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Technology Enhancing Science

Q-ACSM

Quadrupole Aerosol Chemical Speciation Monitor

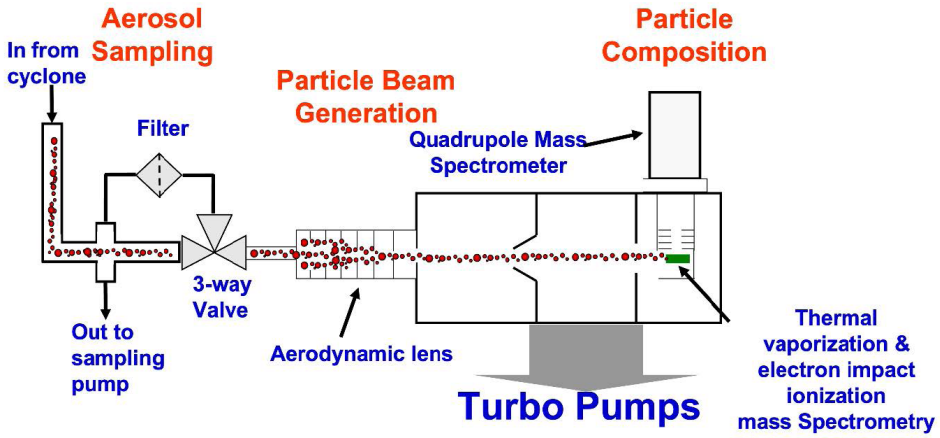
Measure real-time, non-refractory aerosol particle mass and chemical composition.

Applications

- Continuous on-line measurement of ambient aerosol mass concentrations and chemical composition including ammonium, nitrate, chloride, sulfate, and organic species
- Routine/long-term air quality monitoring
- Field measurements of aerosol chemical composition
- Aerosol chamber studies
- Optical/CCN closure
- Source characterization
- Industrial process monitoring

Advantages

- Aerodynamic particle lens for efficient gas-particle separation
- Mass spectrometric analysis (0-200 amu)
- Automated zeroing (filter)
- Minimal maintenance; remote control ready
- Direct linear detection of sulfate, nitrate, ammonium, chloride and organic aerosol species through two-step thermal vaporization (~600 C) and electron impact ionization process
- Separation and quantification of organic aerosol species, including primary and secondary organic aerosol



Q-ACSM

Specifications

Detection Limits (μg m^{-3}, 30 minute, 3σ)

Organics:	0.7
Sulfate:	0.09
Nitrate:	0.05
Chloride:	0.07
Ammonium:	0.4

Data Rate

- Adjustable, 30 minutes typical

Sample Flow

- 85 cc min^{-1} (volumetric flow)

Software

- Custom acquisition and analysis routines
- Specialized routines for PMF analysis of the organic fraction

Operating Temperature

- < 35 °C

Aerosol Size Range

- 70-700 nm vacuum aerodynamic diameter (standard lens)
- 110-3500 nm (PM2.5 lens option)

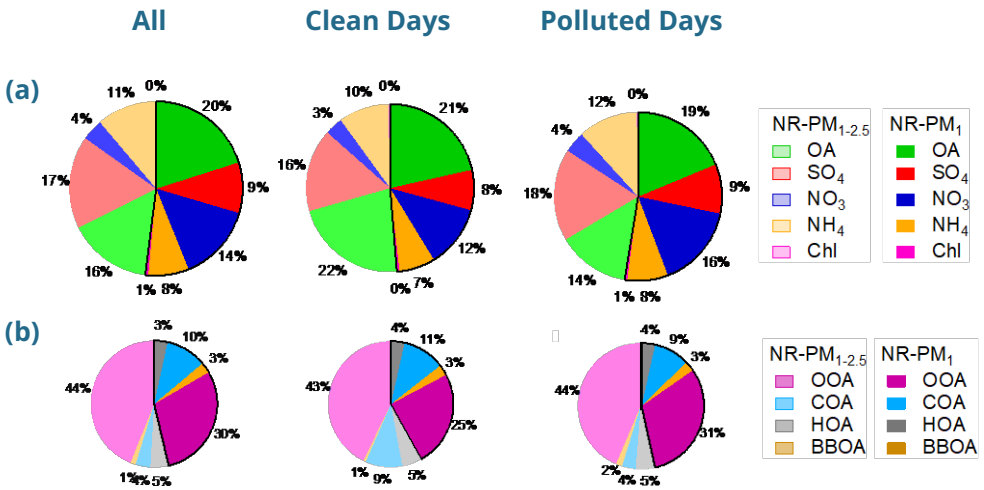
Size/Weight

- Benchtop, 21 in x 19.5 in x 34 in; 140 lbs [53 cm x 50 cm x 86 cm; 64 kg]

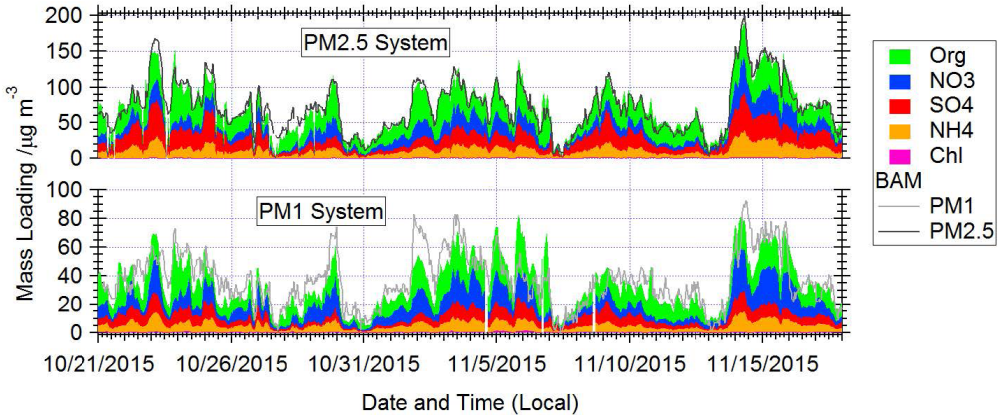
Electrical

- 300 W max, 90-260 VAC, 50-60 Hz

*Specifications depend on instrument settings and are subject to change without notice.



Comparison of the chemical composition and organic aerosol sources of PM1 and PM2.5 during relatively clean and polluted days (Li et al., Env. Res., 212, 113557, 2022)



Comparison between PM1 and PM2.5 ACSM measurements and co-located PM monitors in Nanjing, China (Zhang et al., Atmos. Chem. Phys., 17, 14501, 2017)

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