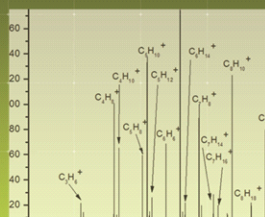




On-line Volatile Organic Compounds Mass Spectrometer

SPIMS-1000 series



- World advanced mass spectrometry
- Field real-time monitoring
- On-line quantitative and qualitative analysis
- Simultaneous detection of multiple components
- Powerful data processing ability
- Stable and credible performance
- Independent intellectual property

做中国人的质谱仪器

■ SPIMS-1000 series

SPIMS-1000 is an on-line analytical instrument with fully independent intellectual property by Hexin analytical instrument limited company. SPIMS-1000 is better than universal instrument in many aspects, for example, performance index, overall functions, after-sale service, customized software and customized function service. SPIMS-1000 has been applied in many places such as Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Chemical Defense Institute in Beijing, Shanghai University and so on.

■ Application fields

- VOC and SVOC Research
- Environmental Emergency Monitoring
- National Defence and Armaments
- Public Safety Monitoring
- Industry Process Monitoring
- Automobile Exhaust Monitoring
- Food Industry Process Monitoring



■ Functions

- To realize the real-time detection with spectra speed to second level
- Simultaneous on-line detections of multiple organic compounds such as alkane, olefin, alkyne, benzene series, phenylhalostannyl and so on
- To realize the qualitative analysis according to self-building database
- To realize the quantitative analysis according to standard curve and calibration coefficients
- Be able to detect gaseous or liquid samples

■ Performance indexes

- Sample species: gas or liquid
- Sampling pressure: 100mbr-2bar
- Resolution: better than 500FWHM
- Mass range: 1-500amu
- Detection limit: ppb level
- Dynamic range: 4 magnitudes
- Mass Accuracy: $m/z=100 \pm 0.015Th$
- Ionization energy: 10.6eV
- Response time: less than 20s
- Detection speed: up to 5 spectra/s



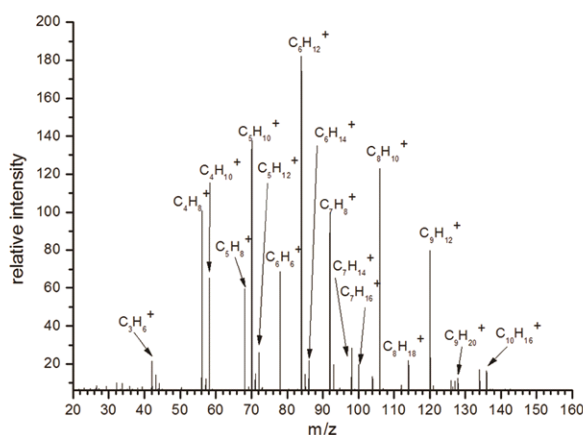
Publications

1. Hongyi, Gaowei, Sunlulu, Tanguobin, limei, Huangzhengxu, Chenping, Fuzhong, Zhouzhen. Trace analysis of volatile organic contaminants from gases or liquids using a time of flight mass spectrometer with single photon ionization and membrane inlet system. Journal of Chinese Mass Spectrometry, 2011, 32: 307-308
2. Tanguobin, Gaowei, Huangzhengxu, Hongyi, Limei, Dongjianguo, Chenping, Fuzhong, Zhouzhen. Preliminary study on volatile organic contaminants emitted by Plants using a time of flight mass spectrometer with photon ionization and membrane inlet system. Journal of Chinese Mass Spectrometry, 2011, 32: 168-169
3. Tanguobin, Gaowei, Huangzhengxu, Hongyi, Fuzhong, Dongjianguo, Chenping, Zhouzheng. Development of the time of flight mass spectrometer with the vacuum ultraviolet single photon ionization. Analysis Chemistry, 2011, accepted

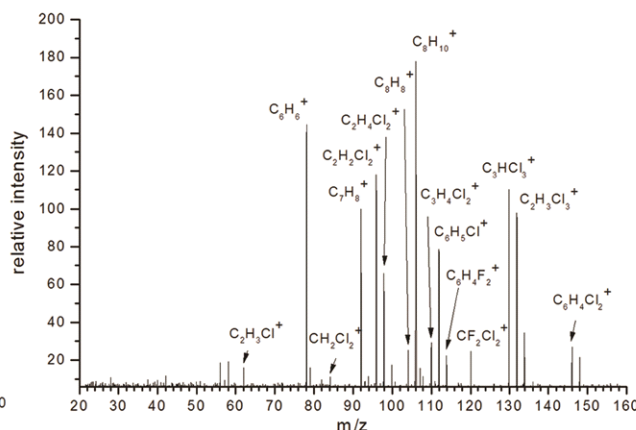
After-sale service

- Responses within 48 h in the central city
- Responses within 72 h in the suburb
- Failure field treatment within 7 days
- One year free guarantee repair

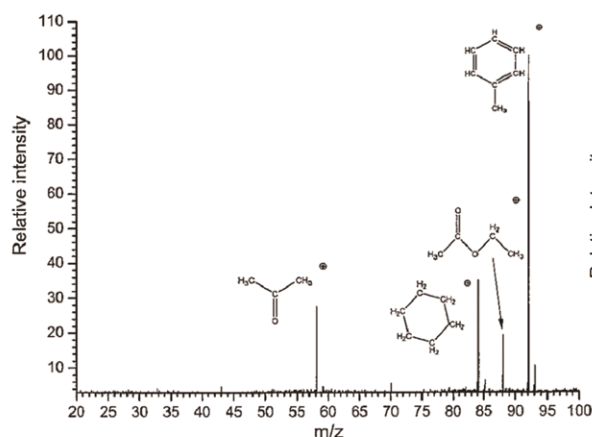
Standard sample tests



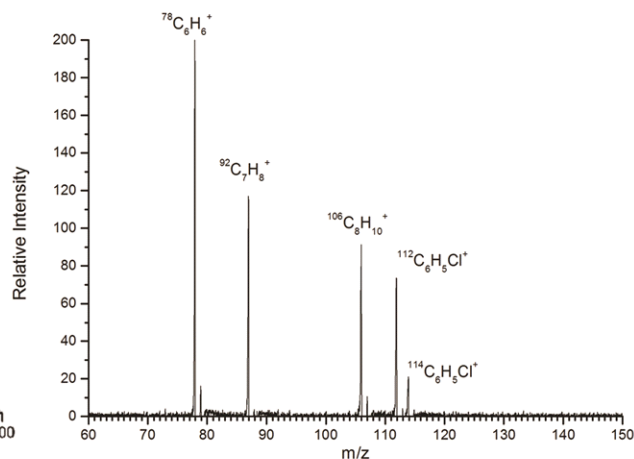
The mass spectrum of 30ppb mixed samples of alkanes from America Plectra Gas Company based on EPA Standard



The mass spectrum of 100ppb mixed samples of halohydrocarbon from America Plectra Gas Company based on EPA Standard

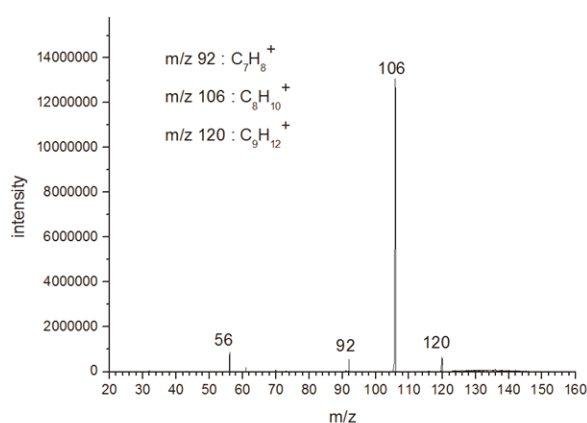


The mass spectrum of Standard 1ppm mixed samples from Guangzhou Shiyuan Company



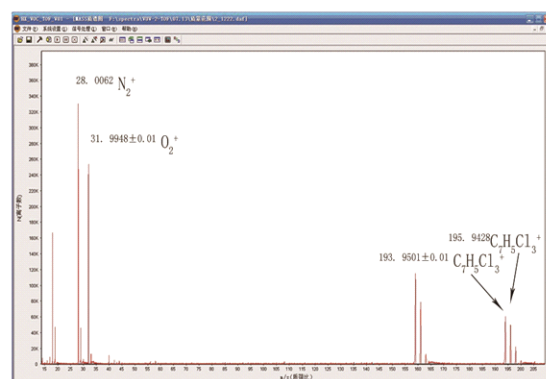
The mass spectrum of Standard 150ppb mixed samples of aromatic series from Guangzhou Shiyuan Company

Simultaneous detections of multiple components



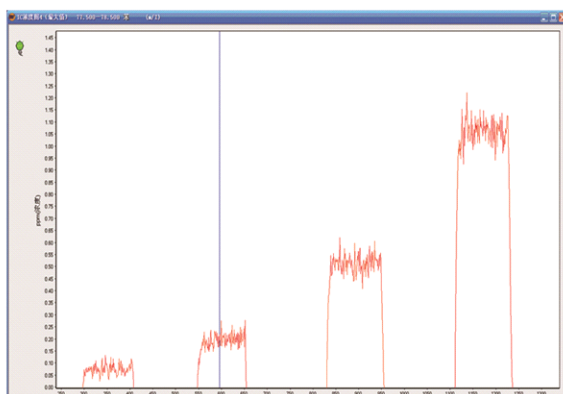
The main substances discovered include toluene, xylene or ethyl benzene and propyl benzene or trimethyl benzene

Precise mass accuracy



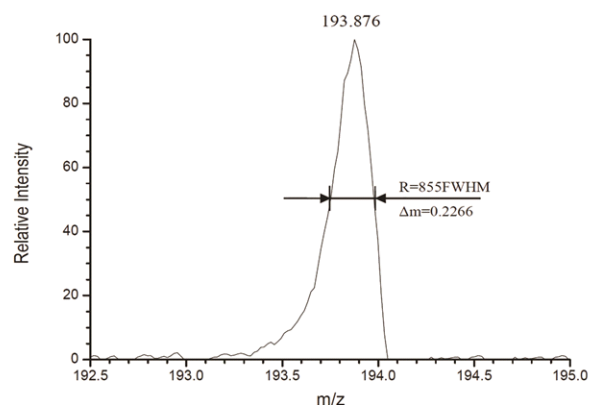
Mass accuracy from single-spectrum calibration: O_2^+ , $m/z=31.99 \pm 0.01$
 $C_7H_5Cl_3^+$, $m/z=193.95 \pm 0.01$

Quantitative analysis of VOCs



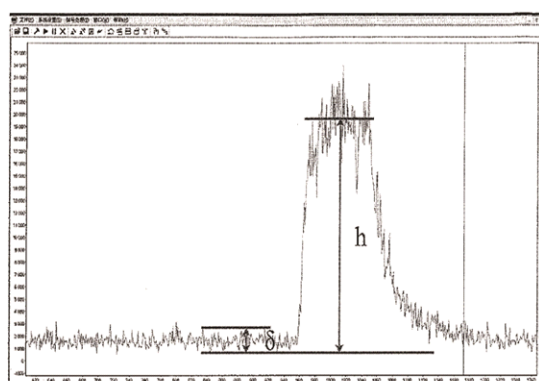
The trend of real-time changes from concentration of benzene

Resolution of instrument



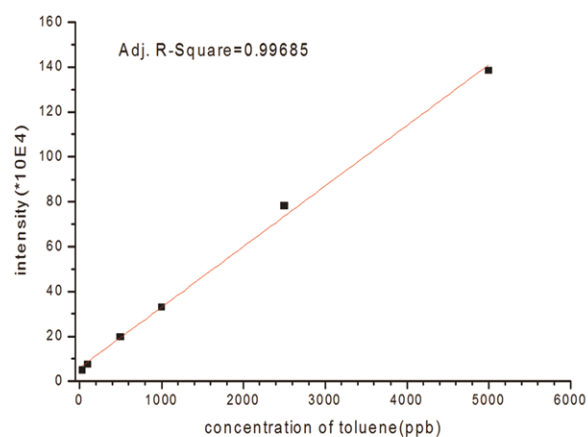
For $C_7H_5Cl_3^+$, $m=193.876$, $\Delta m=0.2266$, Resolution is better than 800FWHM

The least detection limit of instrument



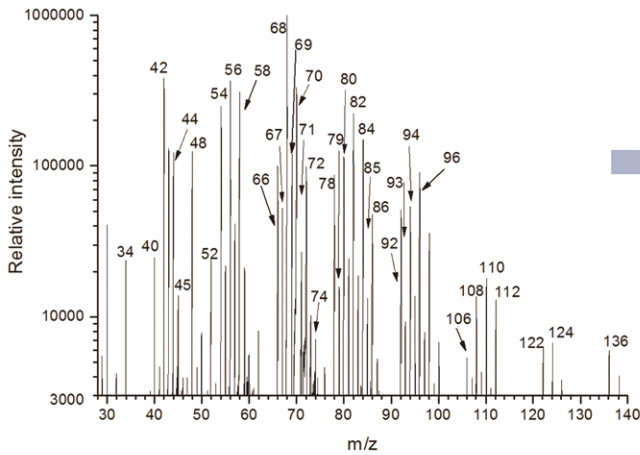
Detection of 6ppb toluene gas, signal intensity $h=17908$, noise standard deviation $\delta=433$, $S/N=41$. Based on the least detection limit ($S/N=3$), detection limit of toluene is ppb level

Linear range of instrument



Standard curve of 30-5000ppb toluene, correlation coefficient $R=0.99685$, Linear range of instrument is better than 3 magnitudes

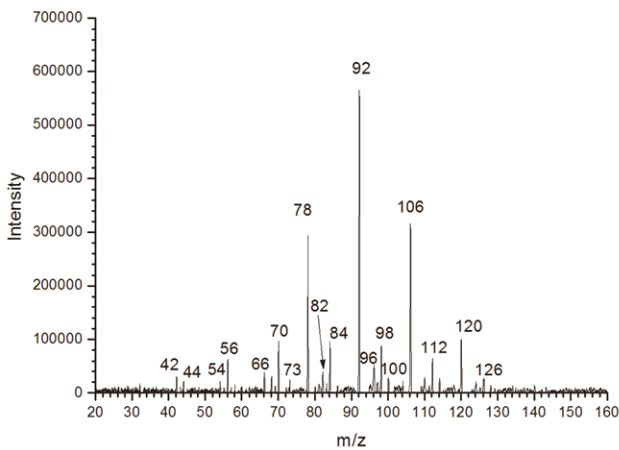
Cigarette smoke



The mass spectrum of VOCs emitted by cigarette

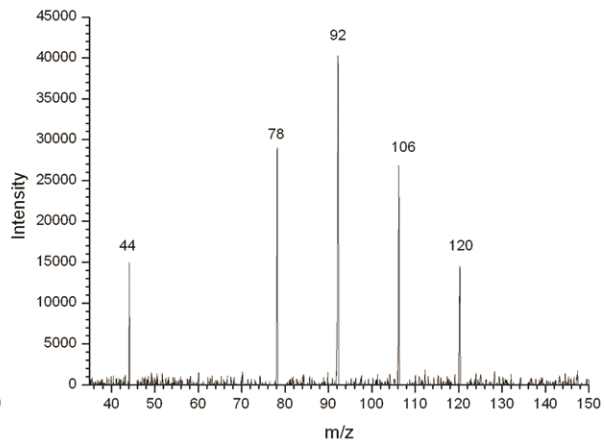
m/z	Compounds of cigarette smoke
34	Hydrogen sulfide
40	Propyne
42	Propene
44	Acetaldehyde
45	Dimethylamine, ethylamine
48	Methanthiol
52	Butenyne
54	1,3-Butadiene, 1-butyne
56	2-Propenal, butene, 2-methylpropene
58	Acetone, propanal
66	Cyclopentadiene
67	Pyrrrole
68	Furan, isoprene, 1,3-pentadiene, cyclopentene
69	Pyrraline
70	2-Butenal, pentene
71	Pyrrolidine
72	2-Methylpropenal, 2-butanone, butanal
74	Tetrahydrofuran
78	Benzene
79	Pyridine
80	Pyrazine
82	Methylfuran, methylcyclopentene, cyclohexene,
84	Cyclopentanone, dimethylbutene, hexene
85	Methylpyrrolidine, piperidine
86	Methylbutanal, 3-methyl-2-butanone, pentanone
92	Toluene
93	Aniline, methylpyridine
94	Phenol, 2-vinylfuran
96	Dimethylfuran, furfural
106	Xylene, ethylbenzene, benzaldehyde
108	Anisole, dimethylpyridine, methylphenol

Detections of VOCs from automobile exhaust



The mass spectrum of organic compounds from automobile exhaust of Gasoline 93 when vehicle started up.

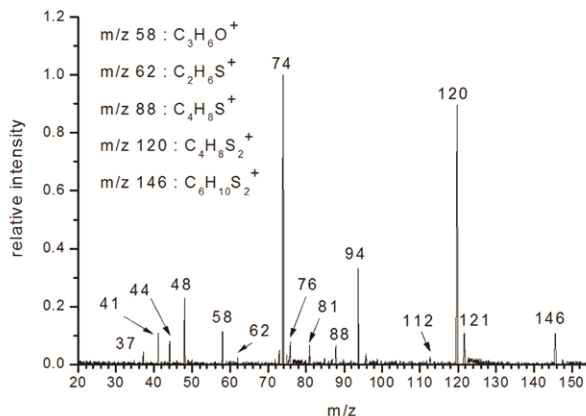
The main substances discovered include benzene series (toluene, xylene or ethyl benzene, benzene and so on) and cycloalkane (cyclobutane, cyclopentane, cyclohexane and so on)



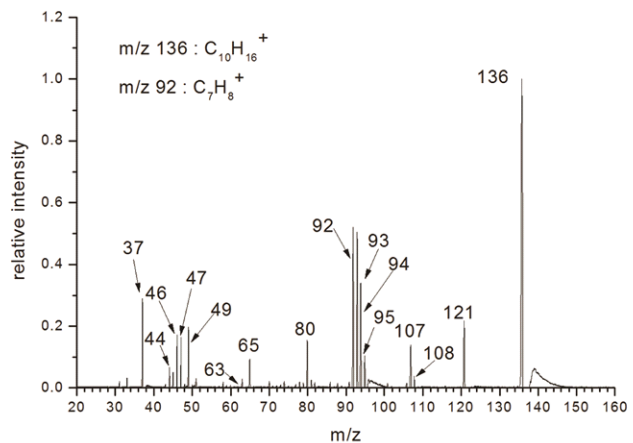
The mass spectrum of organic compounds from automobile exhaust of Gasoline 93 after vehicle ran 5mins

The main substances discovered include benzene series (toluene, xylene or ethyl benzene, benzene and so on)

Detections of VOCs emitted by food

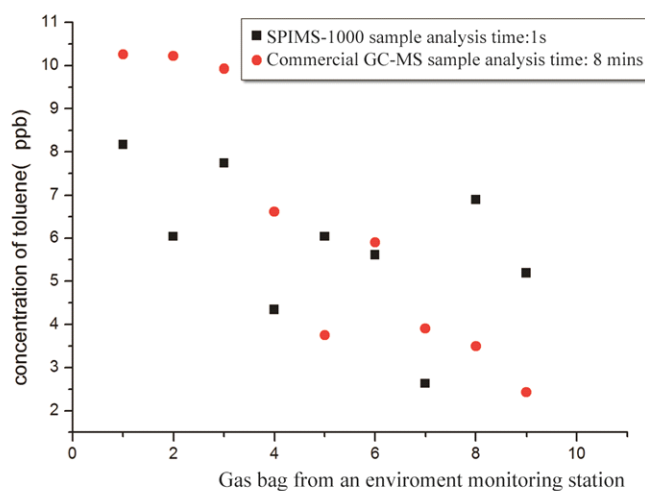


The mass spectrum of VOCs emitted by garlic



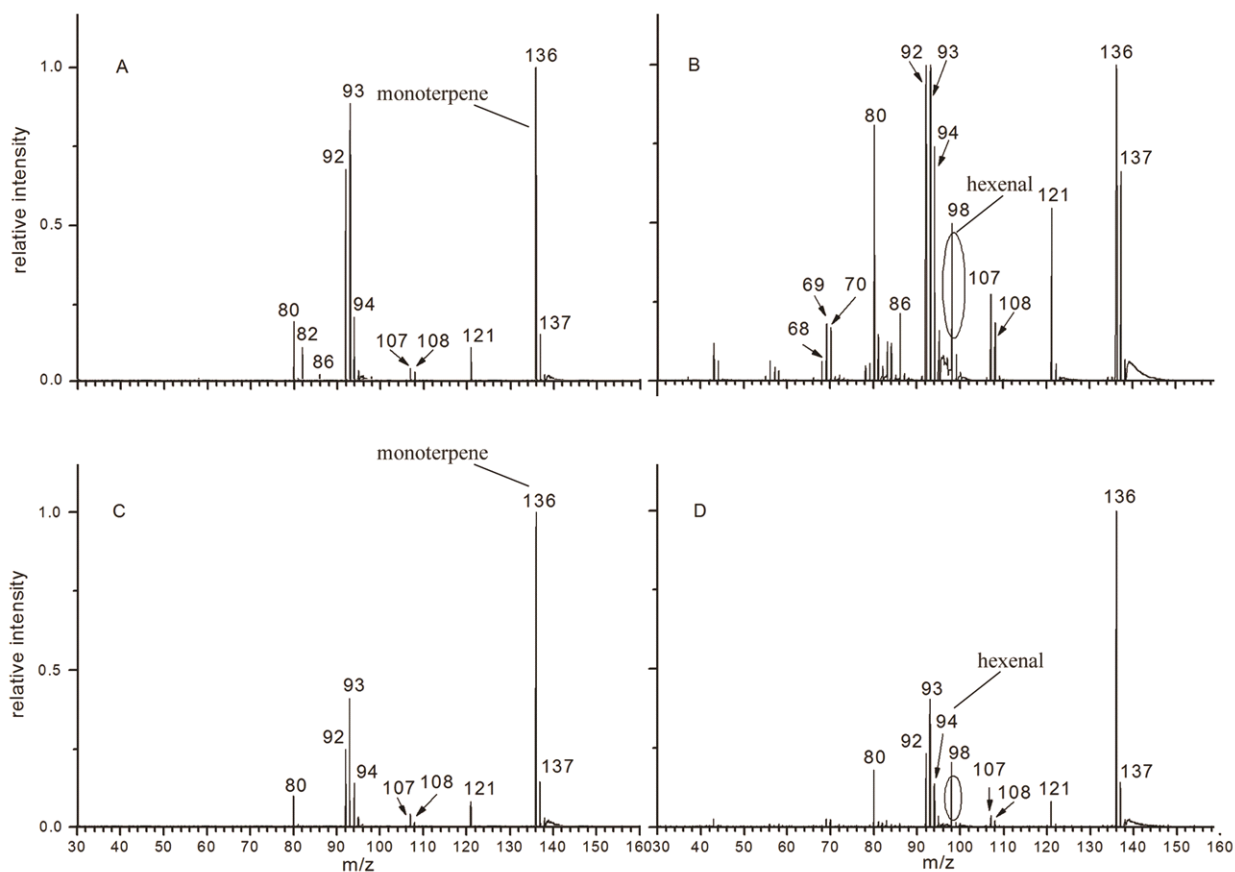
The mass spectrum of VOCs emitted by orange peel

- Detection of gas sample from an enviroment monitoring station and comparison between SPIMS-1000 and commercial GC-MS (Guangzhou Institute of Geochemistry, Chinese Academy of Sciences)



Gas bag	SPIMS-1000 (ppb)	Commercial GC-MS (ppb)	Deviation (%)
1	8.17	10.26	20.37
2	6.04	10.22	40.9
3	7.74	9.92	21.98
4	4.34	6.61	34.34
5	6.04	3.75	61.07
6	5.61	5.9	4.92
7	2.63	3.9	32.56
8	6.89	3.49	97.43
9	5.19	2.43	113.58

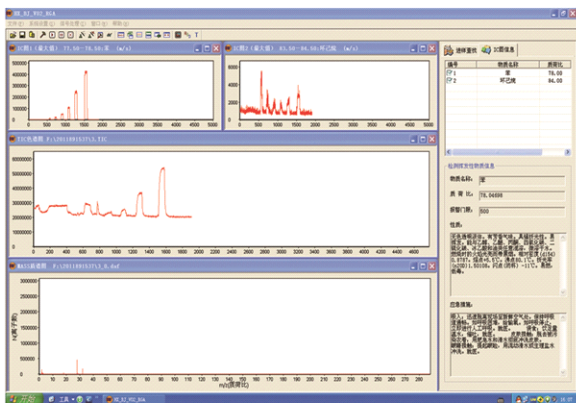
- Detection of VOC emitted by plants (Shanghai University)



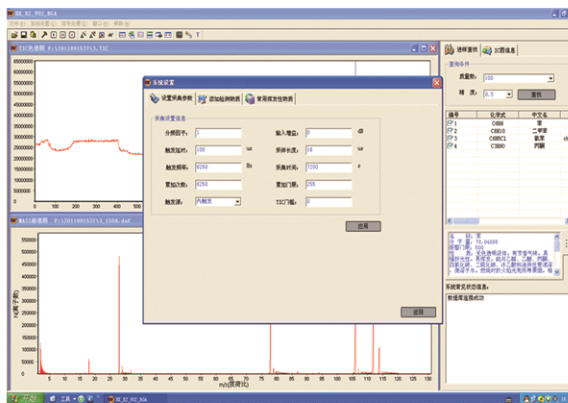
Monoterpene compounds($C_{10}H_{16}$, $m/z=136$), such as α -pinene and limonene, were the higher release of VOC, which were emitted by some plants with branch leaves, for example, masson pine and *Zanthoxylum piperitum*(Fig. A and C)
There was more VOCs released when the branch leaves were issubjected to mechanical damage, and there were some hexenal compoundsdetected significantly($C_6H_{10}O$, $m/z=98$) (Fig. B and D)

Software functions

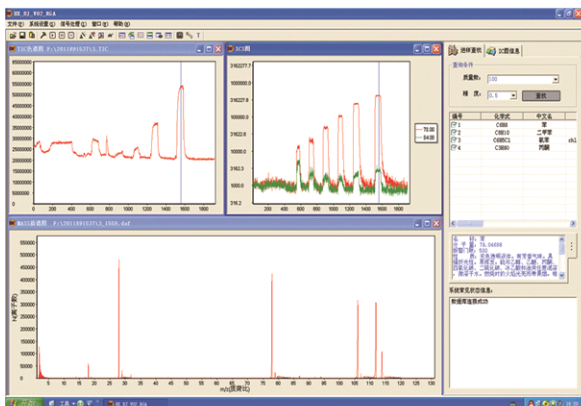
Hexin company researched and developed the software and system for instrument control, data collection and analysis independently, which could be used for routine monitoring, research and analysis. We could also provide customized software and instrument control platform of stability and high efficiency for customers based on the practical need of customers.



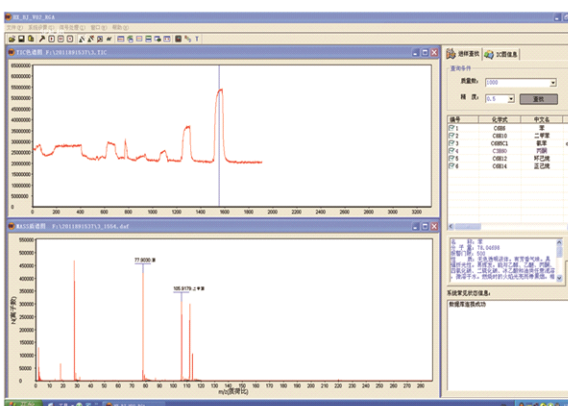
Real-time display mass spectrum and ion count graph
Able to check compound information simultaneously



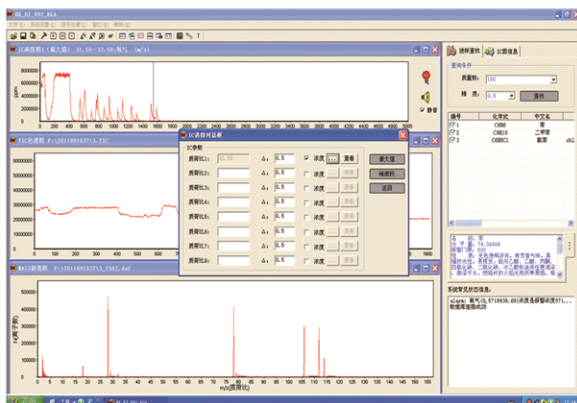
Simple data collection setting



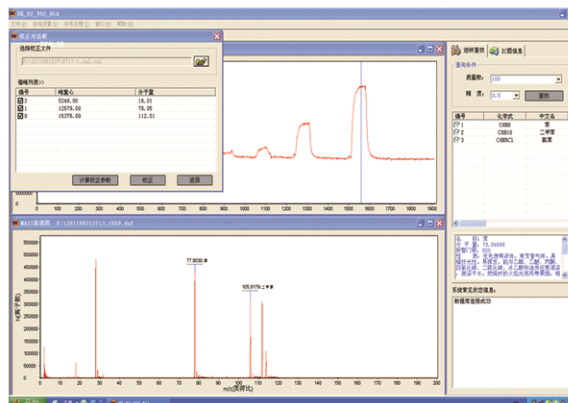
Multi-piece ion count curves in a single spectrum



Self-building standard mass spectral data base
Automatically find out compound species



On-line display concentration
Concentration alarm system
Display of material information and control measures



Easy calibration progress

Company Introduction

Hexin company is engaged in research and development, manufacture, sale and service of mass spectrometry instruments specifically. The company has obtained ISO9001:2008 certification. It is a pioneering enterprise, of "thousands talent plan" sponsored by Organization Department of the Central Committee of the CPC. Premier Wen Jiabao and Minister Li Yuanchao showed high praise respectively after the visit of Hexin company in 2010.

Hexin company has possessed several completely independent intelligent properties of mass spectrometry core technologies, including high resolution time of flight mass spectrometry detector technology, electrospray ion source, electron impact ion source, vacuum ultraviolet light ion source, atmospheric pressure matrix aided laser desorption ion source, atmospheric pressure interface technology, membrane interface technology and high speed data acquisition card specifically for mass spectrometry etc.

The successfully developed products include online aerosol mass spectrometry (SPAMS 05 series), on-line gas mass spectrometry (HX TOF-50 series, table and portable model), on-line volatile organic compounds mass spectrometry (SPIMS-1000) and cavity ring-down extinction aerosol spectrometer (XG-1000 series). Meanwhile, the company can provide customized mass spectrometers for clients. The product research and development has obtained the vigorous support from the National 863 Program and all levels of science and technology key research plan.

GUANGZHOU HEXIN ANALYTICAL INSTRUMENT CO., LTD.

Address: Third floor, Building A3, No.11, KaiYuan Road, Guangzhou Science City
Zip: 510530
Tel: (+86-20) 82071906 (Line) 82071911 (Bus) -8017
Fax: (+86-20) -82071902
Web: www.tofms.net

KUNSHAN HEXIN MASS SPECTROMETRY TECHNOLOGY CO., LTD.

Address: Third floor, Building 2, Pudong Software Park, No.828, College Road, Bacheng town of Kunshan City
Zip code: 215311
Tel: (+86-512) 57882231
Fax: (+86-512) 50191005

Other products

1. Online aerosol mass spectrometry SPAMS 05 series
Resolution: better than 500FWHM
Mass range: 1~400amu
Sizing Range: 200~2000nm
Total Hit Rate: better than 30%
Time-Resolution: less than 30min
Dimension: 1200×780×1490mm³
Power: <1.5kw
2. Online gas mass spectrometer HX TOF-50 Series
Resolution: 800FWHM
Mass range: 1~500amu
Direct Injection (including table, Portable)
3. Cavity ring-down extinction aerosol extinction spectrometer (XG-1000 series)
Sensitivity: 10⁻⁷m⁻¹
Measuring Range: 10⁻⁷-10⁻³ m⁻¹
Extinction coefficient uncertainty: <3%
Single scattering albedo uncertainty: <11.2%
Sampling frequency: 1~30 min
Working temperature: -30℃~+400℃
4. Customized mass spectrometers
Resolution: 100—10000
Ion source: EI, ESI, SPI, APMALDI
Precision: better than 100ppm
Dynamic Range: Four orders of magnitude
5. Time-digital converter (TDC)
Dual channels
Sampling rate: 2.5GHZ
MS-specific software
6. High-speed data acquisition card (ADC)
Dual channels
Sampling rate: 1GHZ
8-bit resolution
MS-specific software
7. Other MS-specific accessories

