

# 水中硼元素3种检测方法的比较

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**摘要** 对水中硼的3种检测方法进行比较分析。甲亚胺-H分光光度法具有较高的精密度和准确度，可作为检测水中硼含量的仲裁方法；姜黄素分光光度法是测定水中硼含量的经典方法，但操作繁琐，稳定性不高；电感耦合等离子体质谱法(ICP-MS)简单易行、测定范围广，但设备昂贵，较难普及，可作为快速测定方法。

**关键词** 硼测定；姜黄素分光光度法；甲亚胺-H分光光度法；ICP-MS法

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## Comparison of three detection methods of boron in water

QIN Ying

College of Water Conservancy and Environmental Engineering Zhengzhou University Zhengzhou Henan 450001 China

**Abstract** The three detection methods of boron in water are compared and analyzed. Azomethine-H spectrophotometry has higher precision and accuracy, and can be used as the arbitration method to detect the content of boron in water. Curcumin spectrophotometry is the classic method for determination of boron content in water, but the operation is tedious and the stability is poor. ICP-MS is simple, wide measuring range, but the expensive equipment is difficult to popularize, can be used as a rapid determination method.

**Key words** determination of boron curcumin spectrophotometry azomethine-H spectrophotometry inductively coupled plasma mass spectrometry

3<sup>1</sup>

4-5 540 nm

2 -H

-H

2 GB/T5750.5 2006 6

H -H -

420 nm

7-8

3 ICP-MS

15 min

pH 5

249 nm

2 结果与分析

2.1 标准曲线

-H

1

HJ/T 49 1999 3

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[作者简介] 1988

E-mail qinying 2008 good@163.com

1      2

$\rho_B$     0 ~ 25  $\mu\text{g/mL}$

$y=0.6070x+0.0030$                        $R^2=0.9995$

-H     $y=0.0697x-0.0026$

$R^2=0.9999$

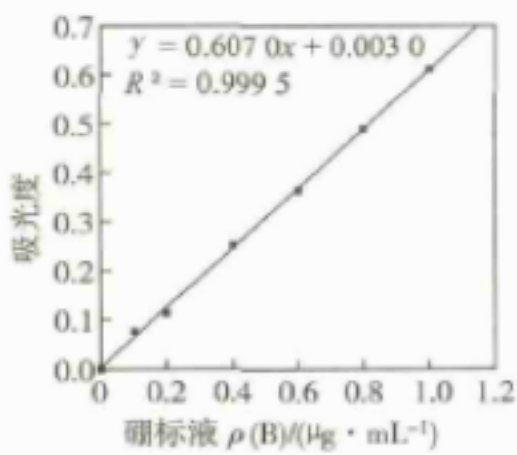


图1 姜黄素分光光度法标准曲线

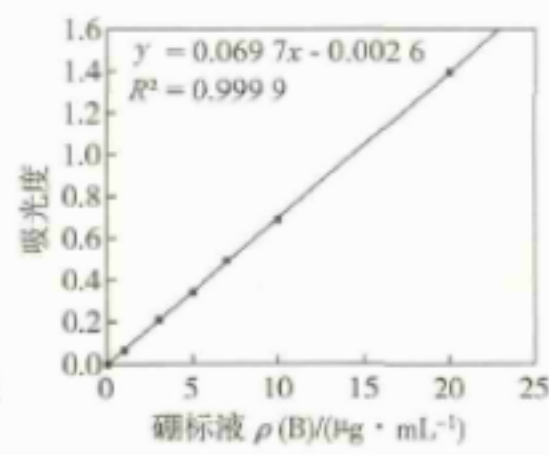


图2 甲亚胺-H分光光度法标准曲线

2.2 精密度分析

3                      6

1      1                      -H

ICP-MS                      ICP-MS

表1 3种方法的精密度结果比较

	$\rho_B / \text{mg}\cdot\text{L}^{-1}$	$\rho_B / \text{mg}\cdot\text{L}^{-1}$	RSD/%
-H	0.2	0.19	4.64
	0.5	0.48	5.41
	0.8	0.77	2.05
	0.4	0.39	3.26
	1.0	0.97	1.68
ICP-MS	1.6	1.45	6.58
	0.1	0.11	9.25
	1.0	1.08	4.86
	4.0	4.09	2.71

2.3 准确度分析

3                      2

-H                      ICP-MS

85.31% ~ 106.72%    95.42% ~

105.07%    89.66% ~ 106.45%    3

-H

表2 3种方法用不同水样对不同硼标液  $\rho(B)$  的回收结果

	$\rho_B / \text{mg}\cdot\text{L}^{-1}$	/%	$\rho_B / \text{mg}\cdot\text{L}^{-1}$	/%
-H	0.6	85.31	0.4	103.08
	0.7	87.52	1.0	97.82
	0.8	106.72	1.6	95.59
	0.6	95.42	0.4	105.07
	0.7	97.54	1.0	104.02
ICP-MS	0.8	103.24	1.6	98.69
	5.0	105.72	5.0	101.91
	20.0	93.29	20.0	104.42
	40.0	89.66	40.0	106.45

3 结论

3

H

95.42%~105.07%

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