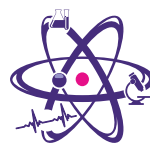


GC Optima-9007

Gas Chromatography





Instrument feature

One button access to routine maintenance information.

PCM control module much precise with independent-development AFC system;

8-channel high-accuracy temperature control system and 8-channel outside events to fulfill counter-control ;

Every gas circuit can achieve constant-pressure, constant-flow, constant-speed, programmable-temperature-rise, programmable-flow-rise and programmable-speed-rise;

Unlimited valve events to fulfill accurate switching of multi-valve;

Outside power & voltage checking system, over-heating protection system and flow monitoring system to make it intellectualized.

Vacuum fluorescent display with english/chinese changeable;

Multi-function keyboard can set complicated parameters and store 16 chromatography method;

FID and FPD can provide reminder for auto ignite and turn-off, TCD with overflow/cut-off protection, flameout detection.

Excellent FID wide-range to enhance linear range;

Multi-valve and multi-column switch system to make sure complicated analysis at one times injection;

PCB system shielding function to reduce interference;

Carrier gas saving mode available to reduce cost;

Autosampler, headspace and thermal desorption can be incorporated;

Clarity workstation can fulfill 3Q certification to meet GMP/GLP standard.

GC should be capable of upgradation to any 3rd detector or mass Detector.

Built in display and computer interface, display chromatograms, method parameters like temp., pressure and flow rates etc.

EPC/AFC Gas system

AFC: split/splitless mode, carrier gas can fulfill constant-pressure, constant-flow, constant-speed, programmable-temperature-rise, programmable-flow-rise and programmable-speed-rise to reduce sample decomposition and discrimination while increase separation and shorten analysis time.

EPCAFC fulfill digitalization and automatization, only need input column parameters, EPC/AFC can set best flow of column and show digitally.

EPC/AFC can fulfill gas leaking self-diagnosis and cut off flow & gas source and alarm at the same time.

Carrier and makeup gas setting selectable for He, H₂, N₂, and Ar

Psi, KPa, Bar units selectable

Pressure control range: 1-600KPa, Pressure accuracy:0.1Psi, Programmable pressure ramp RSD < 0.5%

Flow range control range: 0-600ml/min, flow rate accuracy: 0.1ml/min, flow rate RSD < 0.1%

Clarity workstation feature

Multi-channel and multi-user universal workstation to control all parameter Can collect signal from 4 detectors via RS232 or USB

Basic parameter: max sample-collecting frequency @100Hz/unlimited peak process quantity/integral sensitivity @1 μ V*s

Batch processing makes machine control, auto sampling sequence collecting, auto integral correction much easier auto integral correction much easier

Fully support FDA-21CFR PART 11, SST AND IQ/OQ

Powerful post-treatment facilitate chromatography comparing, re-correction and data input&output.

Feature like easy to use report publisher, online help and answer, fully compatible with windows 7/10.

Offers minimum sampling time snapshot function, single analysis capability. Automatic and manual peak integration, manipulation, identification, calibration points and levels and manual calibration curve creation, column performance calibration, data comparison function etc.

LAN

Windows XP/7 support

Signal capture from 2 detectors simultaneously

Sampling frequency: 100Hz

Sampling Speed: 50 times/sec

Unlimited peak quantity

Self-diagnosis: intelligent automatic error identification and self-protection

Can compatible with Clarity to fully support FDA-21CFR part 11, SST and IQ/OQ.

Inlets

Packed purge injection port (PPIP)

Split/splitless capillary port (S/SL)

1) Max Temperature: 450"

2) Split ratio: 4500:1

3) Gas saver mode to reduce gas consumption without compromise performance

4) Programmable Temp./Pressure ramp: 8 steps

5) Valve injection is available

System Capability

Assembly simultaneously: 2 inlets +3 detectors (FID, TCD, ECD, FPD and NPD)

Automatic control can be done from local keyboard and networked PC

Carrier gas control: EPC/AFC

Automatic liquid sampling available

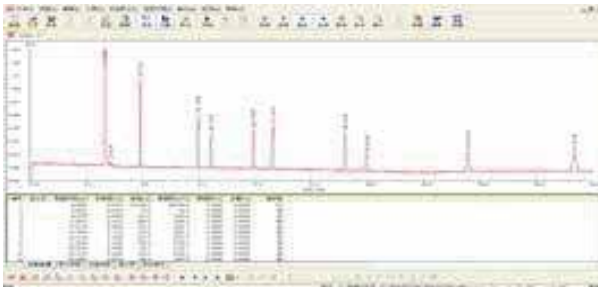
Basic info

Voltage: 220V \pm 10%, 50Hz

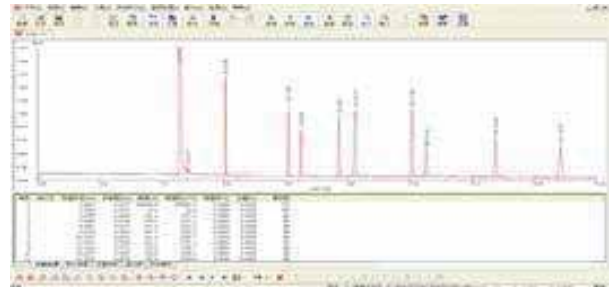
Power: 3000W

Net dimension 645 x 500 x 555mm

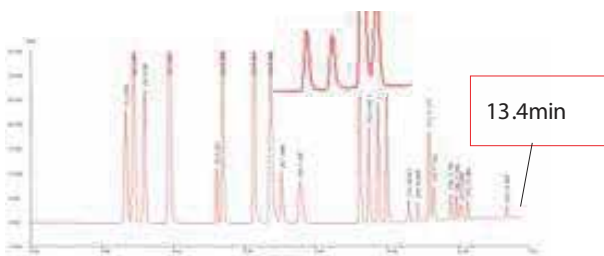
Net weight: 55Kg



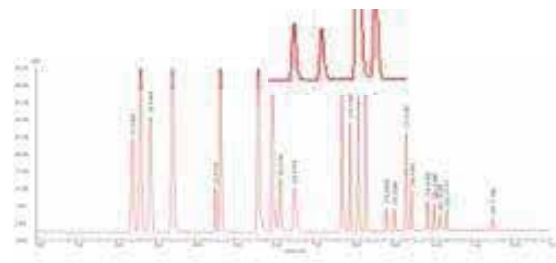
Traditional GC(Column temp @140°C) Analysis time 43min



Optima-9007 (Column temp @140°C) with programmable pressure-rise Analysis time 17min

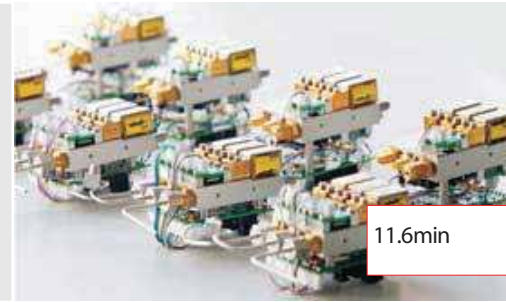


Traditional GC constant-flow mode Analysis time 13.4min



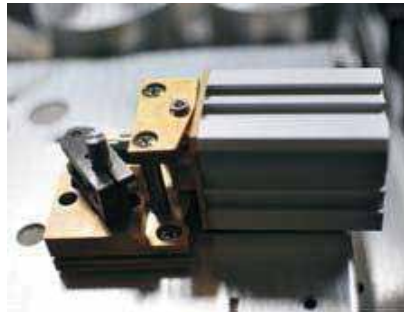
Optima-9007 with programmable pressure-rise Analysis time 17min

Carrier gas saving mode:
After injection, can proceed low split flow mode automatically to reduce carrier gas significantly.

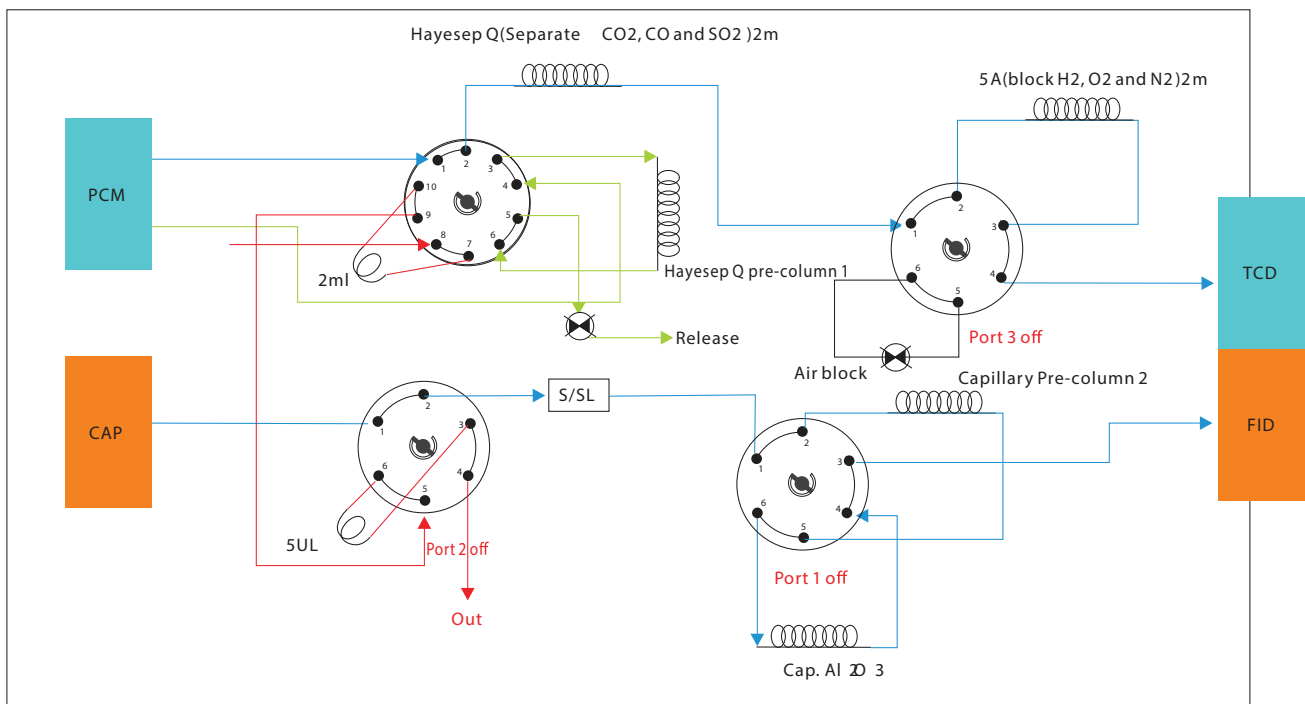


Multi-valve and multi-column switch

Adopting AFP pneumatic valve, can setup 3-valve- 4-column and 4-valve- 5- column switch system to fully analyze only at one time sinpetro chemical, coalgas, trace C₂H₂ inethylene and trace CO and CO₂ in ethylene.



Multi-valve and multi-column flow diagram



Clarity workstation is applicable

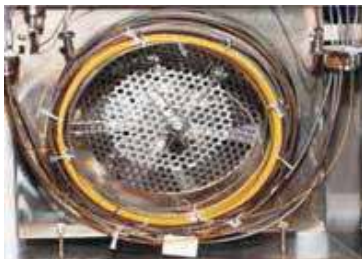
- ▶ Multi-channel and multi-user universal workstation to control all parameter
- ▶ Can collect signal from 4 detectors via RS232 or USB
- ▶ Basic parameter: max sample-collecting frequency @100Hz/unlimited peak process quantity/integral sensitivity @1 μ V*s
- ▶ Batch processing makes machine control, auto sampling sequence collecting, auto integral correction much easier
- ▶ Fully support FDA-21CFR PART11, SSTAND IQ/OQ
- ▶ Powerful post-treatment facilitate chromatography comparing, re-correction and data input & output.
- Fully counter-control to set all parameter in workstation
- Easy operational
- Multi-channel signal sampling, multi outside events control



Autosampler for optima-9007

- Big displayer with double -tower automatic injection;
- Tray vial quantity: 16 or 150;
- Injection volume: 0.1-100 μ L;
- Sampling accuracy:+0.01 μ L;
- Injection Port: split/splitless capillary
- Injection needle: 5, 10, 50, 100 μ L;
- Injection loop: multiport(0.25ml, 0.5ml and 1ml)
- Injection repeatability: <0.5%
- Maximum Temperature: 450 $^{\circ}$ C)
- Temp. Contrl range: RT+5 $^{\circ}$ C ~ 450 $^{\circ}$ C (0.1 $^{\circ}$ C increment)
- Maximum pressure: 0-150psi(with EPC)





Column oven dimension: 278x310x165mm=14.2L; accommodate up to 2pcs
105m x 0.53mm ID capillary column
Temp. control range: RT+5°C~450°C(0.1°C increment)
Temperature Ramp: multi-ramp(>14)with plateaus
Temperature set point Resolution: 1°C
Programming temp.-ramp speed: 0-120°C/min
Programming temp.-ramp : any step;
Fast cool down: 350~100°C ≤3.5min
Temp. accuracy: 0.1°C.
Max run time: 999.99 minutes



Wide split ratio setting range;
Max capillary split ratio: 4500:1;
Packed injection, capillary injection, flash-evaporation
injection, PTV injection and liquid injection are available;
Easy consumables changeover .



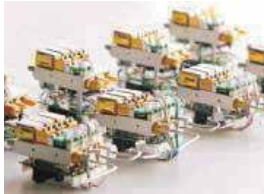
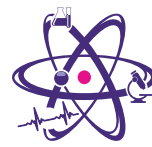
Excellent wide range FID design, no ceiling limit for solvent peak;
Limit of detection can be 3×10^{-12} g/s;
Ignition recognition, Hprotection, anti-ponding;
Solvent no tailing peak.

Can incorporate flash-evaporation and high pressure liquid injection

Flash-evaporation injection for gas-liquid mixture, high pressure valve injection for liquid.

PTV sample injection

With multiple accumulated injection and solvent release, increase temperature program-rise to achieve trace analysis.



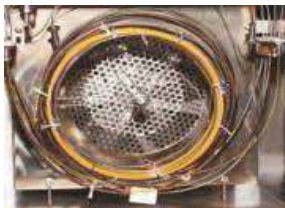
Carrier and makeup gas settings selectable for He, H₂, N₂ and Ar

Psi, KPa, Bar units selectable

Pressure control range: 1~600KPa, Pressure accuracy: 0.001Psi
Programmable pressure ramp RSD \leq 0.5%

Flow rate control range: 0~600ml/min, flow rate accuracy: 0.1ml/min
flow rate RSD \leq 0.1%

programmable pressure/flow rate ramping: 8 steps



Column oven dimension: 278x 310x 165mm=14.2L

Temp. Contrl range: RT+5°C ~ 450°C (0.1°C increment)

Programming temp. - ramp speed : 0-120°C/min

Programming temp.-ramp : any stap

Fast cool down: 250~100°C \leq 1.5minutes

Temp. accuracy: \pm 0.1°C

Flow sensor accuracy: \leq +3%, detector module accuracy: \leq +7%

Detector	Max operating temp.	Limit of detection	Baseline noise	Baseline drift (after 2hrs stabilization)	Linear dynamic range
FID	450°C	$\leq 3.0 \times 10^{-12}$ g/s (N-C16)	$\leq 2 \times 10^{-14}$ A	5×10^{-14} A/30min	$\geq 10^7$
TCD	400°C	≥ 10000 mV.ml/mg (N-C16)	≤ 30 uV	≤ 100 uV /30min	$\geq 10^4$
ECD	400°C	$\leq 3 \times 10^{-14}$ g/ml (Y-666)	≤ 20 uV	≤ 50 uV /30min	$\geq 10^4$
FPD	400°C	S: $\leq 2.0 \times 10^{-11}$ g/s P: $\leq 5.0 \times 10^{-13}$ g/s or 2.0×10^{-13} g/s	S: $\leq 2 \times 10^{-13}$ A P: $\leq 8 \times 10^{-13}$ A	S: $\leq 1 \times 10^{-12}$ A/30min P: $\leq 2 \times 10^{-12}$ A/30min	S $\geq 10^2$ P: $\geq 10^3$
NPD	400°C	N: $\leq 1 \times 10^{-12}$ g/s(Azobenzene) P: $\leq 5 \times 10^{-13}$ g/s(Malathion)	$\leq 4 \times 10^{-13}$ A	2×10^{-12} A/30min	N: $\geq 10^3$ P: $\geq 10^3$

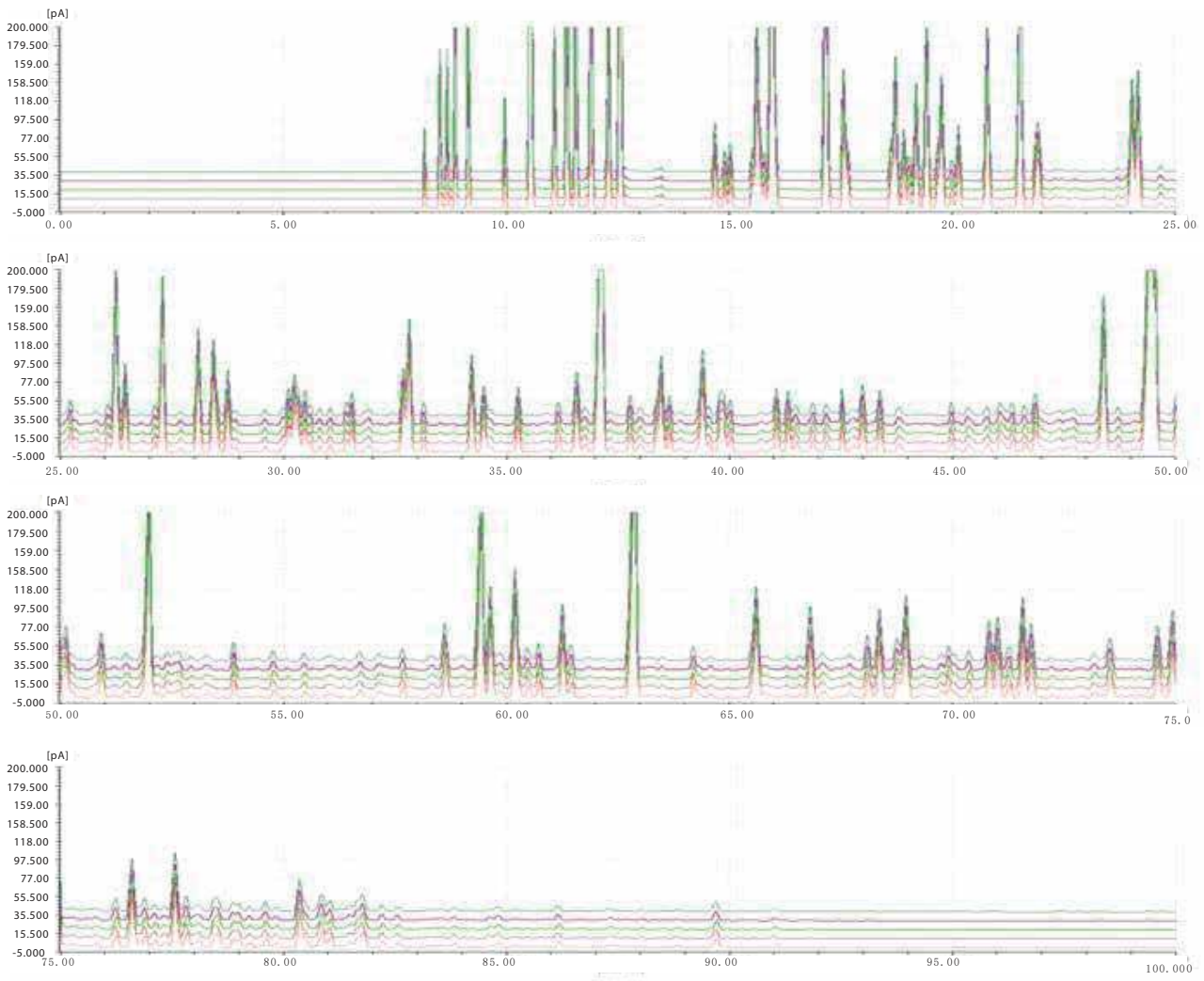
Standard setup	Capillary inlet	Split/splitless capillary
	Packed inlet	Packed inlet
	Workstation	Optima-9007 or Clarity counter-control workstation
Optional sampling device	Injection Valve	6 - port valve or 10-port valve
	Headspace sampler	Available
	Thermal desorption	Available
	Auto sampler	16 or 110

Performance introduction

INSTRUMENTS PERFORMANCE IS INTRODUCED

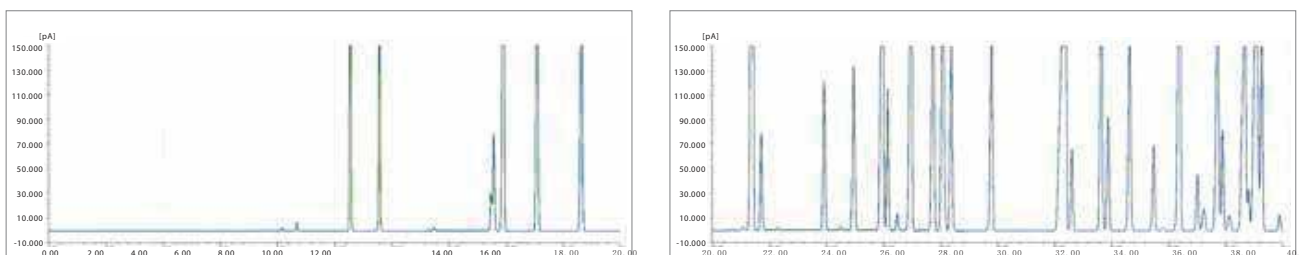
Excellent qualitative repeatability

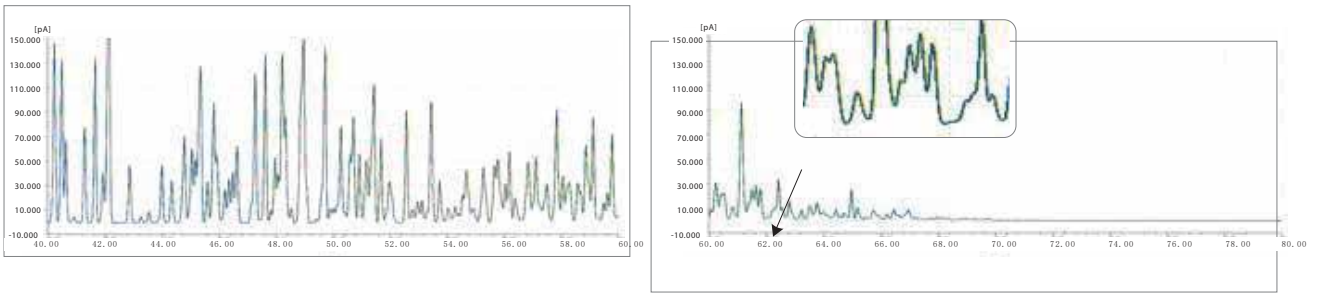
Retention time: <0.0008 min



Excellent quantitative repeatability

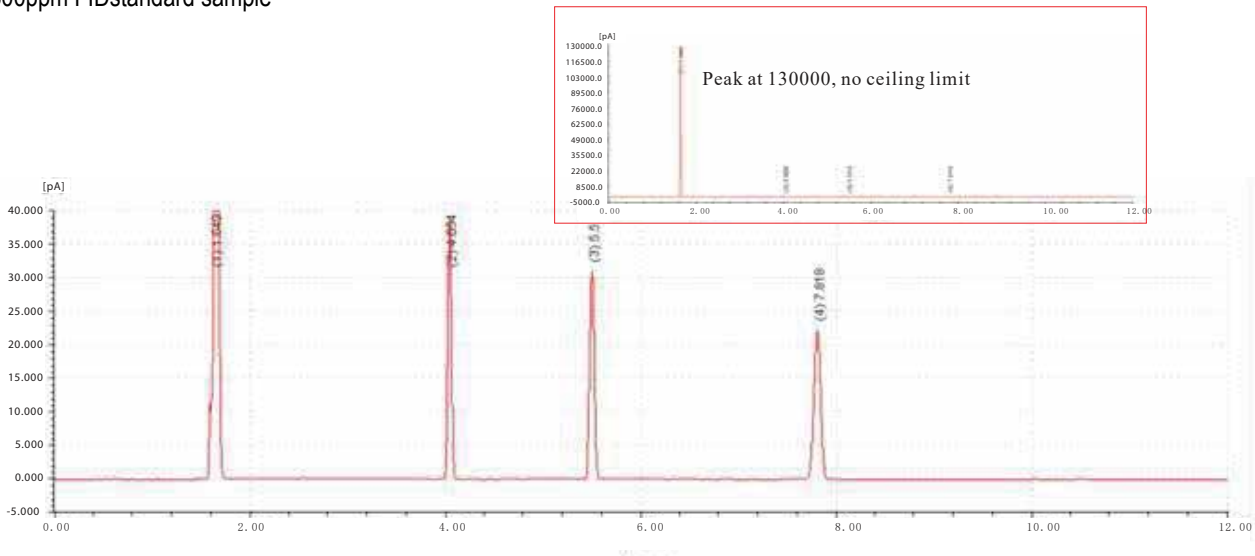
Peak Area: <0.5% RSD





Excellent wide-range design makes no ceiling limit of solvent peak

300ppm FIDstandard sample



Typical application

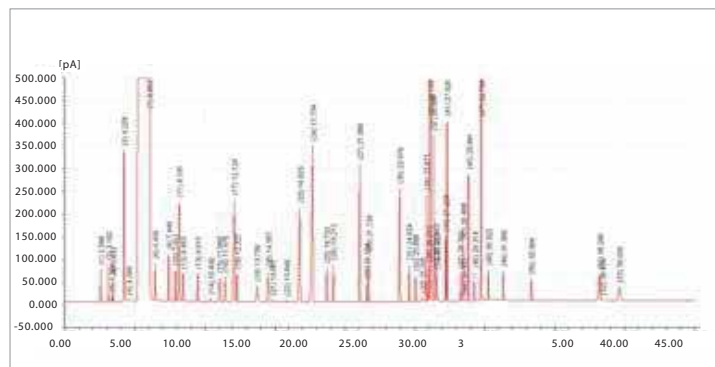
GC-9007 is suitable but no limited to below application: food safety, environmental protection, energy(), medicine Petroleum refining industry and etc.

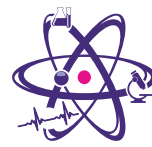
【Food safety】

Chinse white wine

Setup

Detector: FID
 Inlet: Capillary
 Gas control module: 2 sets
 Injection mode: liquid autosampler
 Column: LZP950 for wine
 Workstation: Optima-9007

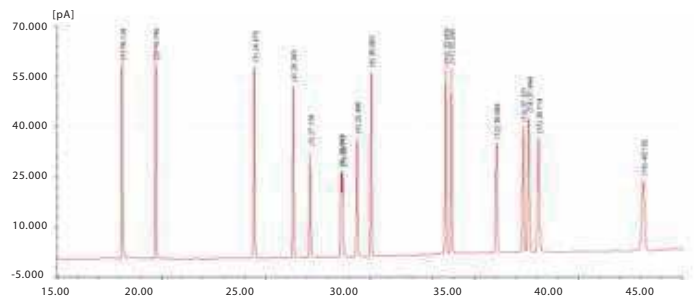




DEHP(Di-(2-ethylhexyl)phthalate)

Setup

Detector: FID
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: HP-5 cap.
Workstation: Optima-9007

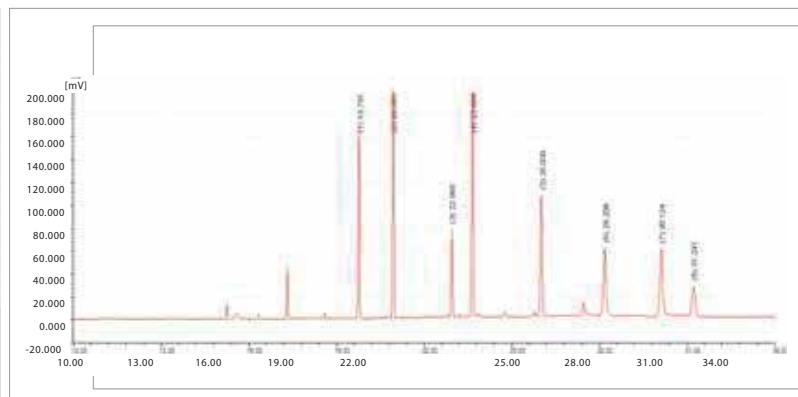


200ppb organochlorine in pesticide residue

Setup

Detector: ECD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: HP-5
Workstation: Optima-9007

Peak sequence: α -BHC, β -BHC, γ -BHC, δ -BHC, op-DDE, pp-DDD, op-DDT, pp-DDT

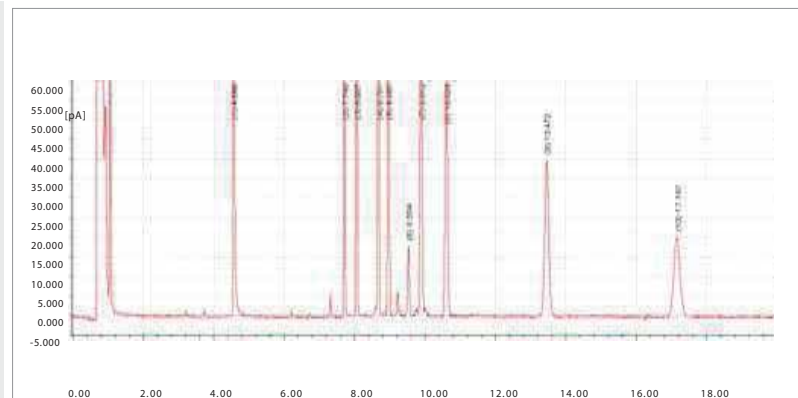


100ppb organophosphoruspesticideresidue

Setup

Detector: FPD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: DB-35
Workstation: Optima-9007

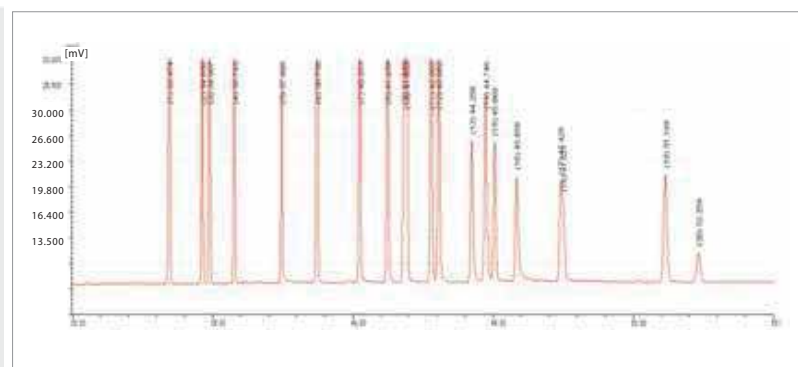
Peak sequence: DDVP, methamidophos, acephate, omethoate, dimethoate, parathionmethyl, fenitrothion, parathion, quinalphos, tigruron triazophos



Complicated Organochlorine

Setup

Detector: ECD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler

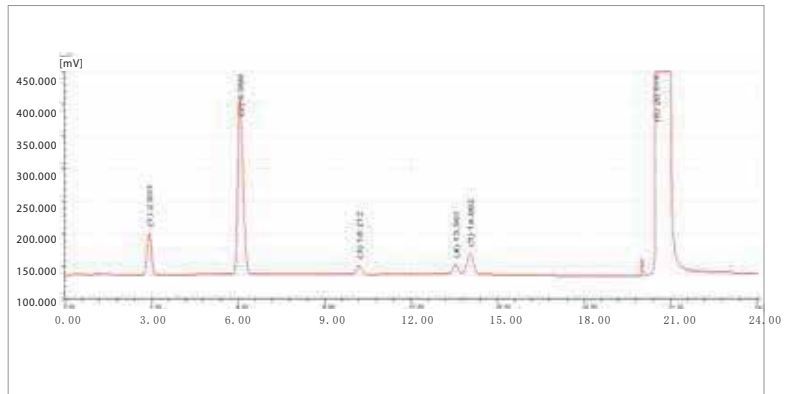


【 Environmental protection 】

Setup

Detector: TCD
 Inlet: Packed
 Gas control module: 2 sets
 Injection mode: liquid autosampler
 Column: Hayesep Q
 Workstation: Optima-9007

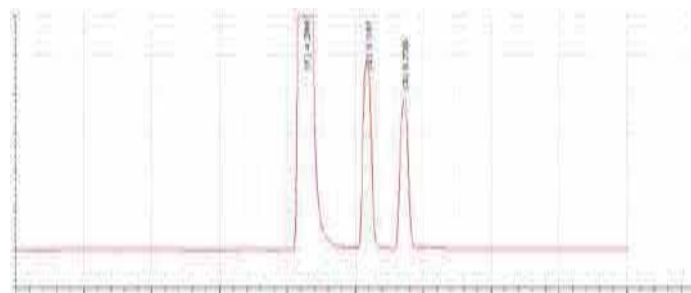
Peak sequence: COS, CS₂, SO₂, Methyl Mercaptan, Ethyl Mercaptan



Setup

Detector: ECD
 Inlet: Capillary
 Gas control module: 2 sets
 Injection mode: liquid autosampler
 Column: DM-1
 Workstation: Optima-9007

Peak sequence: CHCl₃, CCl₄



【 Energy 】

Setup

Detector: FID+TOC
 Injector: gas/capillary

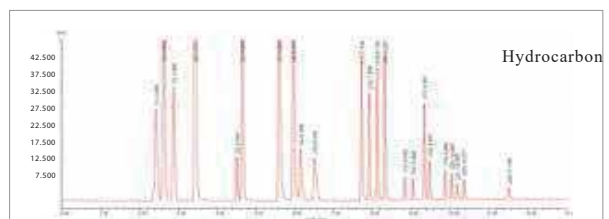
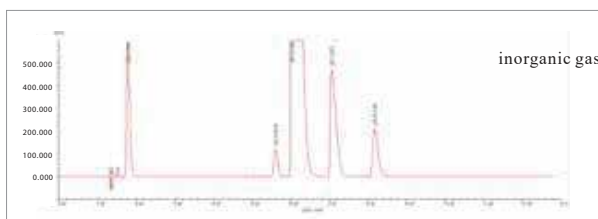
4-valve-5-column
 Gas control module: 4sets
 Valve injection

Column: Hayesep Q packed, 5A packed,
 AL₂O₃ capillary, DB-1 capillary
 Workstation: GC-9007

Inorganic gas peak sequence: H₂, CO₂, O₂, N₂, CO

Hydrocarbon peak sequence: CH₄, C₂H₆, C₂H₄, C₃H₆, C₃H₈, cyclopropane, C₂H₂, iso-butane,

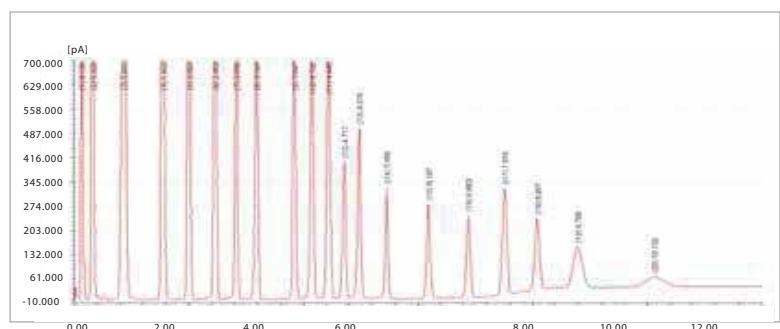
Propadiene, n-butane, trans-2-Butene, n-butylene, isobutene, cis-2-Butene, isopentane, n-pentane, allylene, 1,3-butadiene, 2-methyl-2-butene, trans-2-Pentene, 1-pentene, cis-2-Pentene, Hexane

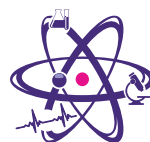


Distillationsimulation

Setup

Detector: FID
 Inlet: Capillary
 Gas control module: 2 sets
 Injection mode: liquid autosampler
 Column: HP-1 cap.
 Workstation: GC-9007



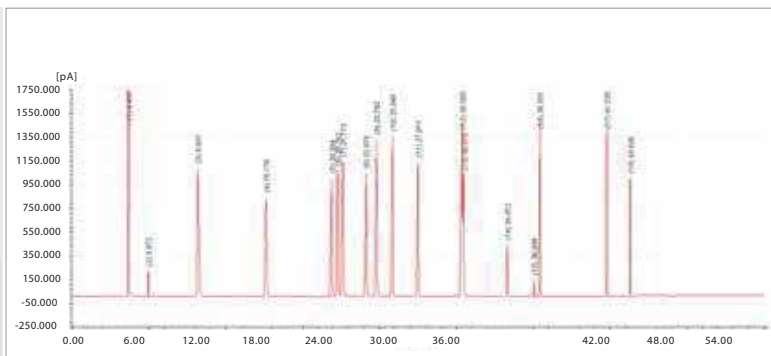


Aromatic compounds

Setup

Detector: FID
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: Innowax cap.
Workstation: Optima-9007

Peak sequence: Benzene, Toluene, Ethane, P-xylene, M-xylene, P-Ethyltoluene, M-Ethyltoluene, S-Butylbenzene, Diethylbenzene, O-diethylbenzene

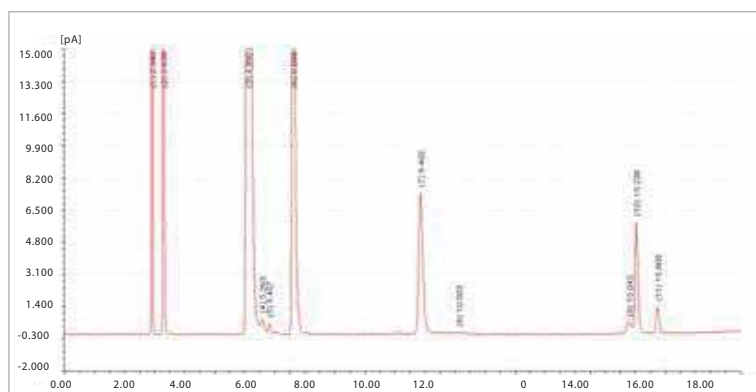


Dimethyl ether in LNG

Setup

Detector: FID
Inlet: Capillary
Gas control module: 2 sets
Injection mode: Gas valve injection
Column: PLOTQ cap.
Workstation: Optima-9007

Peak sequence: CH₄, C₂H₂, prepene, propane, methylal, Dimethyl ether, n-butene, cis-bitene, isomylene, methyl alcohol, n-pentane



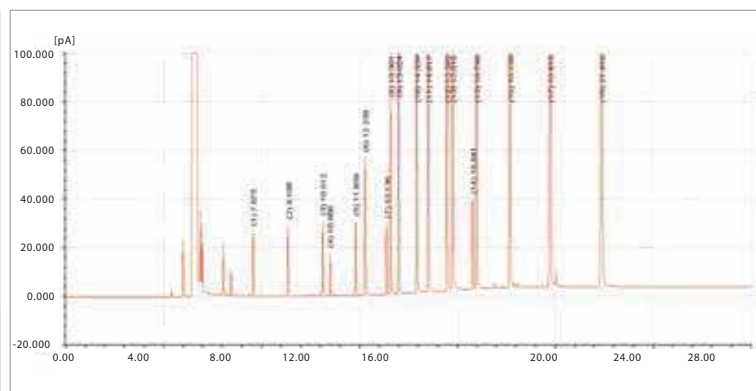
[Medicine]

Organic acid

Setup

Detector: FID
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: DB-FFAP
Workstation: Optima-9007

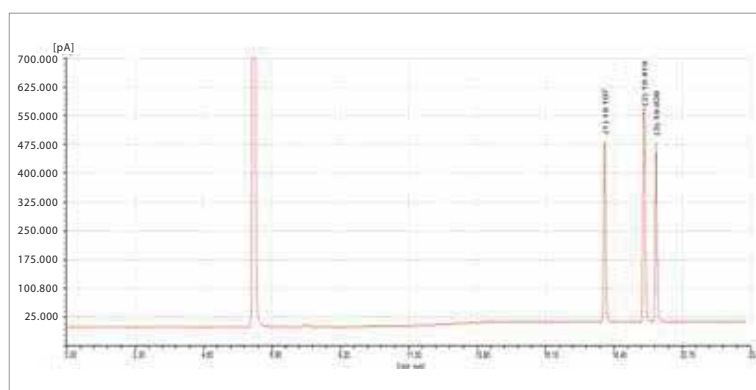
Peak sequence: acetic acid, propionic acid, butyrate, valeric acid, sovaleric acid, caproic acid, heptylic acid, octanoic acid, n-nonanoic acid, lactic acid, 2-Hydroxy-2-Methylbutyric Acid.

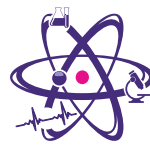


Cresolisomer

Setup

Detector: FID
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: specialized for cresol
Workstation: Optima-9007



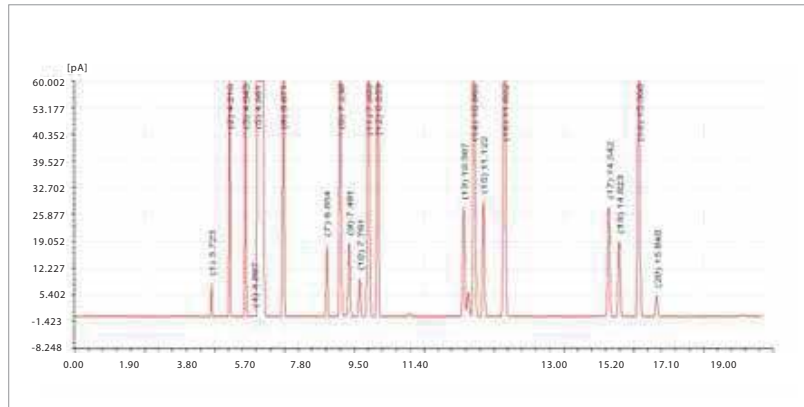


Organic solvent:

Setup

Detector: FPD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: DB-624 cap.
Workstation: Optima-9007

Peak sequence: methyl alcohol, ethanol, acetone+ isopropanol, acetonitrile, dichloromethane, chloroform, isobutanol, CCl₄, Benzene, n-heptane, isoamylol, pyridine, toluene, n-amyl alcohol, ethylbenzene, p-xylene, n-Hexanol, o-xylene

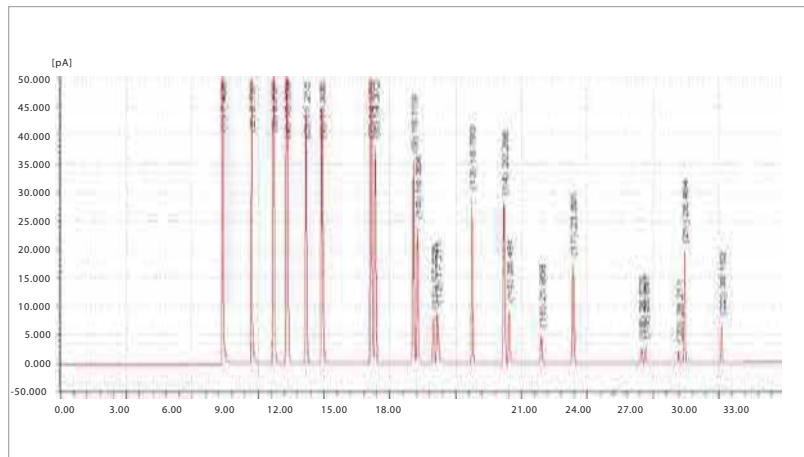


VOCS2nd-level solution

Setup

Detector: FPD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: PC-VOCOL
Workstation: Optima-9007

Peak sequence: methanol, ethanol, isopropanol, acetone, methyl acetate, n-butyl alcohol, butanone, ethyl acetate, acetic acid isopropyl ester benzene, 1-Methoxy-2-propanol, propyl acetat, 4-methyl-2-pentanone, 1-Ethoxy-2-propanol, toluene, n-butyl acetate, ethylbenzene, o-xylene, styrene



50ppb thiopheneinBenzene

Setup

Detector: FPD
Inlet: Capillary
Gas control module: 2 sets
Injection mode: liquid autosampler
Column: HP-Innowax
Workstation: Optima-9007

