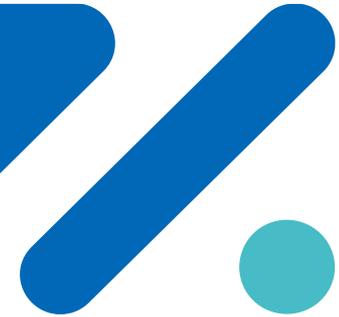


The Pioneer of Mass Spectrometry

ACE 3000 ICP-MS



2023. 12

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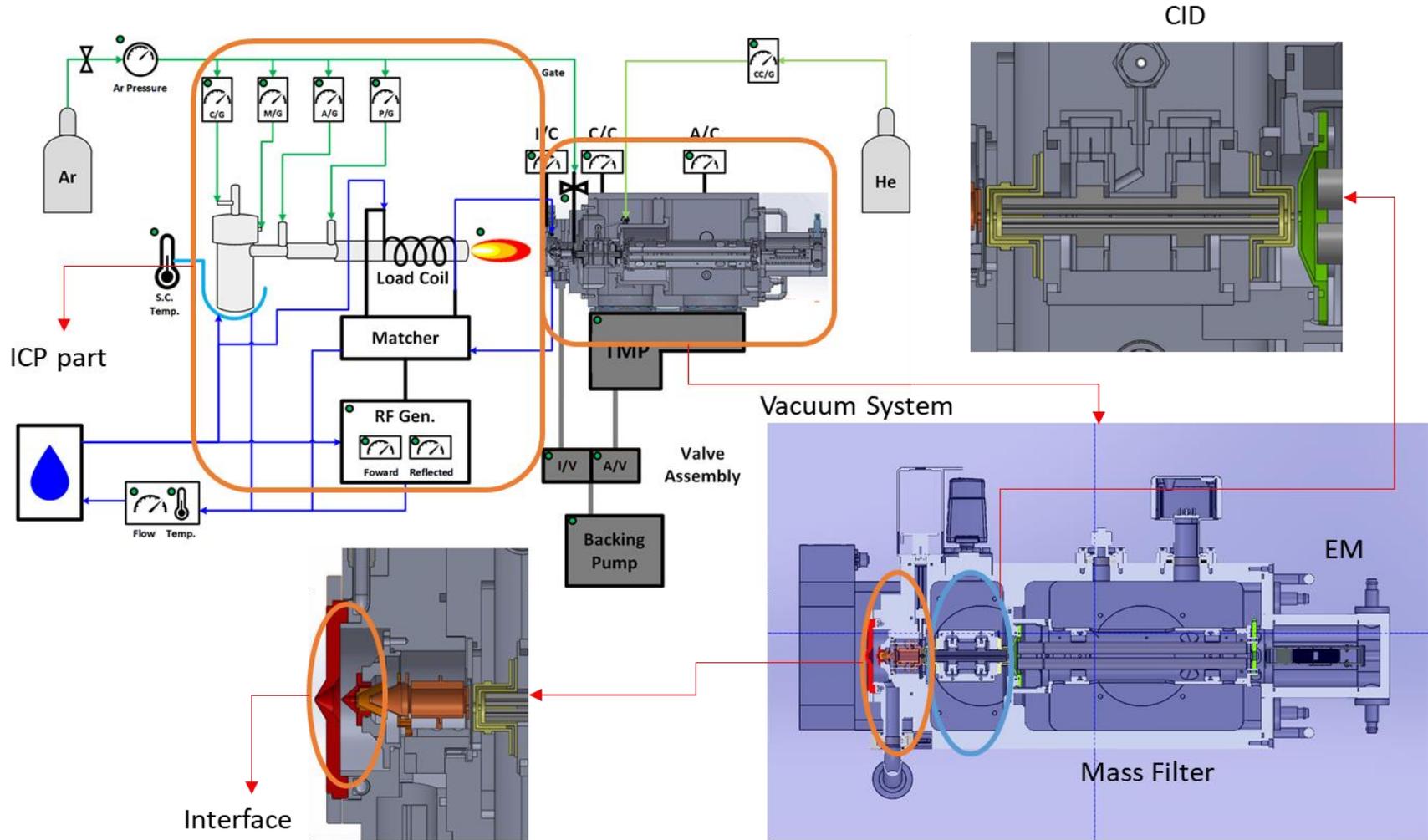
 YOUNG IN ACE

Contents



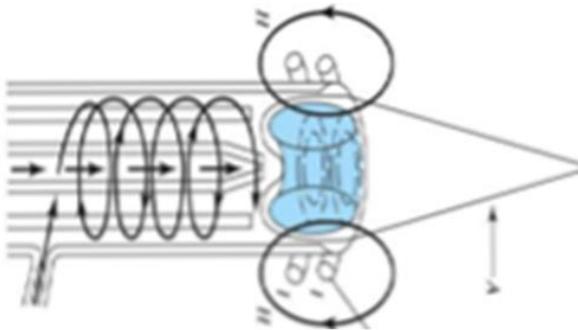
- 01 System Composition**
- 02 Main Features**
- 03 Analysis Performance**
- 04 Specification**
- 05 Software**

01 System Composition

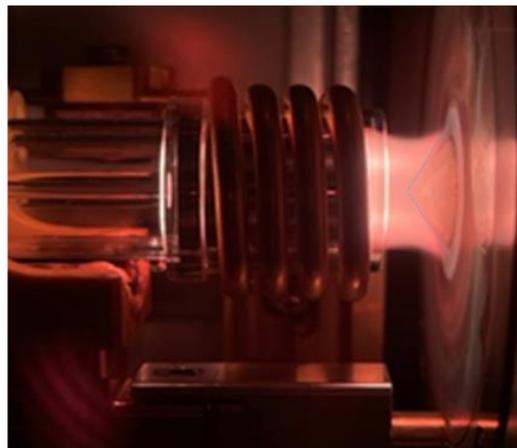
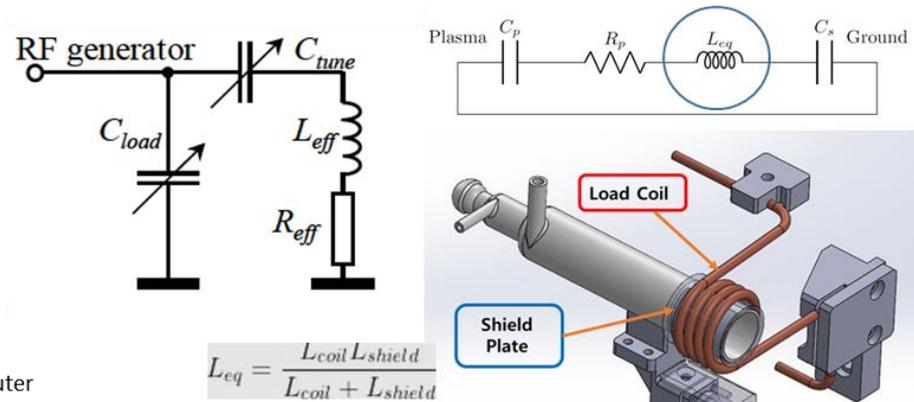
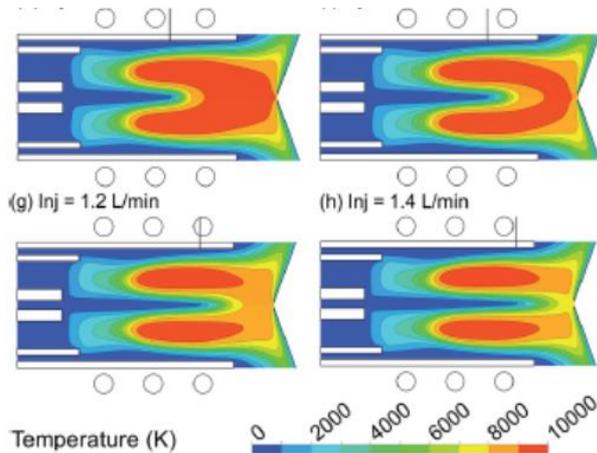


02 Main Features

ICP



A. Bogaerts and M. Aghaei, ICP-MS: insights through computer modeling, *J. Anal. At. Spectrom.*, 2017, **32**, 233



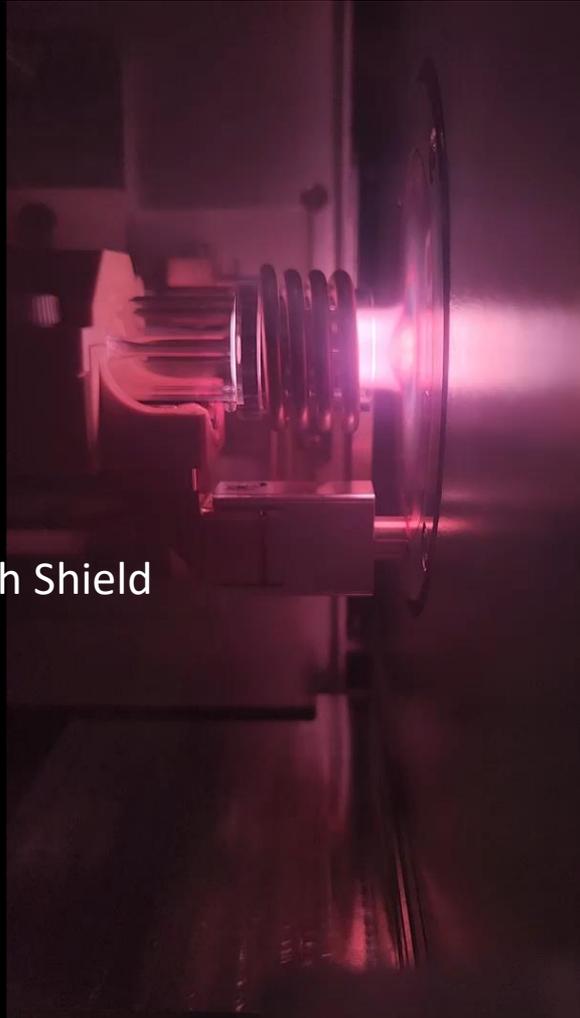
It is critical to reduce the plasma potential across the sheath :

shielding technology (or center tap)

ICP Video

: Comparison of Plasma
Stability

with Shield

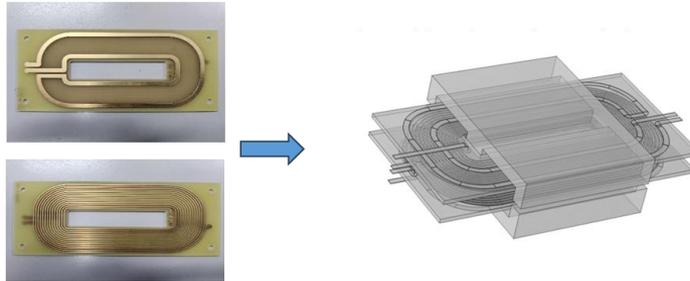


without Shield



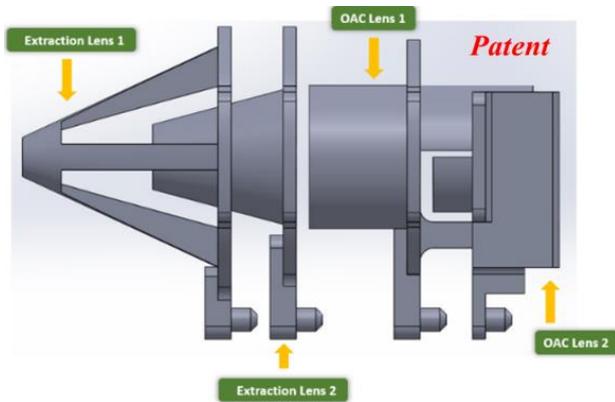
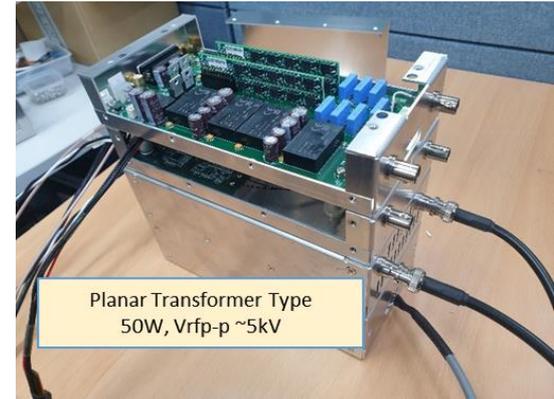
02 Main Features

Ion Lens & RF Power

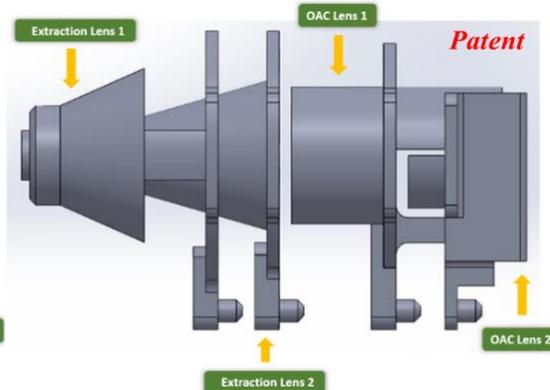


Planar Transformer for Quadrupole RF Power Supply

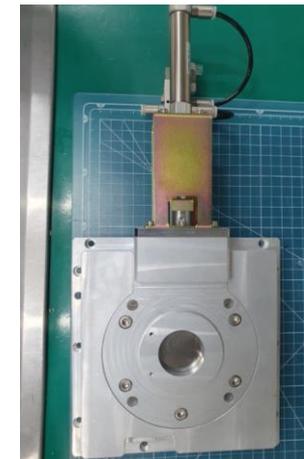
Patent



Sigma lens for semiconductor industry



Epsilon lens for environmental analysis



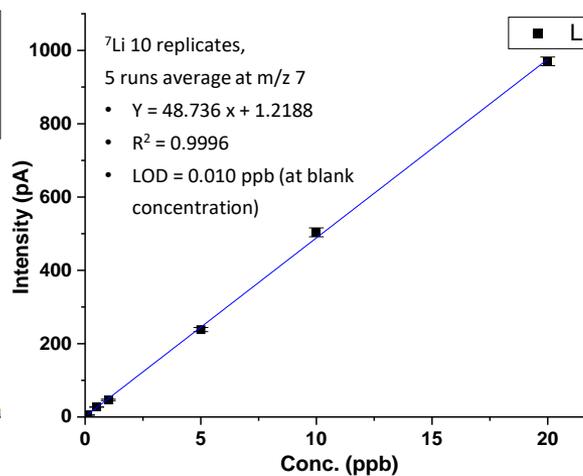
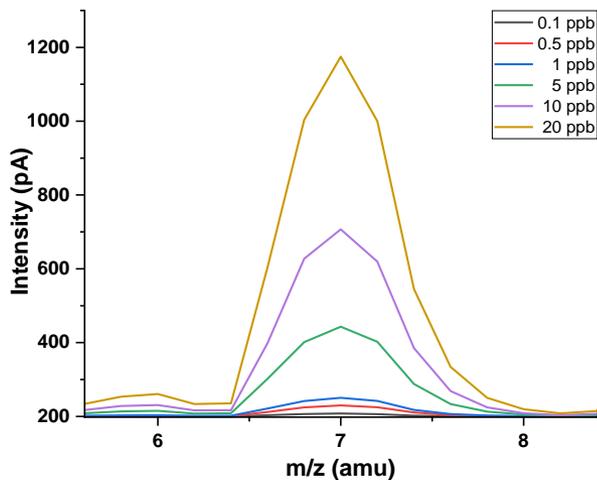
Gate Valve System

03 Analysis Performance

Li⁷

Average of 10 repetitions (pA)							Result	
Element	1	2	3	4	5			
Li	810.655	806.534	812.581	805.107	804.863	Average (blk rem, pA)		602.91
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)		6.89
7	801.763	793.238	800.748	793.508	794.710	Short term RSD (%)		1.14

Average of 10 repetitions (pA)							Result	
Element	1	2	3	4	5			
Li	743.709	749.935	727.546	734.058	762.298	Average (blk rem, pA)		532.67
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)		13.85
7	725.844	737.607	720.202	724.429	720.671	Long term RSD (%)		2.60



⁷Li 10 replicates, 5 runs average at m/z = 7

- $Y = 48.736x + 1.219$
- $R^2 = 0.9996$

• LOD = 0.010 ppb (at blank concentration)

The RSD (Relative Standard Deviation) for 5 runs at 10 ppb = 0.50 (%)

03 Analysis Performance

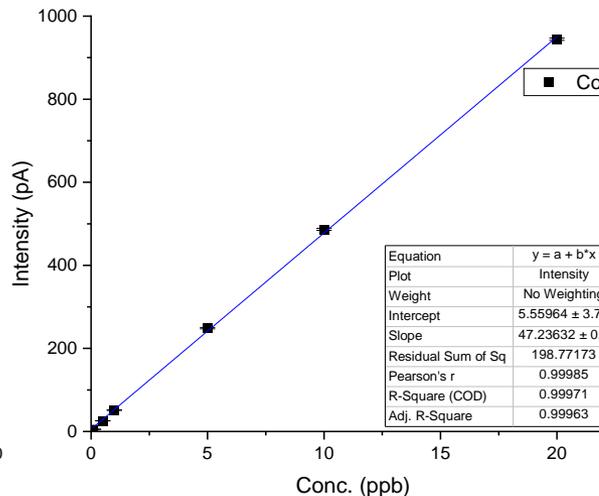
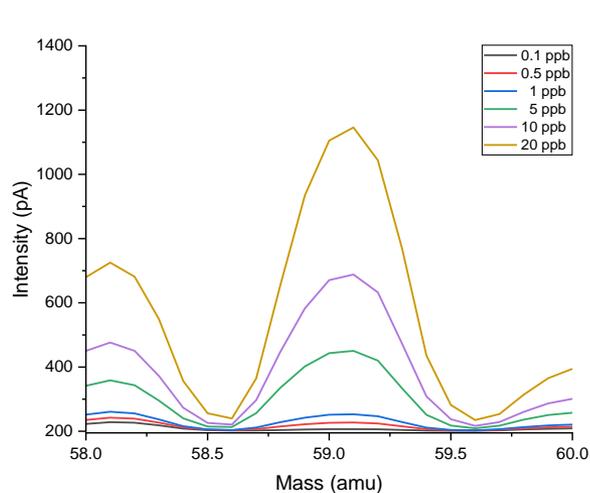
Co⁵⁹

10 Runs Averages (pA) - Using the last 10 out of 20 replicates for each of the 10 runs

Element	1	2	3	4	5	Result	
Co	719.89883	709.12461	707.26133	704.47422	705.03887	Average (blk rem, pA)	500.78
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	10.19
59.1	703.64102	700.64434	689.11992	694.44063	686.0332	Short term RSD (%)	2.04

10회 반복 평균 (pA) - 1번 당 20회 중 뒤 10회 사용

Element	1	2	3	4	5	Result	
Co	784.88418	782.44648	783.34805	796.20391	807.73555	Average (blk rem, pA)	602.92
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	17.06
58.9	821.26836	824.74043	819.43984	819.11562	814.63164	Long term RSD (%)	2.83



⁵⁹Co 10 replicates, 5 runs average at m/z 59

- Y = 47.236 x + 5.596
- R² = 0.9997

• LOD = 0.004 ppb (at blank concentration)

The RSD (Relative Standard Deviation) for 5 runs at 10 ppb = 0.50 (%)

03 Analysis Performance



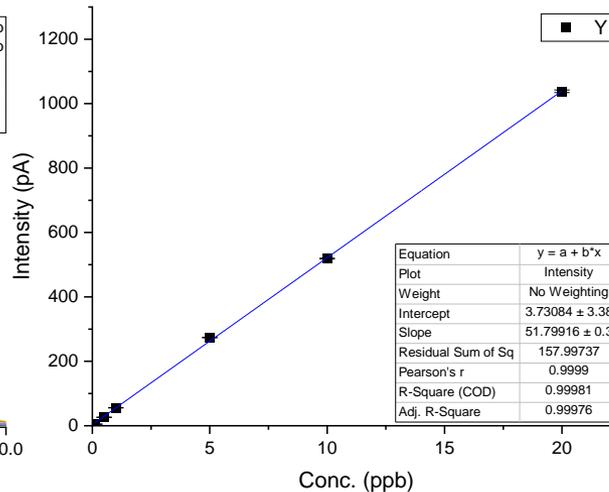
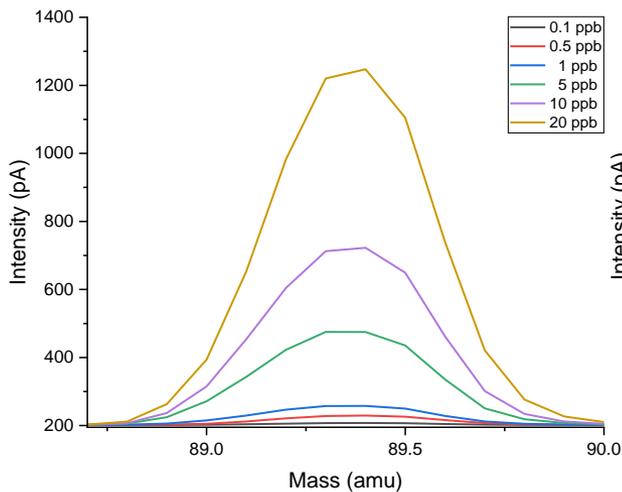
γ^{89}

10 Runs Averages (pA) - Using the last 10 out of 20 replicates for each of the 10 runs

Element	1	2	3	4	5	Result	
Y	753.60293	741.19238	740.82969	745.30547	739.74414	Average (blk rem, pA)	538.14
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	5.21
89.4	738.4998	739.42891	736.35566	735.56387	738.71133	Short term RSD (%)	0.97

10 Runs Averages (pA) - Using the last 10 out of 20 replicates for each of the 10 runs

Element	1	2	3	4	5	Result	
Y	721.71	735.74	754.23	755.60	740.53	Average (blk rem, pA)	544.96
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	11.74
89.5	752.98	749.21	739.33	753.42	760.03	Long term RSD (%)	2.15



^{89}Y 10 replicates, 5 runs average at m/z 89.4

- $Y = 51.799 x + 3.731$
- $R^2 = 0.9998$
- LOD = 0.007 ppb (at blank concentration)

The RSD (Relative Standard Deviation) for 5 runs at 10 ppb = 0.26 (%)

03 Analysis Performance

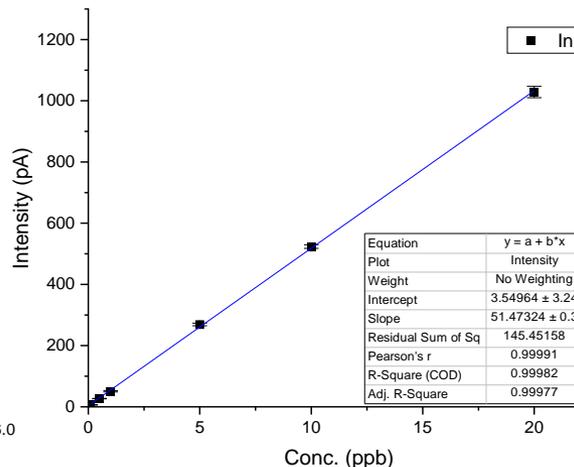
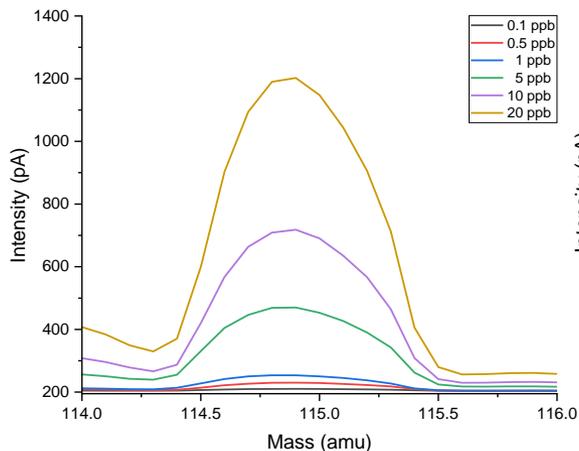
In¹¹⁵

10 Runs Averages (pA) - Using the last 10 out of 20 replicates for each of the 10 runs

Element	1	2	3	4	5	Result	
In	744.21	749.04	733.29	732.36	736.65	Average (blk rem, pA)	532.91
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	6.95
115	735.96	728.51	735.41	726.43	730.07	Short term RSD (%)	1.30

10 Runs Averages (pA) - Using the last 10 out of 20 replicates for each of the 10 runs

Element	1	2	3	4	5	Result	
Y	741.04	720.91	714.80	747.03	745.23	Average (blk rem, pA)	537.05
amu	6	7	8	9	10	Std. Dev. (blk rem, pA)	12.63
115.1	734.26	746.00	752.12	748.31	748.59	Long term RSD (%)	2.35



¹¹⁵In 10 replicates, 5 runs average at m/z 115

- $Y = 51.473 x + 3.5496$
- $R^2 = 0.9998$
- **LOD = 0.008 ppb (at blank concentration)**

The RSD (Relative Standard Deviation) for 5 runs at 10 ppb = 1.15 (%)



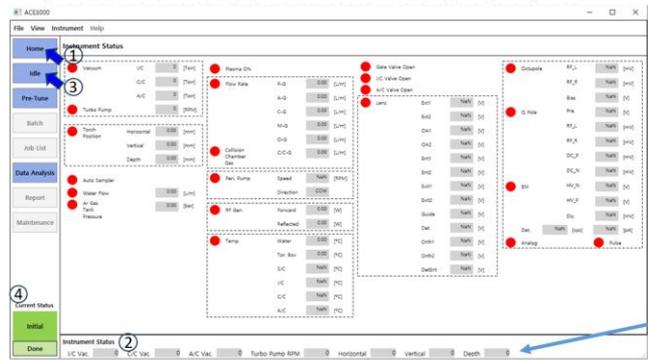
Specification	Mass range	5 ~ 250 amu
	Mass resolution	> 0.05 amu
	Dynamic range	10 ¹⁰ Analog/Pulse dual mode
	Sensitivity	Low mass : 50 Mcps/ppm or better Mid mass : 120 Mcps/ppm or better High mass : 30 Mcps/ppm or better
	Detection limit	Low mass: 5 ppt or better Mid mass : 5 ppt or better High Mass : 5 ppt or better
	Stability	< 2.0 (%RSD) in 10 mins
Interference removing technology		Collision chamber (H/He gas)

05 Software

ACE3000 GUI



ACE3000 ICP-MS Software Program: Home, Operation Mode



1. Click the Home button to check the information of each part of the equipment at once.

2. You can fix up to 7 desired parameters at the bottom for monitoring.

3. You can easily change the status of the equipment by pressing the Operation Mode button located below the Home button.



4. During a status change, you can determine the state of the equipment from the color and text of the Current Status. Additionally, the progress can be monitored via the Progress bar at the bottom.

Leverage the convenience of data analysis provided by the ACE3000 software



1. You can choose files or folder for data analysis.

2. The files are sorted in a specified order, and you can select the analysis method in the 'Calibration Method'.

3. To check for errors, press 'Validate' and if no warnings appear, press 'Data Analysis Start' to display the desired information. The data is processed immediately.

4. In the 'spectrum' window, you can observe the mass peaks of the selected file as well as the signal fluctuations of the internal standard.

5. In the 'calibration curve' window, you can view graphs, equations, R², LOD, BEC, and other information for each analyzed element.

6. If desired, you can double-click to zoom in on data for a specific element.

Thank you

For more information, please contact :

Jaewook Kang

jwkang@younginace.com

031-340-3128

010-6218-7224