

Fuli instruments
welcome suitable
distributors all over
the world to talk
about cooperation.

Fuli Instruments

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Ex²-Chrom 气相色谱仪

Gas Chromatograph

MAKING Expanded&Excellent



GC9720 Plus

Fuli Instruments company profile

Founded in 1998, integrated with R&D, production, sales and service, Fuli is committed to provide total solutions for separation analysis to chemical energy, environmental protection, food safety, human health, etc. Main products include GC(gas chromatograph), GC-MS System (Gas Chromatograph Mass Spectrometer), HPLC(High Performance Liquid Chromatograph) and AAS(atomic absorption spectrophotometer).

- Over 2000 GC shipped in 2018
- Over 23,000 total Install base
- No.3 market share in China (> 13% by units) in 2018

Products roadmap

1997-----Start first GC model--GC9790
 2001-----GC9750 go to market (Stopped)
 2003-----Start first HPLC model--FL2200 (Stopped)
 2007-----Start first AAS model-- AA1700
 2009-----Start first GC model with EPC---GC9710 (Stopped)
 2011-----GC model with full EPC modules-- GC9720 (to be upgrade)
 2017-----Brand New Designed HPLC model-- LC5090 go to market
 2019-----GC9720PLUS released



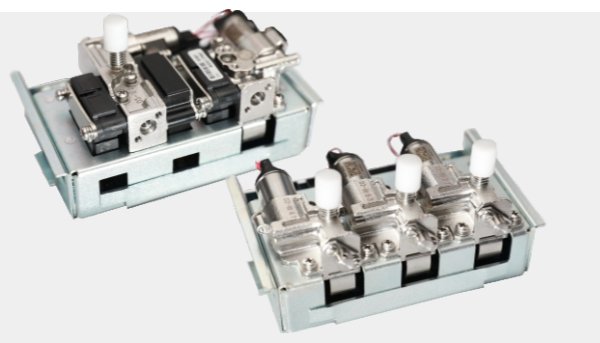
GC9720PLUS main spec

Max capacity: 2 inlets, 3 detectors(3 channel signal output),
 Full AFC/EPC, 6 AFC module with 18-channel AFC/EPC independent control,
 AFC/EPC pressure accuracy 0.001psi,
 Retention time RSD <=0.02%,
 Peak area RSD <=1.0%,

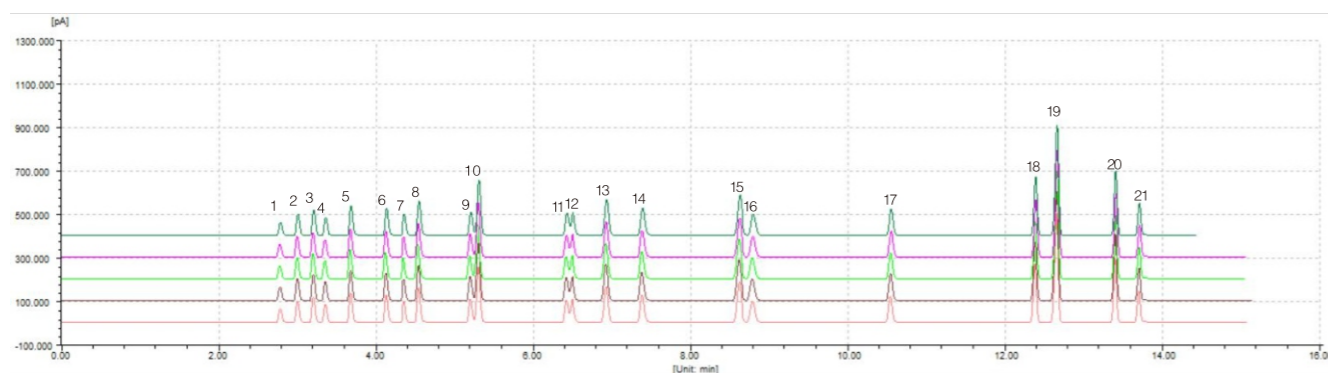
Independent split cold-trap and septum collecting trap,
 Carrier gas control mode: pressure, flow, programming pressure, programming flow,
 Programming pressure/flow/linear speed: max 8 steps,
 Maintenance tracking reminder, intelligent regular maintenance plan,
 Split ratio: 4500:1.

EPC/AFC feature

- ▶ EPC/AFC with proportional valve and sensor from world-famous brand
- ▶ Excellent corrosion-resistance and long service life brings stability and reliability
- ▶ Independent split cold-trap and septum collecting trap makes maintenance easier



RSD chromatogram



序号	组分名	平均时间	时间RSD%	平均面积	面积RSD%	平均峰高	峰高RSD%	平均含量	含量RSD%	谱图数
1	甲醇	2.787	0.059	195114.2	0.889	62606.1	1.202	1.8023	0.630	5
2	乙醇	3.005	0.058	300948.0	0.919	100029.4	0.951	2.7798	0.398	5
3	丙酮	3.204	0.054	351520.4	0.726	118995.8	0.997	3.2470	0.283	5
4	甲酸乙酯	3.367	0.053	252301.9	0.701	85299.9	1.055	2.3306	0.609	5
5	正丙醇	3.685	0.049	406849.2	0.945	137171.3	1.110	3.7579	0.288	5
6	丁酮	4.131	0.060	375081.7	0.939	126202.8	1.378	3.4645	0.291	5
7	乙酸乙酯	4.364	0.057	290286.7	0.767	99224.0	0.906	2.6814	0.097	5
8	异丁酯	4.552	0.052	487039.8	0.674	160764.6	0.850	4.4989	0.283	5
9	乙酸异丙酯	5.203	0.045	329001.8	0.753	110426.2	0.878	3.0390	0.165	5
10	苯	5.305	0.042	819535.0	0.878	256684.8	1.106	7.5698	0.231	5
11	丙酸乙酯	6.425	0.032	339968.7	1.160	105534.2	1.029	3.1401	0.658	5
12	乙酸正丙酯	6.505	0.029	385179.1	0.490	109847.1	0.788	3.5581	0.466	5
13	甲基环己烷	6.938	0.026	603196.9	0.834	168183.4	1.007	5.5716	0.217	5
14	甲基异丁酮	7.388	0.025	480621.3	0.779	128741.1	0.944	4.4395	0.155	5
15	甲苯	8.626	0.025	768639.2	0.877	187315.6	1.005	7.0997	0.225	5
16	乙酸异丁酯	8.804	0.027	426580.5	0.592	100768.6	0.780	3.9405	0.500	5
17	乙酸丁酯	10.553	0.020	418542.6	0.698	124119.7	0.955	3.8661	0.118	5
18	乙苯	12.397	0.016	777508.3	0.695	270708.7	0.722	7.1819	0.085	5
19	对)二甲苯	12.667	0.014	1609006.7	0.673	503195.6	0.662	14.8625	0.082	5
20	邻二甲苯	13.417	0.013	797522.9	0.630	299218.9	1.027	7.3668	0.112	5
21	二醇单丁醚	13.716	0.013	411549.3	0.363	150367.7	0.807	3.8020	0.878	5

Intelligent and simplified injector design

- ▶ Manual dismount in 10s to make liner replacement easier
- ▶ Intelligent tip to record and remind replacement/maintenance of septum, liner and split cold-trap

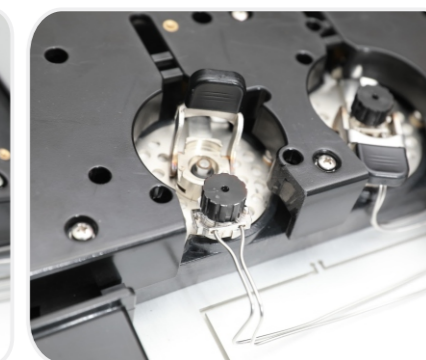
Dismount procedure



Step 1: hold cap

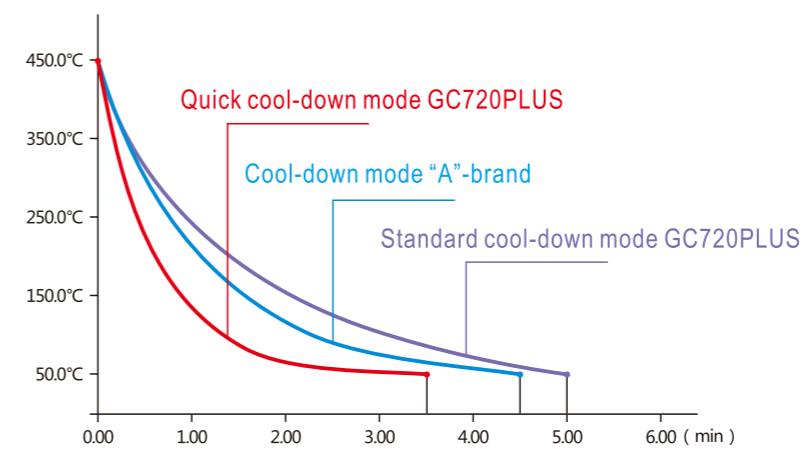


Step 2: pull upward



Step 3: remove nut

Excellent temperature control system



- ▶ Standard cool-down mode 450—50°C ≤ 5min
- ▶ Optional quick cool-down mode 450—50°C ≤ 3.5min
- ▶ Scientific inner heating interchange to achieve high consistency in between front and back column heating distribution
- ▶ Reproducible temp. ramp process in column oven to achieve good retention time RSD

Detector spec

Autosampler



- ▶ Single FL1092T, 16-vial autosampler
- ▶ Double FL1092T, double-tower independent asynchronous control or synchronous control to improve analysis efficiency
- ▶ Single/double FL1092T+FL1092C, 150-vial autosampler, heating/barcode scan/stirring and whole plate cooling/heating are optional

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

Other GC pre-treatment device

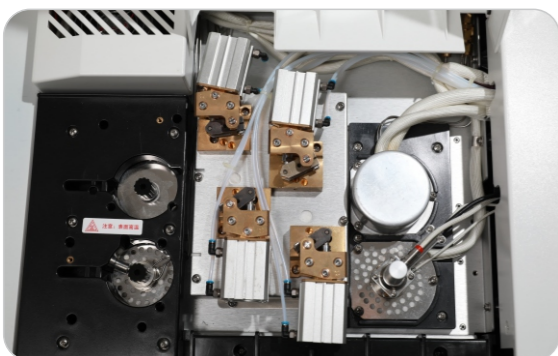


Thermal desorption



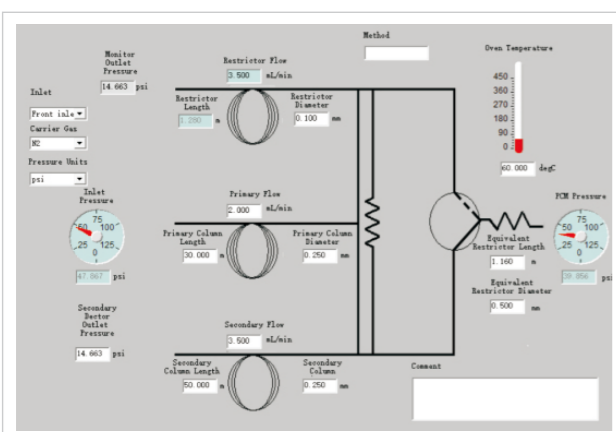
Automatic Headspace

Multi-valve system



- ▶ Multi-valve/multi-column available to customize per different application, max 4
- ▶ external valve can be installed
- ▶ One-time injection for complete gas analysis
- ▶ High stability and low valve switchover fluctuation

Microchannel Flow Control



- ▶ Designed for complex matrix
- ▶ Uses photochemical etching technique to reduce dead volume of flow path;
- ▶ 'Visa card' flow-broad: Capable for faster thermal response and leak-free
- ▶ Deactivated Inner-surfaces for Inert gas line
- ▶ No leak under repeated heating to 400°C and cooling

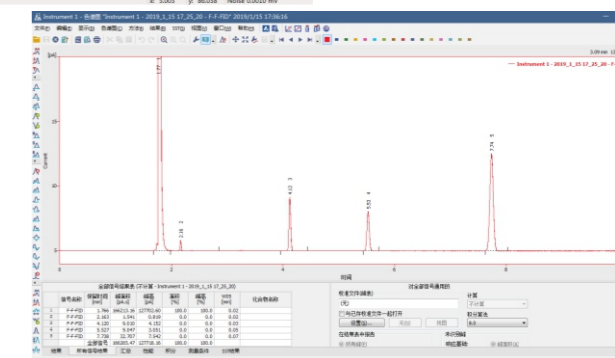
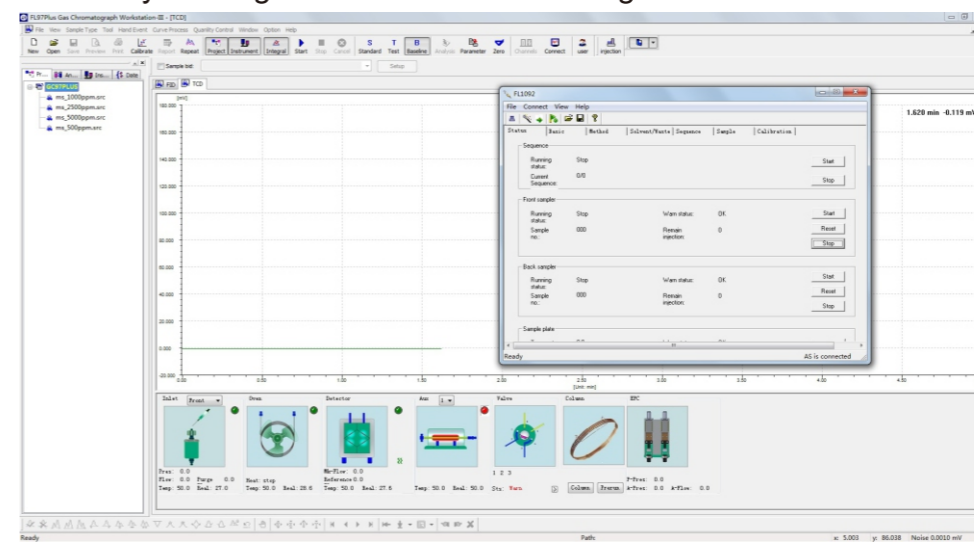
Patented gas purifier

- ▶ Brand-new design for gas purifier to achieve H2 over-pressure shutoff safely.
- ▶ Strict EMC test to make excellent anti-interference capability



Workstation

FI97PLUS and Clarity workstation available for selection, with audit trail, electronic signature, authority management to meet GMP regulation

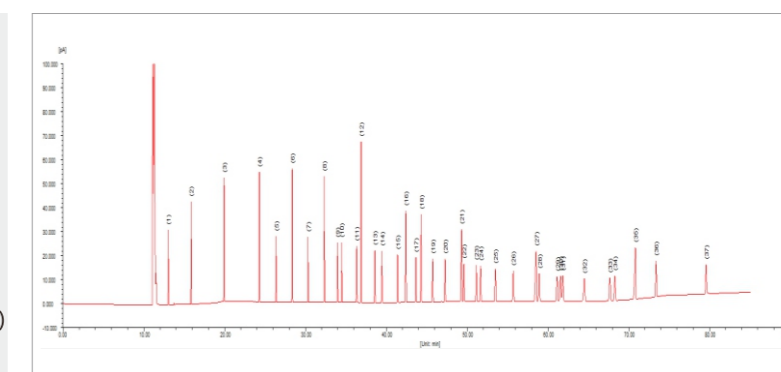


Typical application

【Food safety】

Fatty acid

Column: HP-88/100m*0.25mm*0.2um
Carrier gas: N2, constant-flow 0.8ml/min
Column oven:
100°C for 13min,
ramp from 100 to 180°C at 10°C/min for 6min
ramp from 180°C to 200°C at 4°C/min for 20min
ramp from 200°C to 230°C at 1°C/min for 15min
Injection: splitless, 270°C
Detector: FID, 250°C
Sample: 1ul 37 types of fatty acid (200-400ppm)

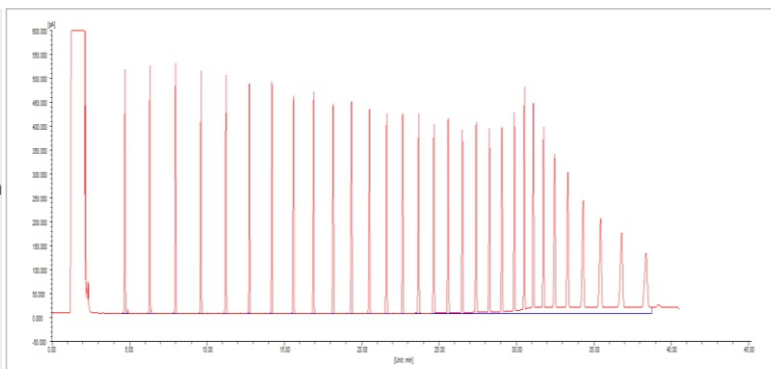


1.C4:0	2.C6:0	3.C8:0	4.C10:0	5.C11:0	6.C12:0	7.C13:0	8.C14:0	9.C14:1	10.C15:0
11.C15:1	12.C16:0	13.C16:1	14.C17:0	15.C17:1	16.C18:0	17.C18:1n9t	18.C18:1n9c	19.C18:2n6t	20.C18:2n6c
21.C20:0	22.C18:3n6	23.C20:1	24.C18:3n3	25.C21:0	26.C20:2	27.C22:0	28.C20:3n6	29.C22:1n9	30.C20:3n3
31.C20:4n6	32.C23:0	33.C22:2	34.C24:0	35.C20:5n3	36.C24:1	37.C22:6n3			

【Environment】

Petroleum hydrocarbon in soil and water

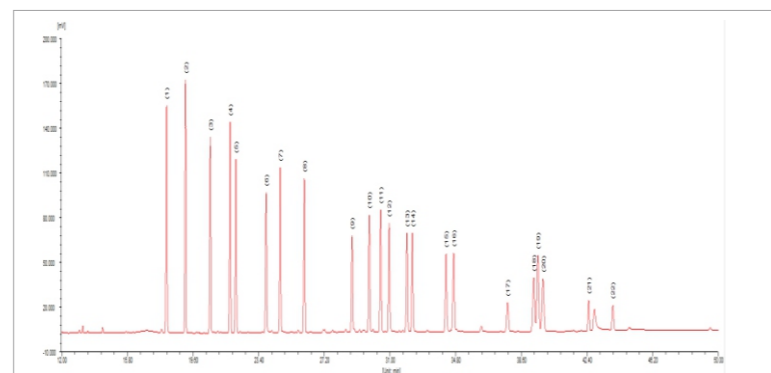
Column: HP-5/30m*0.32mm*0.25um
Carrier gas: N2, constant-flow 3ml/min
Column oven:
60°C at 1min,
ramp from 60 to 290°C at 8°C/min,
ramp from 290°C to 310°C at 30°C/min, keep 10min
Injection: splitless, 320°C
Detector: FID, 320°C
Sample: 1ul C10-C40 petroleum



【Pesticide】

Organochlorine residue

Column: RB-50+/30m*0.25mm*0.25um
Carrier gas: N2, constant-pressure 80kPa
Column oven:
60°C at 0.3min,
ramp from 20 to 180°C at 20°C/min, keep 5min
ramp from 180°C to 240°C at 3°C/min, keep 10min
ramp from 240°C to 260°C at 40°C/min, keep 6min
Injection: splitless, 240°C
Detector: ECD, 280°C
Sample: 1ul organochlorine(22 types, 200ppb)

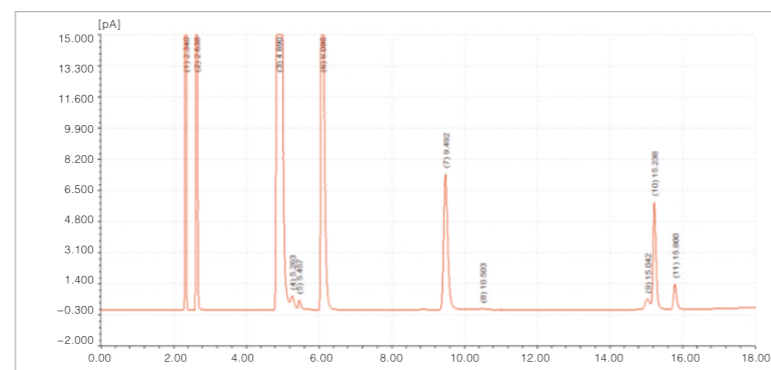


【Petroleum】

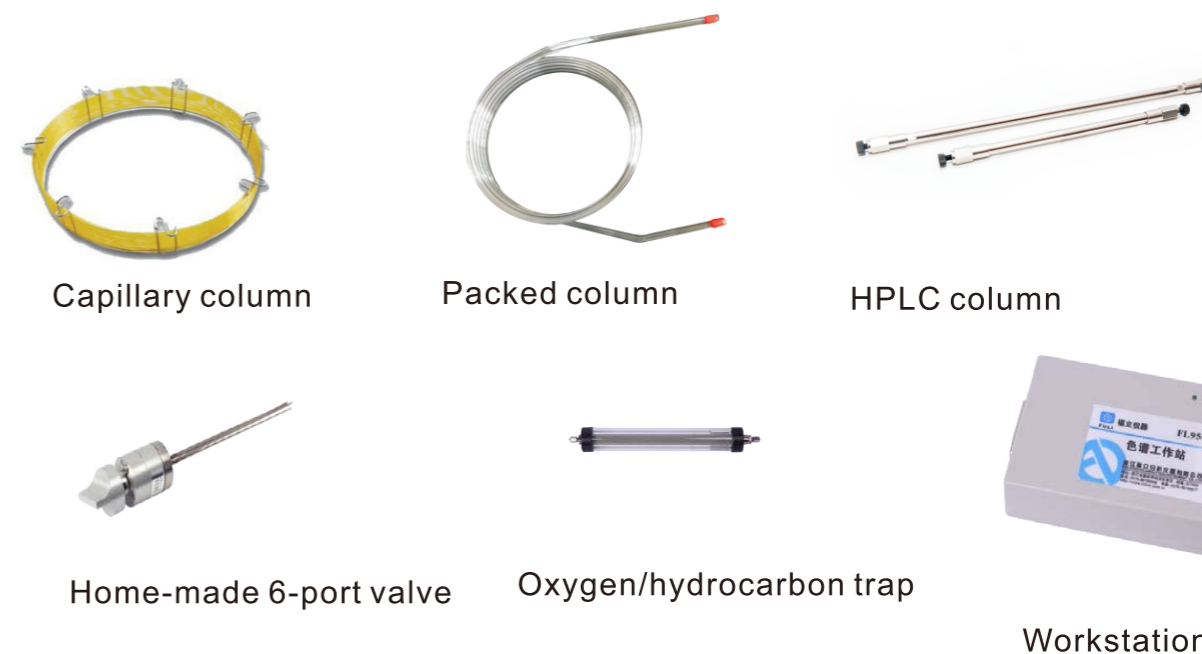
Dimethyl ether in LPG

Detector: FID
Injector: capillary inlet
Injection mode: GSV
Column: PLOT Q capillary column

Peak: CH4 -ethylene -propylene -propane -methylal
dimethyl ether -n-butene -maleic -isopentane
-methyl alcohol -n-pentane



GC/HPLC column and consumables



Capillary column

Packed column

HPLC column



Home-made 6-port valve



Oxygen/hydrocarbon trap



Workstation

Big customers list

