A brief history of ASITA, Isomass and Radom

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ASITA 2026,

University of Saskatchewan

7th – 11th June 2026

Disclaimer

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Talk overview

This will be a talk in three parts. First, I will present a brief history of the ASITA conference and how it got to where it is today in the 31st year since it's inception.

Next, I will discuss the Radom source and its use in isotopic analysis.

Finally, I will talk a little about Isomass Scientific today and where we find ourselves.

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Before ASITA

Technology comparison

Dual Inlet	Continuous Flow
High precision	Low precision – needed drift correction
Low throughput	High throughput potential
Required methodical working practises	Weigh, seal and run
Well known and trusted	New and suspect

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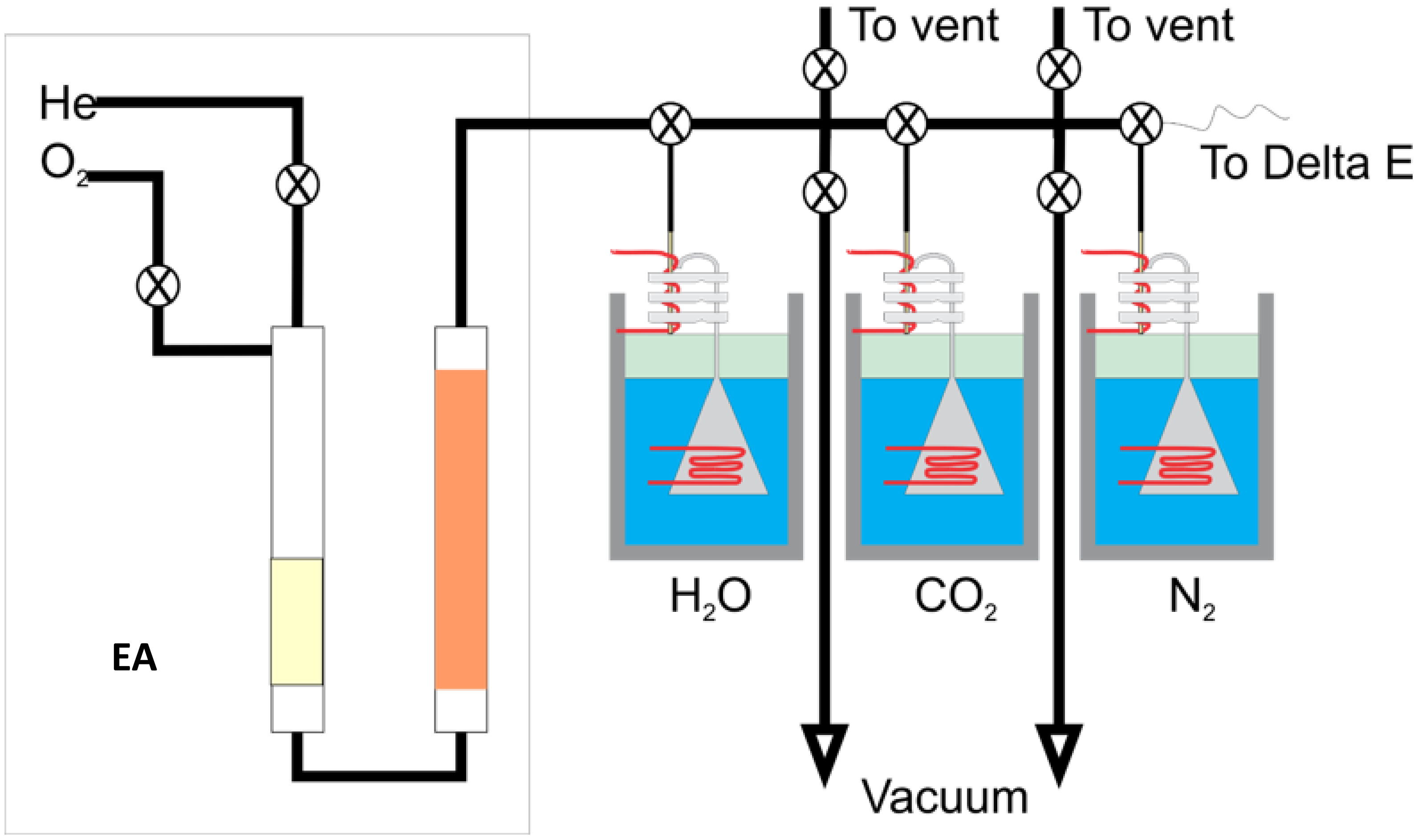
Trapping Box NC



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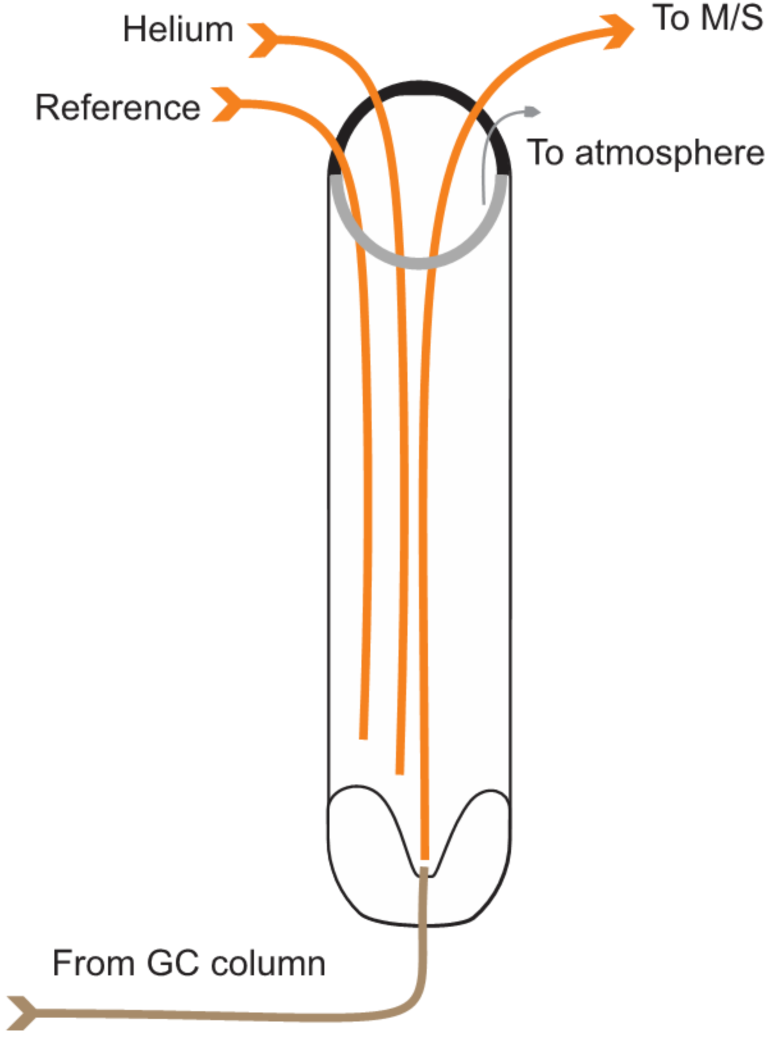

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The Invite

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June 2, 1994

Dear 3~:

Iso-Mass Scientific Inc. is organizing a two day Continuous Flow - Isotope Ratio Mass Spectrometer (CF-IRMS) workshop during the week of September 12, 1994. You are cordially invited to attend this workshop.

The CF-IRMS workshop is open to Canadian users of VG Isotech (Fisons Inst.), Europa Scientific and Finnigan-MAT instruments. It will be held at Agriculture Canada, Lethbridge Research Station where a VG Isotech OPTIMA (Carlo Erba NA1500) was recently installed with their latest reference gas injection hardware and software.

To ensure that you are informed on current technologies, factory representatives from VG Isotech, Europa Scientific and Finnigan-MAT will be present to give overviews on their methodologies and applications.

Attendants to the workshop will come from the Agriculture, Oceanography, Geological and Health Sciences fields. Information on hotel accommodations will be provided at a later date.

We hope that you will be able to take advantage of this unique opportunity of having the three major Isotope Ratio Mass Spectrometer representatives in one location at the same time, presenting their latest technologies.

If you or anyone in your department is interested in attending the workshop, please fill in the attached form and return by fax to my attention.

Sincerely yours,
Iso-Mass Scientific Inc.

Nik Binder
President

ESTABLISHED
1981

The CF-IRMS is born

First Canadian CF-IRMS Workshop

Lethbridge, Alberta — PROGRAM — *September 14 - 16, 1994*

Wednesday, September 14 (*Lethbridge Lodge Hotel*)

7:00 pm - 10:00 pm	Workshop Registration & Wine and Cheese Social	

Thursday, September 15 (*Agriculture Canada, Lethbridge Research Station*)

CHAIRMAN: Nik Binder

9:00 am - 9:15 am	Nik Binder	Welcome
9:15 am - 9:30 am	Nik Binder	Workshop Overview
9:30 am - 10:30 am	John Theobold	History of Carlo Erba Elemental Analysis and Product Overview
10:30 am - 11:00 am	COFFEE BREAK	
11:00 am - 11:30 pm	Nik Binder	New Methodologies in Stable Isotope Analysis
11:30 pm - 12:00 pm	John Morrison	Continuous Flow Sulphur Analysis on the OPTIMA
12:30 pm - 1:30 pm	LUNCH	
1:30 pm - 2:30 pm	Glenn Malkin	Fisons Instruments Isotopic Analysis Product Overview
2:30 pm - 3:30 pm	Dennis Leigh	TracerMAT CF-IRMS
3:30 pm - 3:45 pm	COFFEE BREAK	
3:45 pm - 4:30 pm	Dennis Leigh	TracerMAT CF-IRMS, continued
4:30 pm - 5:00 pm	Chuck Douthitt	Finnigan MAT Product Overview

Thursday, September 15 (*Lethbridge Lodge Hotel*)

6:30 pm - 7:00 pm	Cocktails
7:00 pm - 10:00 pm	Dinner

First Canadian CF-IRMS Workshop

PROGRAM, Continued

Friday, September 16 (*Agriculture Canada, Lethbridge Research Centre*)

CHAIRMAN: Nik Binder

9:00 am - 10:00 am	Michael Whiticar	Atmospheric Methane; Gasoline-Range Hydrocarbons; $\delta^{13}C$ of Cellulose/Sediments by EA-IRMS
10:00 am - 10:30 am	Nik Binder	Sample Handling Techniques for CF-IRMS
10:30 am - 10:45 am	COFFEE BREAK	
10:45 am - 12:30 pm	**Instrument Demos**	John Morrison - OPTIMA/Carlo Erba NA 1500 CF-IRMS John Theobold - Carlo Erba NA1500 Elemental Analyzer Dennis Leigh - TracerMAT /Carlo Erba CHN CF-IRMS
12:30 pm to 1:30 pm	LUNCH	
1:30 pm to 4:30 pm	**Instrument Demos**	Continuation

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CF-IRMS and ASITA cities

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Queens 2011: ASITA is born

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The MICAP Source

Changing gears now. The second part of this talk will focus on the MICAP OES from Radom Corp.

The MICAP is a Microwave Indicatively Coupled Atmospheric Plasma source for MS. This innovative nitrogen-based plasma source replaces the traditional argon generated plasma technology. This is only possible by Incorporating CERAWAVE™ technology which replaces the electric water-cooled coil found in most commercially available MS instruments today.

The plasma temperature is approximately 5,500°C which supplies energy to sufficiently ionize most elements on the periodic table. This compares with 6,500°C for an Ar plasma.

The N2 plasma removes some interferences on important isotopes allowing analysis at lower resolution leading to higher sensitivity,

RADOM INSTRUMENTS

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Cerawave

Produces highly efficient plasma energy coupling

The innovative ceramic waveguide design transfers microwave energy into the plasma. Minimal energy is wasted as heat during the transmission process. The ring is precisely engineered to match the impedance of the plasma, ensuring optimal energy transfer.

Eliminates need for water cooling

The elimination of water-cooled coils presents a paradigm shift in plasma science. The MICAP removes the dependency on external water chillers that flood a laboratory with excess heat and noise.

Provides superior sample matrix tolerance

Traditional microwave plasma methods often struggle with maintaining stable performance in the presence of heavy sample matrix levels. The patented Cerawave technology ensures maximum energy coupling for optimum stability in difficult samples.

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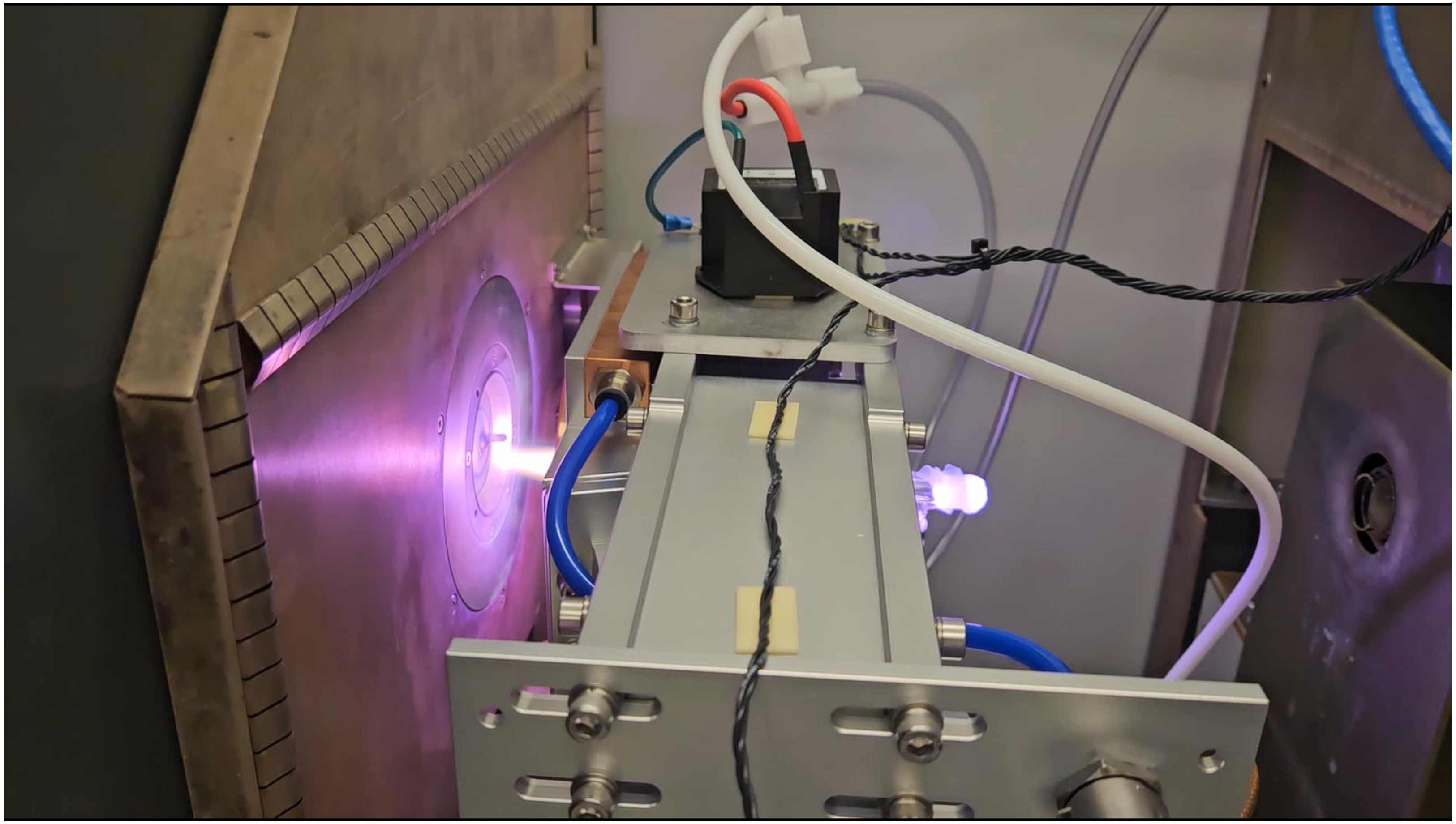
The Plasma



Applications, so far!

Calcium:

Advancing Ca isotopic analysis: Direct measurement of $^{44}Ca/^{40}Ca$ isotopic composition by MC-MICAP-MS with nitrogen plasma

Anika Retzmann *, Michael E. Wieser

University of Calgary – Department of Physics and Astronomy, 2500 University Dr. NW, Calgary, AB, T2N 1N4, Canada

Strontium:

Introducing MC-MICAP-MS: using a N_2-based plasma ion source for Sr isotope abundance ratio measurements

Anika Retzmann, *[a] Ashok Menon[b] and Michael E. Wieser[a]

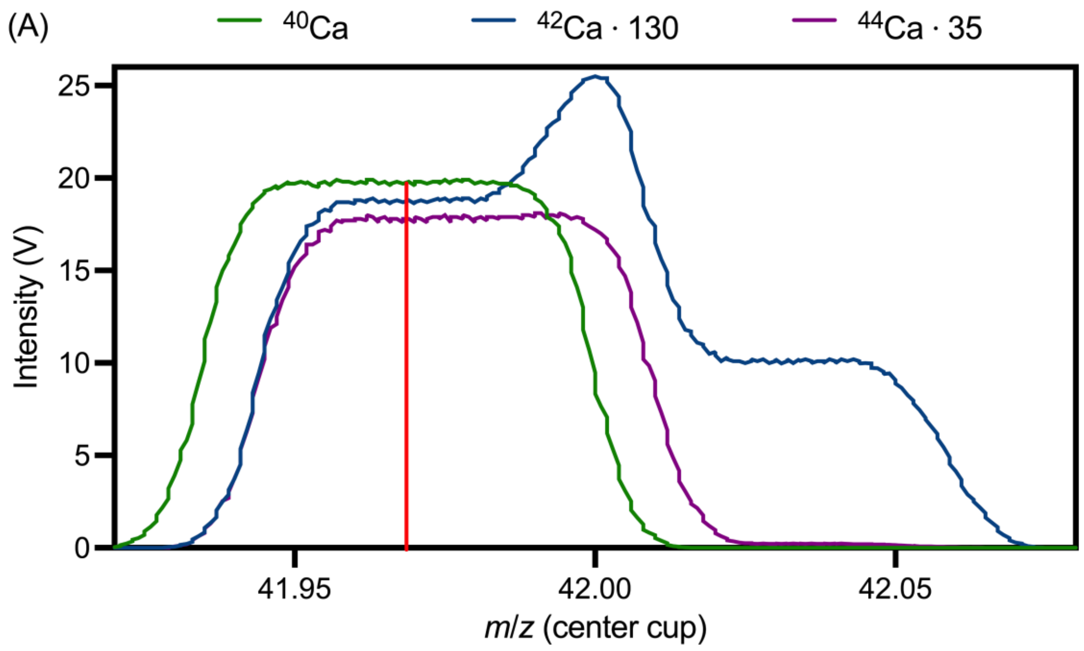
Iron:

Nitrogen plasma meets automated purification: Direct and reliable Fe isotopic analysis with MC-MICAP-MS

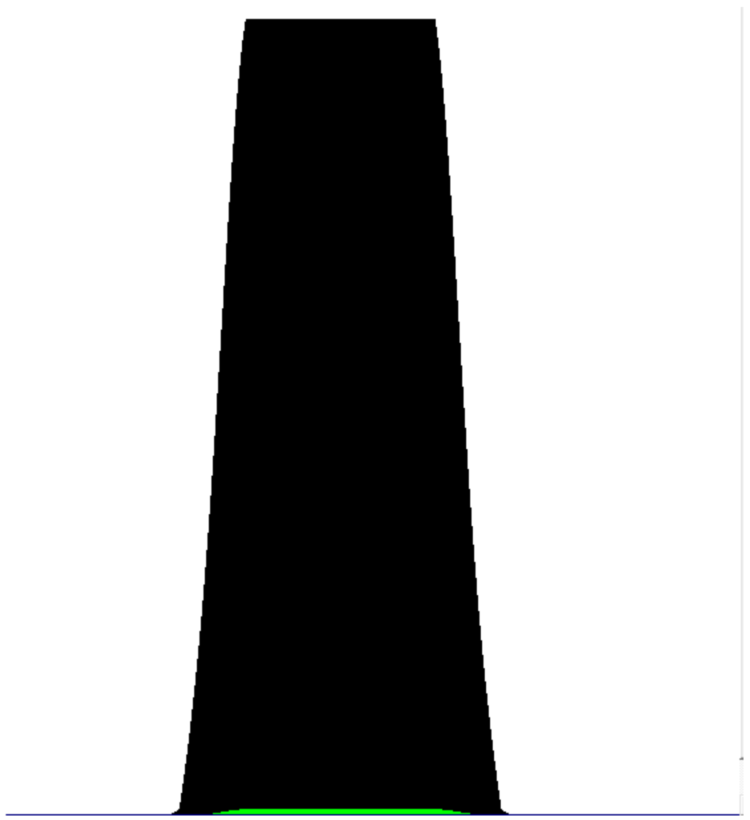
Anika Retzmann *, Hadassah Michelle Dubois Recinos, Michael E. Wieser

University of Calgary, Department of Physics and Astronomy, 2500 University Drive NW, Calgary, AB, T2N 1N4, Canada

Calcium



(A)
40Ca
42Ca · 130
44Ca · 35
Intensity (V)
25
20
15
10
5
0
41.95
42.00
42.05
m/z (center cup)



Strontium

Table 3 Conventional $^{87}Sr/^{86}Sr$ isotope abundance ratios as well as $\delta^{87}Sr/^{86}Sr_{SRM987}$ and $\delta^{88}Sr/^{86}Sr_{SRM987}$ values for duplicate digests of the geological and biological reference material. Errors were considered equal to the expanded uncertainty (U, $k = 2$)

Reference material	$R_{con}(^{87}Sr/^{86}Sr)$ value – this study	Published $R_{con}(^{87}Sr/^{86}Sr)$ value	$\delta^{87}Sr/^{86}Sr_{SRM987}$ value – this study (‰)	Published $\delta^{87}Sr/^{86}Sr_{SRM987}$ value (‰)	$\delta^{88}Sr/^{86}Sr_{SRM987}$ value – this study (‰)	Published $\delta^{88}Sr/^{86}Sr_{SRM987}$ value (‰)
IAPSO (seawater)	0.709168 ± 0.000022	0.709178 ± 0.000013 (ref. 55)[a]	−1.33 ± 0.14	−1.44 ± 0.10 (ref. 43)[c]	0.39 ± 0.12	0.36 ± 0.03 (ref. 56)
	0.709159 ± 0.000021		−1.35 ± 0.12		0.38 ± 0.12	0.38 ± 0.01 (ref. 55)[a]
BCR-2 (basalt)	0.705004 ± 0.000023	0.705012 ± 0.000014 (ref. 55)[a]	−7.22 ± 0.18	−7.38 ± 0.04 (ref. 57)[c]	0.31 ± 0.09	0.22 + 0.07 (ref. 56)
	0.705018 ± 0.000022		−7.22 ± 0.18		0.29 ± 0.13	0.25 ± 0.02 (ref. 58)
OU6 (slate)	0.729758 ± 0.000022	0.729778 ± 0.000047 (ref. 43)	27.60 ± 0.15	27.49 ± 0.06 (ref. 43)[c]	0.28 ± 0.12	—
	0.729777 ± 0.000013		27.51 ± 0.28	27.59 ± 0.19 (ref. 43)[d]		
NIST SRM 1400 (bone ash)	0.713123 ± 0.000014	0.713129 ± 0.000019 (ref. 56)	3.88 ± 0.13	3.93 ± 0.03 (ref. 56)	−0.30 ± 0.09	−0.32 ± 0.03 (ref. 56)
	0.713118 ± 0.000014		3.87 ± 0.13	3.87 ± 0.23 (ref. 59)	−0.28 ± 0.10	−0.33 ± 0.02 (ref. 58)
NIST SRM 1486 (bone meal)	0.709326 ± 0.000014	0.709309 ± 0.000011 (ref. 55)[b]	−1.50 ± 0.15	−1.37 ± 0.08 (ref. 60)[c]	−0.36 ± 0.10	−0.37 ± 0.02 (ref. 58)
	0.709322 ± 0.000013		−1.51 ± 0.14	−1.59 ± 0.22 (ref. 61 and 62)[d]	−0.38 ± 0.13	

[a] Reference values are obtained as median from the data provided in the GeoReM database on June 27th, 2025. [b] Reference values are obtained as median from the data provided in the GeoReM database on June 27th, 2025, excluding data from LA-MC-ICP-MS. [c] $\delta^{88}Sr/^{86}Sr_{SRM987}$ value was calculated based on reported $^{87}Sr/^{86}Sr$ isotope abundance ratios for samples and NIST SRM 987. [d] Reference value was calculated based on the mean of replicate analyses of the sample, carried out by the authors as part of the studies.

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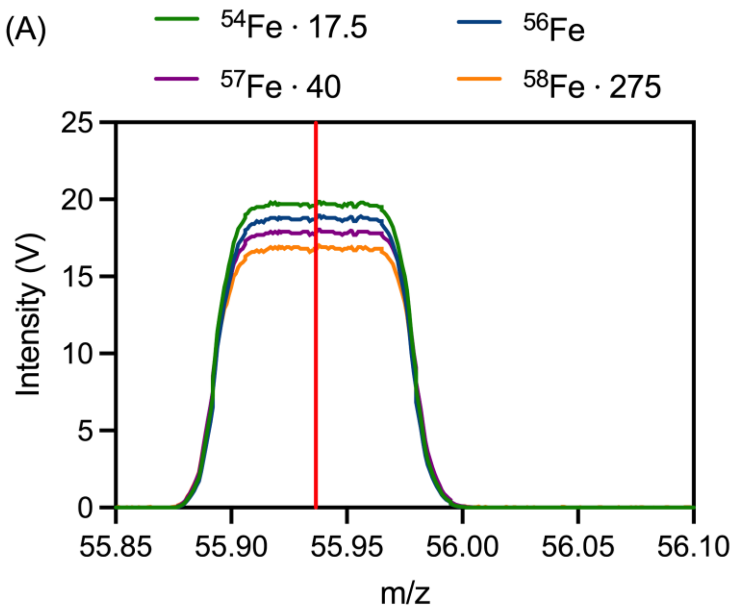
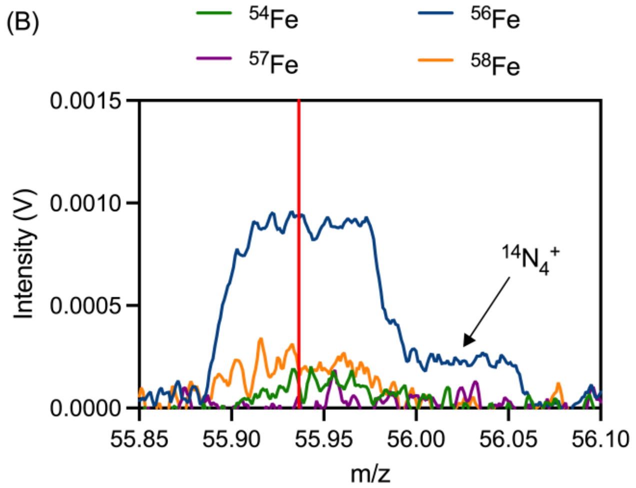
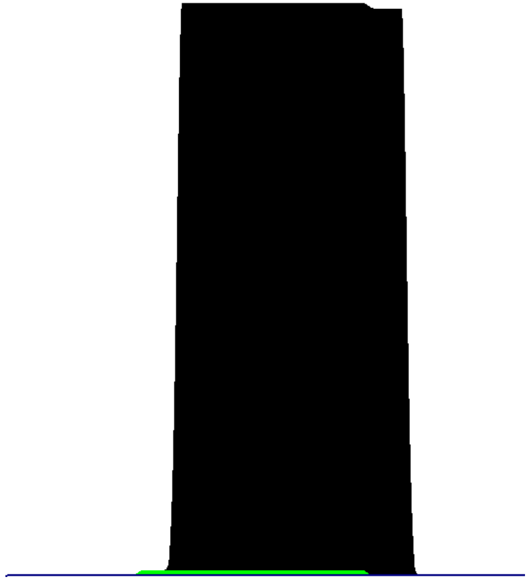
Iron







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MICAP conclusions

- MICAP is a viable alternative to traditional Ar plasma systems providing comparable results.
- The sensitivity of the MICAP system is roughly ½ of the argon plasma systems however there is an isotopic interference that requires the use of either higher resolution or a minor isotope, this is a minor concern.
- The MICAP is cheaper to operate than an Ar plasma.
- For the Neptune the swap between Ar and N2 plasmas is a user operation and can be performed in less than half a day.
- Only Isomass are factory training on Neptune, Element and MICAP

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Thank you for your attention!