

PRISM-PTR-6K

HIGH-RESOLUTION PTR TIME-OF-FLIGHT MASS SPECTROMETER

New real-time measurement technology for full-spectrum rapid VOCs detection



01

REAL-TIME TRACE ANALYSIS

Real-time online monitoring of 100+ airborne VOC species with full-spectrum results.

02

SWITCHABLE REAGENT IONS

≥3 reagent channels — $\text{H}_3\text{O}^+/\text{O}_2^+$ standard, $\text{NO}^+/\text{NH}_4^+/\text{Ar}^+/\text{Kr}^+$ optional.

03

ULTRA-LOW DETECTION LIMIT

≤5 ppt detection limit (xylene, 50 s), ≥2,000 counts/ppbv, ≥5-order dynamic range.

04

GO-ANYWHERE MOBILITY

Raft-type vibration-isolation platform, power-failure auto-restart and vehicle-integrated design for mobile and aerial deployment.

KEY ADVANTAGES

- Proton Transfer Reaction (PTR) ion source with ≥3 switchable reagent channels
- Direct full-air sampling — no membrane inlet, no pre-concentration
- Resolving power ≥6,000 FWHM over a 1-1,000 amu mass range
- ≥10 ms full-spectrum acquisition speed; ≤100 ms response time
- RF-enhanced reaction region with ion radial focusing for high sensitivity
- Multi-stage differential vacuum (mechanical pump + turbomolecular pump)
- Mass accuracy and stability better than ±0.005 u; repeatability ≤1%
- Ion source E/N adjustable from 0 to 200 Td; constant-pressure direct injection
- Differential-pumping ion guide with electrostatic lens / multi-frequency quadrupole
- Built-in capacitive touch screen; control & analysis software in one
- 3D-GIS mobile monitoring platform with CMB rapid source tracing
- Raft-type anti-vibration platform and power-failure auto-restart for vehicle use



REAL-TIME TRACE ANALYSIS

Real-time online monitoring of 100+ VOC species: aromatics, alkanes, alkenes, alkynes, halogenated, oxygenated and nitrogenous organics, organic sulfides.

SWITCHABLE MULTI-REAGENT ION SOURCE

≥3 reagent channels: H_3O^+ and O_2^+ standard; $\text{NO}^+/\text{NH}_4^+/\text{Ar}^+/\text{Kr}^+$ optional. Under water-source conditions no extra reagent gas is needed.

DIRECT SAMPLING, NO MEMBRANE

Direct injection without membrane inlet avoids polarity loss; ion source pressure is adjustable via constant-pressure injection control.

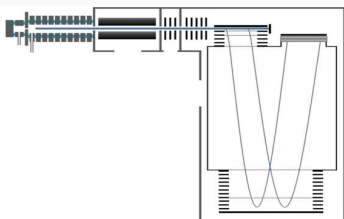
ULTRA-LOW DETECTION LIMIT

Detection limit ≤5 ppt (xylene, 50 s accumulation); sensitivity ≥2,000 counts/ppbv with ≥5 orders of magnitude dynamic range.

BUILT FOR MOBILE MONITORING

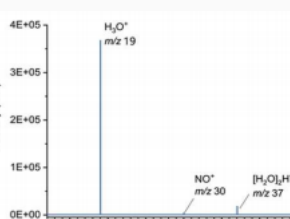
Raft-type vibration-isolation platform withstands elastic deformation in any direction; power-failure protection with automatic restart.

CORE TECHNOLOGIES



MULTI-REAGENT PTR ION SOURCE

- ≥3 switchable reagent channels ($\text{H}_3\text{O}^+/\text{O}_2^+$ standard)
- Mass flow meter controls reagent ion output
- RF-enhanced reaction region, radial ion focusing
- Soft ionisation — almost no fragment ions
- E/N adjustable 0-200 Td for selectivity control



REAL-TIME FULL-SPECTRUM DATA

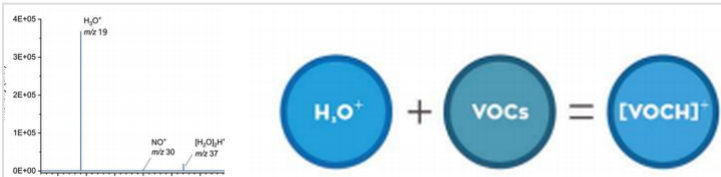
- ≥10 ms per spectrum, transient full spectrum
- ≤100 ms response time
- Control & analysis software in one, real-time integration
- Guided standard-curve creation from raw spectra
- Self-diagnostics, self-protection, one-click operation



VEHICLE-INTEGRATED DESIGN

- Raft-type multi-direction vibration isolation
- Power-failure protection, auto-restart on recovery
- Multi-stage differential vacuum, no external pump
- Laminar sampling manifold, <10 s residence time
- Works with 24 V vehicle sampling system

PERFORMANCE PROOF



Reagent-Ion Spectrum in Real Time

Full-spectrum acquisition resolves the H_3O^+ reagent ion (m/z 19) together with NO^+ (m/z 30) and hydrated clusters (m/z 37) in a single scan — soft proton-transfer ionisation that identifies and quantifies VOCs without sample pre-treatment.

Instrument: PRISM-PTR-6K · Resolving power ≥6,000 FWHM · Mass accuracy ±0.005 u · Reagent mode: H_3O^+

APPLICATION AREAS

NAVIGATION INSPECTION

Regional VOCs aerial inspection of industrial parks; 3D-GIS mapping with CMB rapid source tracing

ENVIRONMENTAL RESEARCH

Ambient and pollution-source monitoring: emissions studies, indoor air quality, mobile surveillance

FOOD & FLAVOUR

Complex aroma systems, real-time oral/nasal analysis, online food-process monitoring

SECURITY & SAFETY

Explosives, toxic industrial chemicals and prohibited drugs; direct injection, no preparation

MEDICAL DIAGNOSTICS

Non-invasive real-time respiratory gas analysis and exhaled-breath VOC profiling

PETROCHEMICAL

Real-time trace volatile compound monitoring for industrial process sites

MAIN SYSTEM

Measurement Principle	Proton Transfer Reaction (PTR) time-of-flight mass spectrometry; real-time online VOCs monitoring, 100+ species
Reagent Ion Source	≥3 switchable channels: H ₃ O ⁺ and O ₂ ⁺ (standard); NO ⁺ /NH ₄ ⁺ /Ar ⁺ /Kr ⁺ (optional)
Resolving Power	≥6,000 FWHM
Mass Range	1-1,000 amu
Spectrum Speed	≥10 ms per spectrum, transient molecular-ion full spectrum
Response Time	≤100 ms
Detection Limit	≤5 ppt (xylene, 50 s accumulation)
Sensitivity	≥2,000 counts/ppbv (xylene or equivalent)
Dynamic Range	≥5 orders of magnitude
Mass Accuracy / Stability	Better than ±0.005 u / ±0.005 u
Repeatability	≤1%
E/N Value	0-200 Td, adjustable
Detectable Compounds	Aromatics, alkanes, alkenes, alkynes, halogenated, oxygenated and nitrogenous organics, organic sulfides; formaldehyde, DMF, etc.; expandable with standard gas

SAMPLE HANDLING & VACUUM

Sampling	Direct injection; no membrane inlet; laminar manifold, <10 s residence
Source Pressure	Constant-pressure injection; source pressure adjustable via inlet pressure
Reagent Flow	Mass flow meter controlled; no extra reagent gas with water source
Reaction Region	Multi-frequency RF-enhanced, radial ion focusing, high sensitivity
Ion Guide	Differential-pumping interface; electrostatic lens / multi-frequency quadrupole
Vacuum System	Multi-stage differential: mechanical + turbomolecular pump
Manifold Material	Stainless steel or PTFE

VEHICLE INTEGRATION

Vibration Isolation	Raft-type platform; all-direction elastic damping for vehicle mounting
Power Protection	Power-failure protection; automatic restart on recovery
On-Board Operation	Capacitive touch screen; -20-45°C, ≤80% RH sampling; 24 V vehicle system

PERFORMANCE HIGHLIGHTS

≥ 6,000

Resolving power (FWHM)

≤ 5 ppt

Detection limit — xylene, 50 s accumulation

≤ 100 ms

Response time

1-1,000

Mass range (amu)

100+

VOC species monitored online, expandable

DETECTORS & DATA SYSTEM

Mass Analyser	Time-of-flight mass analyser with differential-pumping ion guide
Data Collection	Real-time online integration; VOC factor response vs. time display
Status Display	Ion source temperature, transfer vacuum, split pressure, TOF voltage
Qual/Quant	Acquisition & analysis, qual/quant, library build & search, custom methods

SOFTWARE & LIBRARIES

Control Software	Self-diagnostics, self-protection, P/T compensation; one-click auto run; guided curve creation in-software
Mobile Platform	3D-GIS real-time display; one-click export (XLS/JPG); playback; CMB tracing, minute-level response
Libraries	Environmental library >1,000 compounds; Chinese SIC >750 chemicals with exposure limits

ELECTRICAL & ENVIRONMENT

Operating Conditions	0-45°C, ≤85% RH; power: mains or UPS
Vehicle Power	<200 W (cigarette lighter); <500 W on-board; 24 V vehicle system
Battery Operation	>12 h with car battery; >8 h on-board battery

RELIABLE INSTRUMENT MANUFACTURING & SERVICES

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