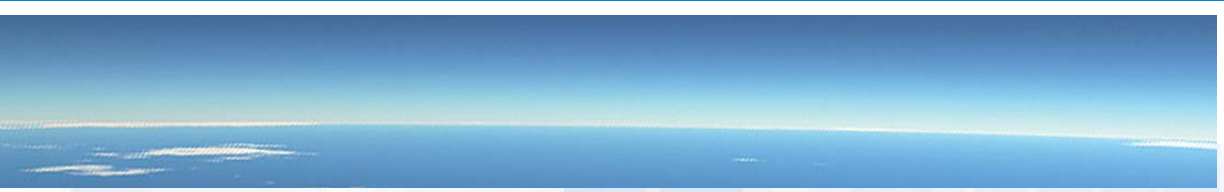


SRI-MS

SELECTIVE REAGENT IONIZATION
MASS SPECTROMETRY

UNIVERSAL REAL-TIME
TRACE GAS ANALYSIS

SRI⁺



IONICON
ANALYTIK

THE WORLD'S
LEADING
PTR-MS
COMPANY

SRI AND SRI+ HIGHLIGHTS

- **Novel ionization method for PTR-MS instruments:** Kr^+ is implemented as a reagent ion in conventional PTR-MS for the very first time.
- **“The Universal Real-Time Trace Gas Analyzer”:** Besides substances having higher proton affinities than water, which can already be ionized using proton transfer from H_3O^+ , we now greatly extended the class of detectable substances to include important molecules such as CH_4 , CO , CO_2 , NO_2 , SO_2 .
- **Choose the SRI+ option with your new IONICON instrument or upgrade!** SRI (NO^+ and O_2^+) and SRI+ (Kr^+ and Xe^+) are available as optional features for all new systems and as upgrades for most IONICON PTR-MS instruments.
- **High reagent ion intensity and purity – low detection limit – high sensitivity:** We achieve a reagent ion purity of over 93% and nearly 9×10^6 cps reagent ion signal for Kr^+ which is again living up to your expectations of IONICON high performance trace gas analyzers.
- **High mass resolution:** The IONICON PTR-TOFMS series with high mass resolving power of the employed time-of-flight mass spectrometers, allows for separation of isobaric compounds. Now also for substances such as e.g. N_2 and CO , CO_2 and N_2O .

INTRODUCTION TO PTR-MS

Proton-Transfer-Reaction Mass Spectrometry (PTR-MS) is a well established technology for real-time trace gas analysis in the fields of environmental research, food and flavor science, medicine, homeland security, etc. PTR-MS allows for simultaneous real-time monitoring of volatile (organic) compounds (VOCs) like acetone, acetaldehyde, methanol, ethanol, benzene, toluene, xylene and many others present in ambient air. IONICON instruments are known for their market-leading detection limits in the single-digit pptv-range and their real-time monitoring capabilities without any sample preparation required.

H_3O^+ ions do not react with any of the major components present in clean air due to

their low proton affinity, but effectively ionize most low concentrated VOCs. Unlike other technologies (e.g. SIFT-MS or IMR-MS) PTR-MS does not dilute low concentrated samples with a carrier gas and does not lose precursor ions on their way through a mass filter between the ion source and the drift tube. This makes PTR-MS very sensitive to trace gases in the sample air. Very high intensities of precursor ions and thus real single-digit pptv-range detection limits are the resulting benefits of our PTR-MS technology.

PTR-MS FACTS

- Soft and efficient ionization via proton transfer from H_3O^+ to all molecules having a higher proton affinity than water.
- Market-leading real-time detection limit (ppqv-/pptv-range)
- No sample preparation (direct air sampling)
- Absolute VOC quantification without calibration
- Soft and efficient chemical ionization
- Quadrupole or time-of-flight mass spectrometry
- No gas supply or carrier gas necessary
- Robust, transportable, easy to use

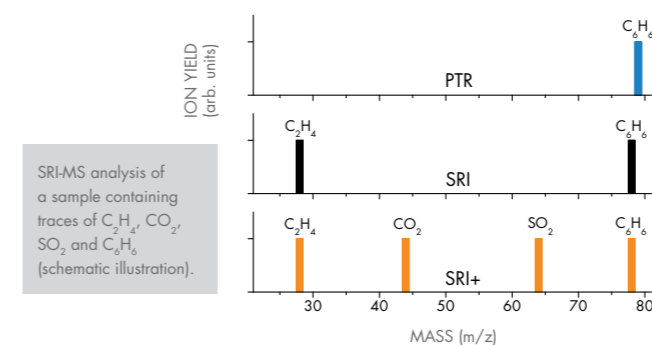
PTR-MS SRI-MS

SRI+

FROM ULTRA-SENSITIVE PROTON-TRANSFER-REACTION TO UNIVERSAL SELECTIVE REAGENT IONIZATION-MASS SPECTROMETRY

In our new Selective Reagent Ionization - Mass Spectrometry (SRI-MS) instruments we combine all benefits of chemical ionization in one universal trace gas analyzer:

- Proton Transfer Reaction - Mass Spectrometry (PTR-MS), known for its soft ionization and high sensitivity.
- PTR-MS complemented with the SRI feature, which additionally allows chemical ionization via NO^+ and O_2^+ , thus enhancing analyzable compound classes and increasing selectivity.
- The revolutionary SRI+ technology, introducing for the very first time in PTR-MS history reagent ions with a higher ionization energy than common air constituents. SRI+ means that Kr^+ and Xe^+ are added to the choice of selectable reagent ions and therefore nearly all existing substance classes are accessible with such an instrument.



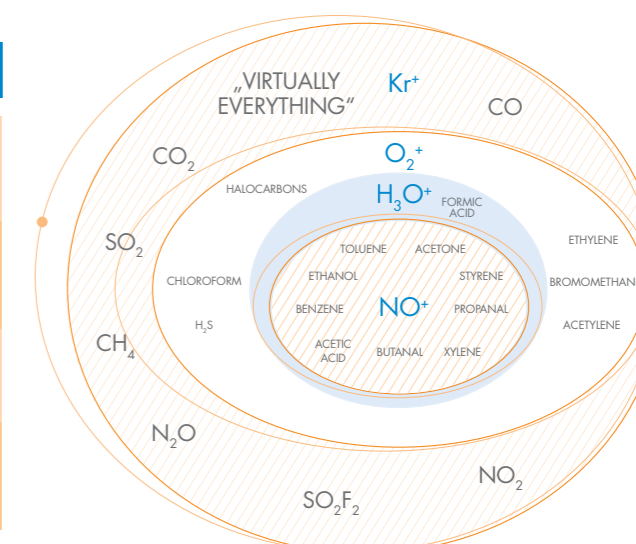
REAGENT ION	IONICON TECHNOLOGY	MAIN BENEFITS, DETECTABLE SUBSTANCES AND EXAMPLES
H_3O^+	PTR-MS	Most common volatile organic compounds (VOCs); e.g. aldehydes, ketones, acids, esters, alcohols, aromatic compounds, nitriles, amines, amides, thiols, sulfides, with a detection limit down to the sub-pptv-range.
NO^+	SRI	Similar to H_3O^+ , especially advantageous for the separation of aldehydes and ketones, carboxylic acids and esters, carboxylic acids and alcohols, etc.
O_2^+	SRI	Additionally e.g. ethylene and acetylene and nearly all halocarbons (carbon with fluorine, chlorine, bromine and iodine) can be detected.
Kr^+	SRI+	The Universal Trace Gas Analyzer: e.g. CO , CO_2 , SO_2 , CH_4 , N_2O and all above mentioned can be detected with IONICON instruments incl. SRI+.

Environmental research is one of the key applications of PTR-MS. Now in addition to trace volatile organic compounds (benzene, toluene, etc.), also very important (inorganic) substances such as CH_4 , CO , CO_2 , NO_2 , SO_2 , etc. can be detected and quantified using a single IONICON SRI-MS instrument. All reagent ions can be selectively produced in the same ion source, each with high purity. Therefore, no additional mass filter is needed for reagent ion selection. Remaining impurities can be clearly distinguished from isobaric sample compounds due to the high mass resolution of the time-of-flight mass spectrometer used e.g. in our flagship PTR-TOFMS series instrument: PTR-TOF 8000.

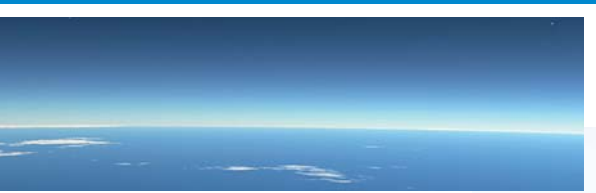
In summary, IONICON SRI-MS instruments are now capable of switching between H_3O^+ , O_2^+ , NO^+ , Kr^+ and Xe^+ . There are virtually no limitations on substance classes and consequently on fields of application any longer.

Patent pending (PCT/EP2011/064170).

Start exploring the endless possibilities with the IONICON Universal Real-Time Trace Gas Analyzers and contact us today at: www.ionicon.com!



ULTRA-SENSITIVE SOLUTIONS FOR REAL-TIME TRACE GAS ANALYSIS



THE WORLD'S
LEADING
PTR-MS
COMPANY

IONICON Analytik GmbH • Eduard-Bodem-Gasse 3 • 6020 Innsbruck • Austria
Tel.: +43 512 214 800 • www.ionicon.com • blog.ionicon.com • info@ionicon.com