

Vacuum Technology

Room 121 - Session VT3-TuM

Novel Vacuum Instrumentation

Moderators: Sol Omolayo, Lawrence Berkeley National Laboratory, Jacob Ricker, NIST

9:15am **VT3-TuM-6 Enabling Vacuum Process Monitoring with Time-of-Flight Spectroscopy**, *Marco John, K. Bergner, S. Hüttl, K. Kirsch, A. Trützscher*, VACOM Vakuum Komponenten & Messtechnik GmbH, Germany
As the complexity of industrial vacuum processes increases, detailed knowledge of the vacuum itself becomes even more important. A crucial aspect to manage this challenge is the importance of fast in-situ monitoring and control of process parameters such as pressure and residual gas composition. Improving process control in this way minimizes production errors, avoids damage to process equipment and ensures longer operating times. The capabilities of hot cathodes and quadrupole mass spectrometers are limited for this complex task, as they can only measure either the total pressure or the gas composition. One answer to this challenge is our novel ion source NOVION®, which combines the well-known technology of time-of-flight spectroscopy with our patented ion trap to an industrially available gas analyzing application.

In this talk we present the fundamental physical principles of the novel ion source and explain the compact combination of time-of-flight spectroscopy with our own patented ion trap. On the one hand we demonstrate the capability of precise total pressure measurements over a wide pressure range. On the other hand, we show the available possibilities to use the novel ion source in partial pressure measurement mode, leak detection and detection of air leaks.

We discuss the advantages and limits in different applications as well as best practices in the field and show the capability to push the principle to its limits at high pressures without compromising the performance or lifetime of the filaments. In addition, we demonstrate a special signal enhancement method to improve the resolution in the near signal-to-noise range.

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