT PLASMA EMISSION DETECTOR SYSTEM FOR GAS CHROMATOGRAPH

The following form will help us designing a detection system that fits perfectly your needs. The more we know about your application, the better your PlasmaDetek will work for you.

YOUR GAS CHROMATOGRAPH

- 1) GC manufacturer and model: _____
- 2) GC input detector voltage scale (Volts): _____
- 3) Power supply (80 to 240 VAC; 50-60 Hz): _____
- 4) Column Type: _____
- 5) Operating temperature: _____
- 6) Chromatographic valves type: _____

APPLICATION REQUIRED

- 1) Gas composition:
- 2) Impurities to be measured:
- 3) Measurement range:
- 4) Lower detection limit:
- 5) Sample pressure and temperature:

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Phone: 418 755-1319 • Fax: 418 755-1329 • info@ldetek.com • www.ldetek.com





MICRO GC FOR MULTIPLE IMPURITIES

The following form will help us designing a complete gas chromatograph that fits perfectly your needs. The more we know about your application, the better your MultiDetek will work for you.

TECHNICAL DETAILS

1) Power supply (80 to 240 VAC; 50-60 Hz): _____

APPLICATION REQUIRED

1) Gas composition: _____

2) Impurities to be measured: _____

3) Measurement range: _____

4) Lower detection limit: _____

5) Sample pressure and temperature: _____

LDP1000 SERIES



GAS PURIFIER COMPATIBLE WITH ANY TRACE GAS ANALYSIS SYSTEM

The LDP1000 series is a sub ppb purifier used for generating high purity calibration gas for online analyzers as well as generating high purity carrier gas for gas chromatograph.

Designed with two steps of purification, this purifier design ensures no undesired impurity is released during process.

WHY CHOOSING LDP1000 SERIES ?

- 2 beds of purification**
Allows perfect purification
- RS-232 port**
Monitor the temperature of the 2 beds of purification
- LEDs indication**
Self-diagnostic and status of the purifier
- Cost effective solution for long-term use**
Interchangeable getter
- Available in different format**
Compact version makes it ideal when space is limited
- Real end of life monitoring**
Combined with PED technology and MultiDetek series, LDP1000 series gas purity can be monitored in real time to offer real auto diagnostic.



NOTES



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