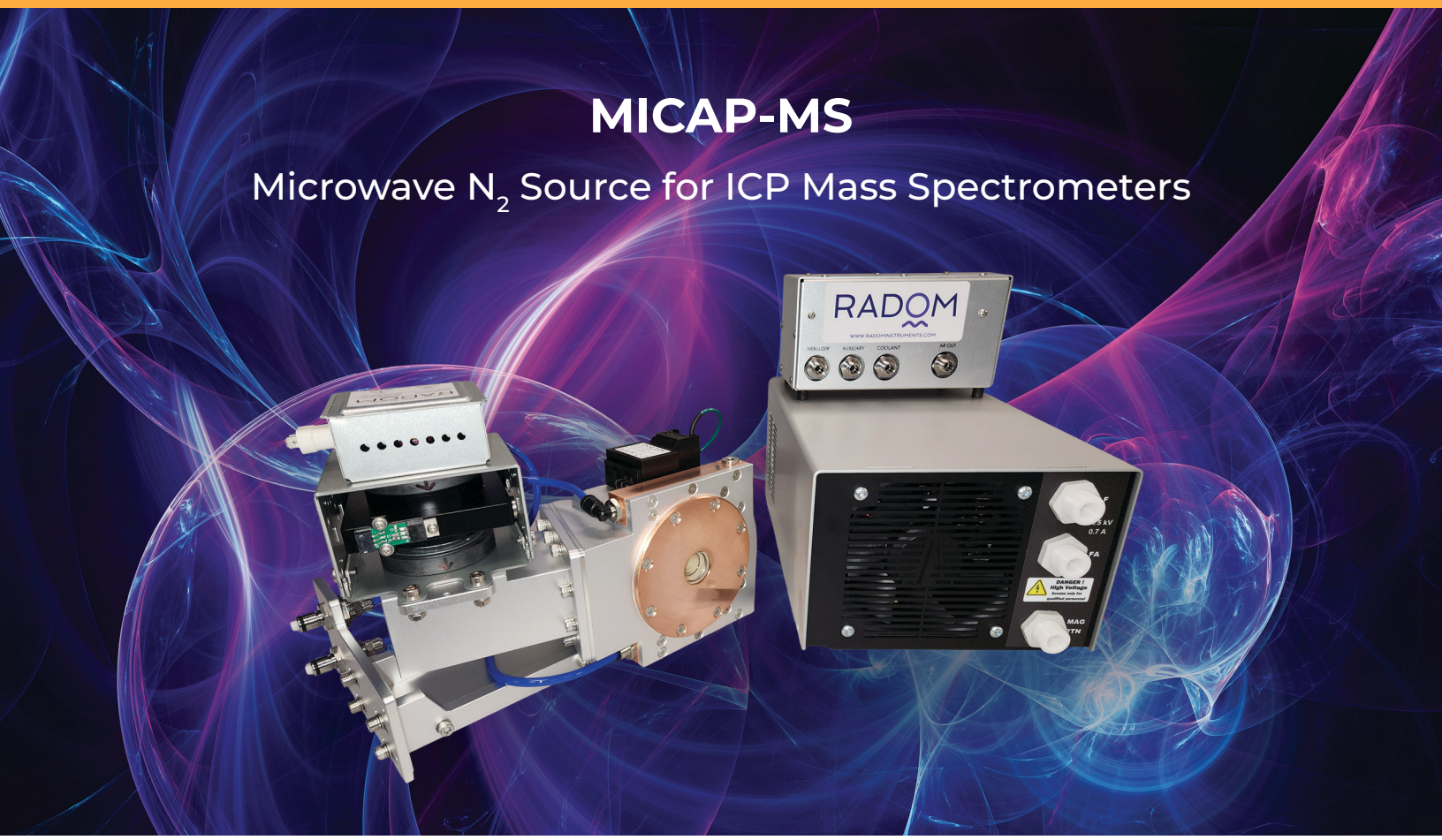
MICAP-MS

Microwave N_2 Source for ICP Mass Spectrometers



- N_2 Microwave Inductively Coupled Atmospheric Plasma (MICAP) ion source
- Provides freedom from Ar-based interferences, delivering interference-free measurements for elements such as Ca, Fe, Cu, Se & others
- Enables helium-free laser ablation applications with N_2 cell gas
- Ultra-stable isotope ratio measurements
- Full plasma control with all standard sample introduction techniques
- State of the art electronic power stabilization and integrated controls
- Modular design with customized designs supporting installation on a wide variety of quadrupole, HR double focusing, and time of flight mass spectrometers – including:
  - Thermo Scientific™ Neptune
  - Thermo Scientific™ Neoma
  - Nu Instruments™ Vitesse
  - Tofwerk™ mipTOF

Radom Instruments presents the MICAP-MS source. The core technology resides in a microwave-generated N_2 plasma which revolutionizes plasma technology. The patented Cerawave™ ceramic ring operates at 100 times the efficiency the traditional metal load coil designs, operating as an ideal diffused plasma discharge. This delivers an extremely robust, DC potential-free and high stability ion source for HR-MICAP-MS measurements.

Radom Instruments is US based and holds over 30 patents with a strong international presence. The company has established itself as a pioneer in innovative solutions for plasma-based systems in analytical chemistry. It's technology has been widely published in peer-reviewed journals, with selected publications listed on the following page.

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Selected MICAP MS Publications

Anika Retzmann, Michael Wieser, **Advancing Ca isotopic analysis: Direct Measurement of 44Ca/40Ca Isotopic Composition by MC-MICAP-MS with Nitrogen Plasma**, Analytica Chimica Acta, 1383 (2026) 344865

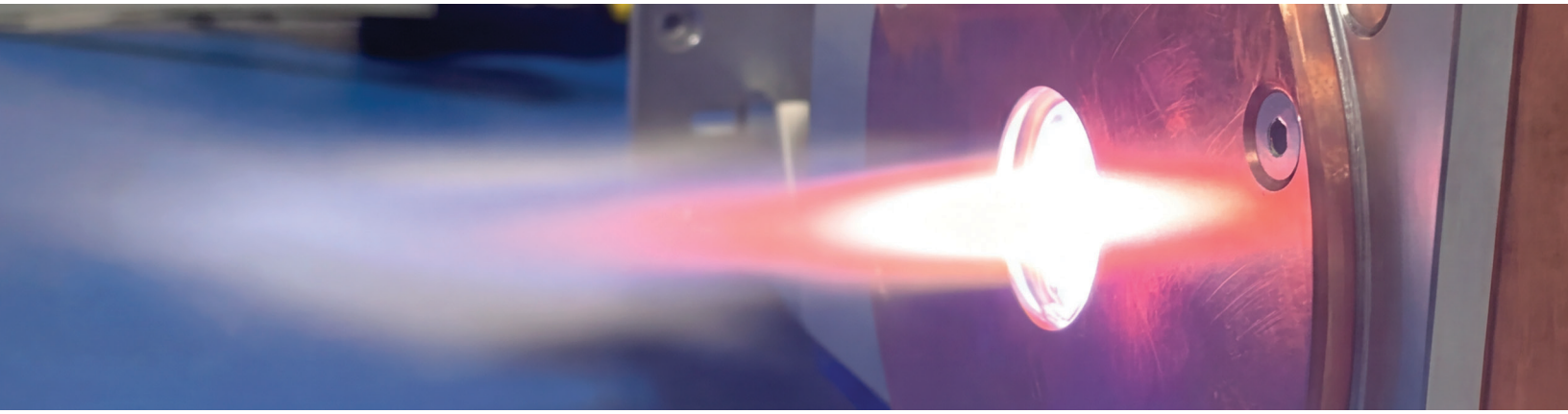
Anika Retzmann, Ashok Menon, and Michael E. Wieser, **Introducing MC-MICAP-MS: Using a N2-based Plasma Ion Source for Sr Isotope Abundance Ratio Measurements**, J. Anal. At. Spectrom., 2025, 40, 2803-2815.

D. Morcillo, A. Winckelmann, M. Oelze, R. Leonhardt, A. Schmidt, S. Richter, S. Recknagel, J. Vogl, U. Panne, C. Abad. **Exploring Age-induced Lithium Isotope Fractionation in Lithium-ion Batteries Using Microwave-induced Cold Nitrogen Plasma Spectrometry**. J. Anal. At. Spectrom., 2025, 40, 3306-3316

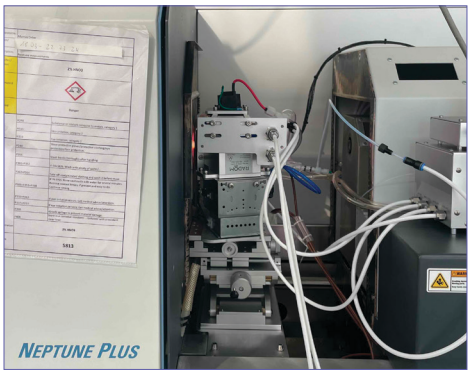
Monique Kuonen, Guanghui Niu, Bodo Hattendorf, and Detlef Günther; "**Characterizing a Nitrogen Microwave Inductively Coupled Atmospheric-Pressure Plasma Ion Source for Element Mass Spectrometry**"; J. Anal. At. Spectrom., 2023, 38, 758-765.

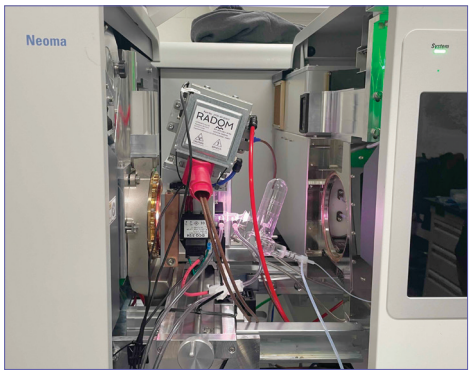
Christoph Neff, Pascal Becker, Bodo Hattendorf and Detlef Gunther; "**LA-ICP-MS using a nitrogen plasma source**"; Anal. At. Spectrom., 2021, 36, 1750-1757.

M. Schild, A. Gundlach-Graham, A. Menon, J. Jevtic, V. Pikelja, M. Tanner, B. Hattendorf, and D. Günther; "**Replacing the Argon ICP: Nitrogen Microwave Inductively Coupled Atmospheric-Pressure Plasma (MICAP) for Mass Spectrometry**"; Anal. Chem. 2018, 90, 22, 13443–13450.



Example MICAP MS Installations





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