



Applications



Picture credit: Lukas Hörtnagl

> Flux Measurements:

Deposition and Emission of BVOCs by Eddy Covariance Flux Measurements

THE CHALLENGE

The eddy covariance (also known as eddy correlation and eddy flux) technique is a key method to measure and calculate vertical turbulent fluxes in the atmosphere. It requires high time resolution measurements of 3D wind components (e.g. 5–20 Hz). A parallel measurement of VOC concentrations can be correlated with the vertical wind component to extract emission and deposition fluxes. This necessitates a trace gas analyzer able to measure ultra-low VOC concentrations quantitatively and with a high-time resolution of 10 Hz.

THE SOLUTION

IONICON's PTR-TOFMS series perfectly meets these requirements for eddy covariance flux measurements. They allow for highly time resolved measurements (> 10 Hz) and their high sensitivity for VOCs provides quantitative results for trace gas concentrations. PTR-TOF instruments acquire the full spectrum in each measurement and gather data on a vast number of existing BVOCs simultaneously. Moreover, their high mass resolving power allows for separation of isobars and provides chemical identification of the measured compounds.

PTR-MS

- > High-time resolution (> 10Hz)
- > Ultra-Sensitive PTR-TOFMS systems
- > Low pptv-range detection limits
- > Entire mass range in split-seconds

Find out more:

www.ionicon.com/flux

PTR-TOF 6000 X2



FLUX MEASUREMENTS OF BVOCs

Most volatile organic compounds (VOCs) in the atmosphere originate from biogenic emissions, so-called BVOCs. They play a critical role in atmospheric chemistry and are associated with ozone production and secondary aerosol (SOA) formation. Studies of the atmosphere-ecosystem exchange of BVOCs have been limited to a few dominant compounds in the past. The high-time resolution of IONICON PTR-TOF instruments enables eddy-covariance measurements to study the active atmosphere-ecosystem exchange of a vast number of BVOCs, giving new insights for understanding the atmospheric VOC budget.

RECOMMENDED: PTR-TOF 6000 X2

Proton Transfer Reaction (PTR) is ideally suited for the sensitive measurement for biogenic VOCs, including hydrocarbons (isoprene, monoterpenes, and sesquiterpenes) as well as oxygenated organic compounds (e.g. methanol, acetone, acetic acid, hexenal) and also previously unexpected compounds. Many researchers around the world rely on an IONICON PTR-TOFMS for atmospheric research.

PTR-TOF 6000 X2 BENEFITS

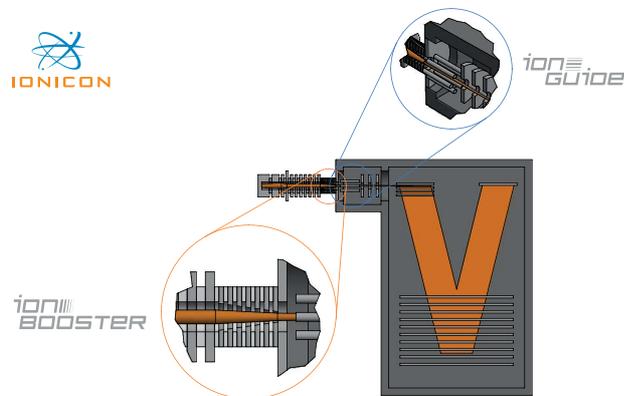
The PTR-TOF 6000 X2 is the new premium IONICON PTR-TOF trace VOC analyzer. X2 combines the latest generation of performance enhancing tools incl. the ION-BOOSTER funnel as well as the hexapole ION-GUIDE. Utmost resolution, sensitivity and lowest real-time detection limit are now available in a robust, transportable platform that is smaller and lighter than previous products. The results are an impressive mass resolution of over 6000 $m/\Delta m$ and a sensitivity more than 1000 cps/ppbv with a low detection limit of below 1 pptv.

No sample preparation and the direct injection of analytes means no waiting time and no loss in capturing of relevant process parameters. This, together with a known simplicity, reliability and robustness is common to all our instruments. The entire mass spectrum can be recorded in split seconds with isobaric species being resolved and identified. Virtually no instrumental mass range limitation and a linearity range over six orders of magnitude complete our flagship instrument.

The PTR-TOF 6000 X2 is completely software controlled featuring a touch screen interface.

TECHNOLOGY

We proudly rely on the unique IONICON PTR-MS soft ionization technology where by proton transfer from H_3O^+ , all compounds with a higher proton affinity (PA) than water are ionized. Common constituents of air, such as N_2 , O_2 , Ar, CO_2 etc. have lower PAs than H_2O and are therefore not detected. This is one of the main reasons for our market-leading low, real-time detection limit for trace compounds. Due to precisely controlled ion source and drift tube parameters, absolute quantification of VOC concentrations is possible.



SRI-MS

The PTR-TOF 6000 X2 is also available with Selective Reagent Ionization - Mass Spectrometry (SRI/SRI+) technology, featuring NO^+ and O_2^+ (SRI) or Kr^+ (SRI+; US Pat. 9,188,564) alternatively to H_3O^+ as precursor ions created in the IONICON ULTRA-PURE ion source.

The benefits are extraordinary as O_2^+ , but especially Kr^+ , have a higher ionization potential than H_3O^+ and therefore many important (inorganic) substances such as CH_4 , CO, CO_2 , NO_2 , SO_2 , etc. can be detected and quantified using a single IONICON instrument. NO^+ as reagent ions help separating several isomeric VOCs that can subsequently be quantified in real-time.