

F. ...
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An overview of inductively coupled plasma mass spectrometry (ICP-MS)

Introduction

ICP-MS (ICP-MS) is a powerful analytical technique for the determination of trace elements in a wide range of samples. It combines the high sensitivity and multi-element capability of mass spectrometry with the high temperature and high flow rate of inductively coupled plasma. The technique is widely used in environmental, clinical, and industrial laboratories for the determination of trace metals and metalloids. The introduction of ICP-MS has revolutionized the field of trace element analysis, providing a significant improvement in detection limits and precision over traditional methods. The technique is particularly well-suited for the analysis of trace metals in complex matrices, such as environmental samples, biological fluids, and industrial effluents. The high temperature of the plasma (up to 10,000 K) ensures that most elements are fully ionized, allowing for efficient transport into the interface region and subsequent detection. The use of a quadrupole mass filter and a detector system enables the simultaneous determination of multiple elements, making ICP-MS a highly efficient and versatile analytical tool.

Key features

ICP-MS offers several key features that make it a preferred method for trace element analysis. These include high sensitivity, multi-element capability, and the ability to analyze a wide range of sample types. The technique is also characterized by its high precision and accuracy, making it suitable for the analysis of trace metals in complex matrices. The use of a quadrupole mass filter and a detector system enables the simultaneous determination of multiple elements, making ICP-MS a highly efficient and versatile analytical tool.

(C d.)

Instrument	Frequency	Amplitude	Phase
AA	$L^{-1} \mu L^{-1}$	$L^{-1} \mu L^{-1}$	$L^{-1} \mu L^{-1}$
F	μL^{-1}	μL^{-1}	μL^{-1}

* $L^{-1} \mu L^{-1} = 10^{12}$, $L^{-1} \mu L^{-1} = 10^9$, $\mu L^{-1} \mu L^{-1} = 10^6$.

Instrument	Frequency	Amplitude	Phase
F	μL^{-1}	μL^{-1}	μL^{-1}

Instrument	Frequency	Amplitude	Phase
(a) Previous instruments			
() I	C	I	IC
()	C	I	
() & ()	F H	I	
() C	C	I	
(b) Servicing			
() A	A	I	E
() A	A	I	
() E	A	I	A
(c) Technical support			
() A	A	I	
()			
()		I	
()		I	A
() &			

(C 4)

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I 1		
1. High frequency (HF) generators	<p>27 H</p>	A.
(a)		HF
(b)	A.	I

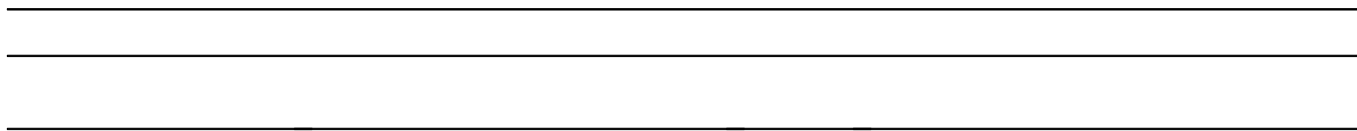
(C 4)

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F. f.	b f.	I. f.
(e), H	f	A, H
5. Interface		
(a) C	b	
(b) E		
(c) C		
(d) I		
(e) C	A	
6. Vacuum system		
7. Ion detector		
(a) f	b	C

(C 4)

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F. f I f f

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F. f I f f

8. Instrument control and monitoring

(a) I f f
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(C d)

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F. f	b f	I f
(d) f

(C d.)

