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国家市场监督管理总局

国家标准化管理委员会

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**贵金属合金电镀废水化学分析方法**

**第2部分：锌、锰、铬、镉、铅、铁、铝、镍、铜、铍含量的测定**

**电感耦合等离子体原子发射光谱法**

Methods for chemical analysis of precious metals alloys electroplating wastewater—

Part 2：Determination of Zn、Mn、Cr、Cd、Pb、

Fe、Al、Ni、Cu、Be contents—

Inductively coupled plasma-atomic emission spectrometry

**(送审稿)**

GB/T ××××—××××

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前 言

本文件按照GB/T 1.1-2020《标准化工作导则第1 部分：标准化文件的结构和起草规则》的规定起草。

本文件是GB/T ××××《贵金属合金电镀废水化学分析方法》的第2部分：

——第1部分：金、银、铂、钯、铱含量的测定 电感耦合等离子体原子发射光谱法；

——第2部分：锌、锰、铬、镉、铅、铁、铝、镍、铜、铍含量的测定 电感耦合等离子体原子发射光谱法；

——第3部分：硫酸盐含量的测定 硫酸钡重量法；

——第4部分：氯离子含量的测定 氯化银浊度法。

请注意本文件的某些内容可能涉及专利。本文件的发布机构不承担识别专利的责任。

本文件由中国有色金属工业协会提出。

本文件由全国有色金属标准化技术委员会（SAC/TC 243）归口。

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**贵金属合金电镀废水化学分析方法**

**第2部分：锌、锰、铬、镉、铅、铁、铝、镍、铜、铍含量的测定**

**电感耦合等离子体光谱法**

**警示——使用本文件的人员应当有正规实验室工作的实践经验。本文件并未指出所有可能的安全问题。使用者有责任采取适当的安全和健康措施，并保证符合国家有关法规规定的条件。**

1 范围

本文件描述了采用电感耦合等离子体原子发射光谱法测定贵金属合金电镀及其生产加工产生的废水（如镀件漂洗水、废槽液、设备冷却水和冲洗首饰、地面水等混合水的贵金属废水）中锌、锰、铬、镉、铅、铁、铝、镍、铜、铍含量的方法。

本文件适用于以贵金属合金电镀及其生产加工产生的废水（如镀件漂洗水、废槽液、设备冷却水和冲洗首饰、地面水等混合水的贵金属废水）中锌、锰、铬、镉、铅、铁、铝、镍、铜、铍的质量浓度的测定方法。各元素测定范围见表 1 。

表1 元素及测定范围

|  |  |
| --- | --- |
| 元素 | 测定范围  mg/mL |
| Al、Be、Cd、Cr、Cu、  Fe、Mn、Ni、Pb、Zn | 0.0001~0.1000 |

2 规范性引用文件

下列文件中的内容通过文中的规范性引用而构成本文件必不可少的条款。其中，注日期的引用文件，仅该日期对应的版本适用于本文件；不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

GB/T 8170 数值修约规则与极限数值的表示和判定

3 术语和定义

本文件没有需要界定的术语和定义。

4 原理

试样经高氯酸消解有机物，经王水溶解后，在盐酸、硝酸介质中，使用电感耦合等离子体光谱仪测定贵金属合金电镀废水中锌、锰、铬、镉、铅、铁、铝、镍、铜、铍的含量。

5 试剂或材料

除非另有说明，在分析中仅使用确认为分析纯的试剂和实验室二级水。

5.1高氯酸（ρ=1.76 g/mL）。

5.2 硝酸（ρ=1.43 g/mL）。

5.3 盐酸（ρ=1.19 g/mL）。

5.4 过氧化氢（ρ=1.11 g/mL）

5.5 硝酸（1+1）。

5.6 盐酸（1+1）。

5.7 混合酸：1体积硝酸（5.2）和3体积盐酸（5.3）和4体积水混匀，用时现配。

5.8 锌标准贮存溶液：称取 0.100 0 g 金属锌（*w*Zn≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 锌。

5.9 锰标准贮存溶液：称取 0.100 0 g 金属锰（*w*Mn≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 锰。5.10 铬标准贮存溶液：称取 0.100 0 g 金属铬（*w*Cr≥99.99%）,置于 100 mL 聚四氟乙烯烧杯中，加入1 mL 硝酸（5.5），5 mL 盐酸（5.6），盖上聚四氟乙烯杯盖，低温加热溶解完全，移入 100 mL 塑料容量瓶中，加入 10 mL 盐酸（5.6），用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 铬。

5.11 镉标准贮存溶液：称取 0.100 0 g 金属镉（*w*Cd≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，挥发驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 镉。5.12 铅标准贮存溶液：称取 0.100 0 g 金属铅（*w*Pb≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 铅。5.13 铁标准贮存溶液：称取 0.100 0 g 金属铁（*w*Fe≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 铁。5.14 铝标准贮存溶液：称取 0.100 0 g 金属铝（*w*Al≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 盐酸（5.6），低温加热溶解，冷却至室温，用盐酸溶液（5.6）移入 100 mL 塑料容量瓶中并稀释至刻度，混匀。此溶液 1 mL 含 1 mg 铝。

5.15 镍标准贮存溶液：称取 0.100 0 g 金属镍（*w*Ni≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加 入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶 中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 镍。

5.16 铜标准贮存溶液：称取 0.100 0 g 金属铜（*w*Cu≥99.99%），置于 100 mL 聚四氟乙烯烧杯中，加入 20 mL 硝酸（5.5），低温加热溶解，驱除氮的氧化物，冷却至室温，移入 100 mL 塑料容量瓶中，用水稀释至刻度，混匀。此溶液 1 mL 含 1 mg 铜。

5.17 铍标准贮存溶液：称取 0.100 0 g金属铍（*w*Be≥99.95%），置于 100 mL 聚四氟乙烯烧杯中，加入20mL盐酸（5.6），低温加热至溶解完全，冷却，移入100mL容量瓶中，以水稀释至刻度，混匀。此溶液1mL含1mg铍。

5.18 混合标准溶液：在200 mL 塑料容量瓶中先加入 30 mL 盐酸（5.3）后，分别移取 2.00 mL 标准贮存溶液（5.8～5.17），用水稀释至刻度，混匀。此溶液 1 mL 含 10 µg 锌、锰、铬、镉、铅、铁、铝、镍、铜、铍。

5.19 氩气（体积分数≥99.99%）

6 仪器设备

电感耦合等离子体原子发射光谱仪。在仪器最佳工作条件下，凡能达到下列指标均可使用：

a) 光源：氩气等离子体光源，发射器最大输出功率不小于1.3KW。

b) 分辨率：200nm左右时的光学分辨率优于0.010nm；400nm左右时的光学分辨率优于0.020nm。

c) 仪器稳定性：仪器1h内稳定性（RSD）不大于2.0%

d) 推荐的电感耦合等离子体原子发射光谱仪工作条件参数见附录 B。

7 样品

样品储存于塑料瓶中备用。

8 试验步骤

8.1 试料

按表2所示准确移取试料。

表2 溶液分取表

|  |  |  |
| --- | --- | --- |
| 元素 | 浓度范围  mg/mL | 取样体积  mL |
| Al、Be、Cd、Cr、Cu、Fe、Mn、Ni、Pb、Zn | 0.0001～0.0050 | 100 |
| Al、Be、Cd、Cr、Cu、Fe、Mn、Ni、Pb、Zn | 0.0050～0.0500 | 10 |
| Al、Be、Cd、Cr、Cu、Fe、Mn、Ni、Pb、Zn | 0.0500～0.1000 | 5 |

8.2 平行试验

独立进行两次测定，取其平均值。

8.3 空白试验

随同试料做空白试验。

8.4 测定

8.4.1 按表2所示移取样品至200mL聚四氟乙烯烧杯中，加入5mL高氯酸（5.1），盖上表皿，加热至冒高氯酸烟，继续加热至湿盐状，取下稍冷，加入30mL水，再加入15mL盐酸（5.3），加入10mL混合酸（5.6），加热至盐类完全溶解，将试液取下稍冷后转入100mL容量瓶，加入适量水混匀，待完全冷却后，用水稀释至刻度，混匀。

8.4.2于电感耦合等离子体原子发射光谱仪上，在选定的仪器工作条件下，测量试液及随同试料空白中被测元素的谱线强度，采用多谱线拟合法等多种校正方法处理出现的谱线干扰，扣除空白值，从工作曲线上确定被测元素的质量浓度。

8.5 标准曲线

8.5.1 标准工作溶液的配制

分别于 8 个 100 mL 塑料容量瓶中，加入10mL混合酸（5.6），再加入混合标准溶液（5.12）0.00mL、0.40mL、1.00 mL、2.00 mL、5.00 mL、10.00 mL 、20.00 mL、50.00 mL，以盐酸（5.5）稀释至刻度，混匀。标准溶液质量浓度见表3。

**表3标准工作溶液质量浓度**

单位：mg/L

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 元素 | STD-1 | STD-2 | STD-3 | STD-4 | STD-5 | STD-6 | STD-7 | STD-8 |
| Au、Ag、Pt、Pd、Ir | 0.00 | 0.04 | 0.10 | 0.20 | 0.50 | 1.00 | 2.00 | 5.00 |

8.5.2 工作曲线绘制

与试液测定相同条件下，测量系列标准工作溶液中各元素的强度，以被测元素的浓度为横坐标、信号强度为纵坐标，由仪器自动绘制工作曲线。

9 实验数据处理

被测元素的含量以质量浓度计，按公式（1）计算，数值以毫克每毫升表示：

....................（1）

式中：

——试料溶液中被测元素的浓度，单位为毫克每升，mg/L；

——试料溶液定容体积，单位为毫升，mL；

——空白溶液中被测元素的浓度，单位为毫克每升，mg/L；

——空白溶液定容体积，单位为毫升，mL；

——样品取样体积，单位为毫升，mL；

计算结果保留至小数点后四位。

10精密度

10.1重复性

在重复性条件下获得的两次独立测试结果的测定值，在以下给出的平均值范围内，这两个测试结果的绝对值不超过重复性限（r），超过重复性限（r）的情况不超过 5%，重复性限（r）按表 4 数据采用线性内插法求得。

表 4 重复性限(r)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 锌质量浓度 mg/mL | 0.0004 | 0.0053 | 0.0207 | 0.0234 | 0.0522 | 0.1012 |
| 重复性限（r) mg/mL | 0.0002 | 0.0005 | 0.0008 | 0.0006 | 0.0018 | 0.0035 |
| 锰质量浓度 mg/mL | 0.0002 | 0.0001 | 0.0100 | 0.0201 | 0.0506 | 0.0973 |
| 重复性限（r) mg/mL | 0.0000 | 0.0004 | 0.0007 | 0.0009 | 0.0010 | 0.0021 |
| 铬质量浓度 mg/mL | 0.0002 | 0.0050 | 0.0102 | 0.0207 | 0.0511 | 0.0971 |
| 重复性限（r) mg/mL | 0.0001 | 0.0003 | 0.0007 | 0.0007 | 0.0017 | 0.0026 |
| 镉质量浓度 mg/mL | 0.0001 | 0.0051 | 0.0101 | 0.0202 | 0.0503 | 0.0998 |
| 重复性限（r) mg/mL | 0.0001 | 0.0003 | 0.0006 | 0.0013 | 0.0012 | 0.0014 |
| 铅质量浓度 mg/mL | 0.0004 | 0.0051 | 0.0102 | 0.0201 | 0.0501 | 0.0989 |
| 重复性限（r) mg/mL | 0.0002 | 0.0005 | 0.0008 | 0.0013 | 0.0014 | 0.0024 |
| 铁质量浓度 mg/mL | 0.0002 | 0.0052 | 0.0110 | 0.0241 | 0.0502 | 0.1034 |
| 重复性限（r) mg/mL | 0.0001 | 0.0004 | 0.0008 | 0.0010 | 0.0018 | 0.0028 |
| 铝质量浓度 mg/mL | 0.0003 | 0.0051 | 0.0105 | 0.0217 | 0.0505 | 0.1027 |
| 重复性限（r) mg/mL | 0.0001 | 0.0004 | 0.0008 | 0.0013 | 0.0015 | 0.0050 |
| 镍质量浓度 mg/mL | 0.0009 | 0.0053 | 0.0146 | 0.0222 | 0.0499 | 0.0985 |
| 重复性限（r) mg/mL | 0.0002 | 0.0005 | 0.0039 | 0.0008 | 0.0013 | 0.0019 |
| 铜质量浓度 mg/mL | 0.0001 | 0.0050 | 0.0470 | 0.0497 | 0.0754 | 0.1016 |
| 重复性限（r) mg/mL | 0.0001 | 0.0004 | 0.0022 | 0.0011 | 0.0009 | 0.0018 |
| 铍质量浓度 mg/mL | 0.0001 | 0.0050 | 0.0102 | 0.0202 | 0.0499 | 0.0996 |
| 重复性限（r) mg/mL | 0.0001 | 0.0003 | 0.0007 | 0.0009 | 0.0014 | 0.0021 |

10.2再现性

在再现性条件下获得的两次独立测试结果的测定值，在以下给出的平均值范围内，这两个测试结果的绝对值不超过再现性限（R），超过再现性限（R）的情况不超过 5%，再现性限（R）按表5 数据采用线性内插法求得。

表5 再现性限(R)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 锌质量浓度 mg/mL | 0.0004 | 0.0053 | 0.0207 | 0.0234 | 0.0522 | 0.1012 |
| 再现性限（R) mg/mL | 0.0003 | 0.0006 | 0.0008 | 0.0150 | 0.0029 | 0.0069 |
| 锰质量浓度 mg/mL | 0.0002 | 0.0001 | 0.0100 | 0.0201 | 0.0506 | 0.0973 |
| 再现性限（R) mg/mL | 0.0001 | 0.0005 | 0.0011 | 0.0016 | 0.0024 | 0.0051 |
| 铬质量浓度 mg/mL | 0.0002 | 0.0050 | 0.0102 | 0.0207 | 0.0511 | 0.0971 |
| 再现性限（R) mg/mL | 0.0006 | 0.0005 | 0.0016 | 0.0014 | 0.0033 | 0.0077 |
| 镉质量浓度 mg/mL | 0.0001 | 0.0051 | 0.0101 | 0.0202 | 0.0503 | 0.0998 |
| 再现性限（R) mg/mL | 0.0001 | 0.0005 | 0.0013 | 0.0021 | 0.0021 | 0.0055 |
| 铅质量浓度 mg/mL | 0.0004 | 0.0051 | 0.0102 | 0.0201 | 0.0501 | 0.0989 |
| 再现性限（R) mg/mL | 0.0002 | 0.0006 | 0.0011 | 0.0015 | 0.0018 | 0.0052 |
| 铁质量浓度 mg/mL | 0.0002 | 0.0052 | 0.0110 | 0.0241 | 0.0502 | 0.1034 |
| 再现性限（R) mg/mL | 0.0001 | 0.0016 | 0.0058 | 0.0048 | 0.0033 | 0.0117 |
| 铝质量浓度 mg/mL | 0.0003 | 0.0051 | 0.0105 | 0.0217 | 0.0505 | 0.1027 |
| 再现性限（R) mg/mL | 0.0002 | 0.0004 | 0.0019 | 0.0025 | 0.0030 | 0.0096 |
| 镍质量浓度 mg/mL | 0.0009 | 0.0053 | 0.0146 | 0.0222 | 0.0499 | 0.0985 |
| 再现性限（R) mg/mL | 0.0003 | 0.0009 | 0.0072 | 0.0058 | 0.0020 | 0.0042 |
| 铜质量浓度 mg/mL | 0.0001 | 0.0050 | 0.0470 | 0.0497 | 0.0754 | 0.1016 |
| 再现性限（R) mg/mL | 0.0001 | 0.0007 | 0.0028 | 0.0027 | 0.0032 | 0.0060 |
| 铍质量浓度 mg/mL | 0.0001 | 0.0050 | 0.0102 | 0.0202 | 0.0499 | 0.0996 |
| 再现性限（R) mg/mL | 0.0001 | 0.0004 | 0.0016 | 0.0021 | 0.0023 | 0.0046 |

11 试验报告

本章规定试验报告所包括的内容。至少应给出以下几个方面的内容：

——试验对象；

——使用的文件（GB/T ××××. ×-202×）；

——分析结果及其表示；

——与基本分析步骤的差异；

——测定中观察到的异常现象；

——试验日期。

附 录A

（资料性）

精密度试验原始数据

精密度数据是在 2022～2023 年由 16 家实验室对含有锌、锰、铬、镉、铅、铁、铝、镍、铜、铍元素不同水 平的贵金属合金电镀废水样品进行共同试验确定的。每家实验室对每个水平的贵金属合金电镀废水样品中锌、锰、铬、镉、铅、铁、铝、镍、铜、铍质量浓度在重复性条件下独立测定7次。测定的原始数据见表A.1-A.10

表A.1 锌的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Zn元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 1# | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 2 | 0.0005 | 0.0004 | 0.0004 | 0.0005 | 0.0004 | 0.0004 | 0.0004 |
| 3 | 0.0004 | 0.0003 | 0.0002 | 0.0003 | 0.0003 | 0.0002 | 0.0003 |
| 4 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 5 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 6 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 7 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 8 | 0.0002 | 0.0002 | 0.0003 | 0.0002 | 0.0003 | 0.0003 | 0.0003 |
| 9 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 10 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 11 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 12 | 0.0003 | 0.0004 | 0.0004 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 13 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 14 | 0.0006 | 0.0005 | 0.0005 | 0.0008 | 0.0005 | 0.0004 | 0.0012 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 2# | 0.0049 | 0.0048 | 0.0047 | 0.0049 | 0.0048 | 0.0048 | 0.0048 |
| 2 | 0.0050 | 0.0048 | 0.0049 | 0.0050 | 0.0051 | 0.0048 | 0.0049 |
| 3 | 0.0051 | 0.0051 | 0.0050 | 0.0050 | 0.0049 | 0.0050 | 0.0050 |
| 4 | 0.0051 | 0.0052 | 0.0050 | 0.0049 | 0.0048 | 0.0051 | 0.0052 |
| 5 | 0.0048 | 0.0050 | 0.0049 | 0.0051 | 0.0047 | 0.0048 | 0.0046 |
| 6 | 0.0051 | 0.0050 | 0.0051 | 0.0049 | 0.0051 | 0.0053 | 0.0051 |
| 7 | 0.0049 | 0.0050 | 0.0053 | 0.0050 | 0.0048 | 0.0048 | 0.0051 |
| 8 | 0.0048 | 0.0050 | 0.0049 | 0.0048 | 0.0049 | 0.0049 | 0.0048 |
| 9 | 0.0051 | 0.0052 | 0.0050 | 0.0053 | 0.0050 | 0.0054 | 0.0050 |
| 10 | 0.0050 | 0.0049 | 0.0052 | 0.0051 | 0.0049 | 0.0049 | 0.0050 |
| 11 | 0.0052 | 0.0051 | 0.0052 | 0.0053 | 0.0053 | 0.0050 | 0.0051 |
| 12 | 0.0049 | 0.0052 | 0.0050 | 0.0053 | 0.0053 | 0.0050 | 0.0053 |
| 13 | 0.0051 | 0.0052 | 0.0050 | 0.0052 | 0.0052 | 0.0050 | 0.0050 |
| 14 | 0.0051 | 0.0050 | 0.0050 | 0.0051 | 0.0051 | 0.0050 | 0.0051 |
| 15 | 0.0048 | 0.0048 | 0.0048 | 0.0049 | 0.0048 | 0.0048 | 0.0048 |
| 16 | 0.0056 | 0.0062 | 0.0051 | 0.0048 | 0.0056 | 0.0051 | 0.0049 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 3# | 0.0142 | 0.0142 | 0.0142 | 0.0142 | 0.0143 | 0.0143 | 0.0144 |
| 2 | 0.0136 | 0.0138 | 0.0138 | 0.0136 | 0.0138 | 0.0139 | 0.0137 |
| 3 | 0.0143 | 0.0138 | 0.0144 | 0.0139 | 0.0136 | 0.0141 | 0.0140 |
| 4 | 0.0142 | 0.0142 | 0.0142 | 0.0142 | 0.0143 | 0.0143 | 0.0144 |
| 5 | 0.0145 | 0.0146 | 0.0143 | 0.0144 | 0.0142 | 0.0144 | 0.0146 |
| 6 | 0.0142 | 0.0143 | 0.0143 | 0.0142 | 0.0144 | 0.0142 | 0.0143 |
| 7 | 0.0130 | 0.0140 | 0.0150 | 0.0140 | 0.0130 | 0.0140 | 0.0140 |
| 8 | 0.0136 | 0.0137 | 0.0131 | 0.0131 | 0.0136 | 0.0139 | 0.0137 |
| 9 | 0.0137 | 0.0136 | 0.0137 | 0.0140 | 0.0147 | 0.0137 | 0.0143 |
| 10 | 0.0134 | 0.0136 | 0.0137 | 0.0134 | 0.0130 | 0.0138 | 0.0135 |
| 11 | 0.0132 | 0.0136 | 0.0132 | 0.0137 | 0.0136 | 0.0137 | 0.0137 |
| 12 | 0.0139 | 0.0139 | 0.0140 | 0.0140 | 0.0143 | 0.0144 | 0.0142 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 4# | 0.0209 | 0.0206 | 0.0209 | 0.0207 | 0.0205 | 0.0205 | 0.0205 |
| 2 | 0.0209 | 0.0207 | 0.0210 | 0.0211 | 0.0207 | 0.0210 | 0.0212 |
| 3 | 0.0209 | 0.0206 | 0.0210 | 0.0207 | 0.0211 | 0.0205 | 0.0203 |
| 4 | 0.0329 | 0.0337 | 0.0328 | 0.0327 | 0.0326 | 0.0326 | 0.0332 |
| 5 | 0.0208 | 0.0209 | 0.0208 | 0.0208 | 0.0207 | 0.0207 | 0.0207 |
| 6 | 0.0208 | 0.0205 | 0.0207 | 0.0208 | 0.0209 | 0.0204 | 0.0205 |
| 7 | 0.0209 | 0.0208 | 0.0205 | 0.0208 | 0.0204 | 0.0208 | 0.0201 |
| 8 | 0.0209 | 0.0208 | 0.0206 | 0.0209 | 0.0208 | 0.0205 | 0.0206 |
| 9 | 0.0209 | 0.0208 | 0.0206 | 0.0205 | 0.0208 | 0.0207 | 0.0204 |
| 10 | 0.0208 | 0.0207 | 0.0208 | 0.0206 | 0.0207 | 0.0206 | 0.0204 |
| 11 | 0.0206 | 0.0206 | 0.0205 | 0.0207 | 0.0206 | 0.0208 | 0.0204 |
| 12 | 0.0328 | 0.0328 | 0.0329 | 0.0329 | 0.0329 | 0.0328 | 0.0328 |
| 13 | 0.0333 | 0.0340 | 0.0342 | 0.0336 | 0.0339 | 0.0341 | 0.0342 |
| 14 | 0.0202 | 0.0205 | 0.0207 | 0.0202 | 0.0205 | 0.0204 | 0.0205 |
| 15 | 0.0354 | 0.0341 | 0.0330 | 0.0340 | 0.0344 | 0.0345 | 0.0337 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 5# | 0.0517 | 0.0516 | 0.0517 | 0.0515 | 0.0518 | 0.0520 | 0.0522 |
| 2 | 0.0514 | 0.0506 | 0.0505 | 0.0511 | 0.0509 | 0.0502 | 0.0501 |
| 3 | 0.0499 | 0.0502 | 0.0499 | 0.0503 | 0.0499 | 0.0502 | 0.0501 |
| 4 | 0.0500 | 0.0502 | 0.0504 | 0.0498 | 0.0496 | 0.0504 | 0.0502 |
| 5 | 0.0499 | 0.0501 | 0.0500 | 0.0496 | 0.0488 | 0.0492 | 0.0497 |
| 6 | 0.0484 | 0.0487 | 0.0518 | 0.0493 | 0.0482 | 0.0492 | 0.0520 |
| 7 | 0.0508 | 0.0508 | 0.0507 | 0.0505 | 0.0506 | 0.0506 | 0.0506 |
| 8 | 0.0506 | 0.0508 | 0.0507 | 0.0505 | 0.0507 | 0.0505 | 0.0502 |
| 9 | 0.0510 | 0.0512 | 0.0515 | 0.0505 | 0.0510 | 0.0508 | 0.0511 |
| 10 | 0.0485 | 0.0489 | 0.0508 | 0.0494 | 0.0498 | 0.0498 | 0.0503 |
| 11 | 0.0510 | 0.0502 | 0.0501 | 0.0503 | 0.0507 | 0.0491 | 0.0505 |
| 12 | 0.0514 | 0.0512 | 0.0509 | 0.0496 | 0.0513 | 0.0507 | 0.0489 |
| 13 | 0.0507 | 0.0495 | 0.0496 | 0.0514 | 0.0498 | 0.0496 | 0.0485 |
| 14 | 0.0501 | 0.0503 | 0.0499 | 0.0505 | 0.0503 | 0.0502 | 0.0509 |
| 15 | 0.0519 | 0.0520 | 0.0522 | 0.0515 | 0.0525 | 0.0520 | 0.0522 |
| 16 | 0.0523 | 0.0531 | 0.0515 | 0.0523 | 0.0523 | 0.0521 | 0.0518 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Zn | 1 | 6# | 0.1038 | 0.1042 | 0.1039 | 0.1044 | 0.1044 | 0.1048 | 0.1049 |
| 2 | 0.0974 | 0.0980 | 0.0981 | 0.0970 | 0.0975 | 0.0976 | 0.0962 |
| 3 | 0.1003 | 0.1001 | 0.1000 | 0.1002 | 0.1003 | 0.1001 | 0.1002 |
| 4 | 0.1038 | 0.1042 | 0.1039 | 0.1044 | 0.1044 | 0.1048 | 0.1049 |
| 5 | 0.0966 | 0.0974 | 0.1051 | 0.0973 | 0.0994 | 0.0979 | 0.0988 |
| 6 | 0.1021 | 0.1019 | 0.1016 | 0.1017 | 0.1017 | 0.1015 | 0.1013 |
| 7 | 0.1009 | 0.1002 | 0.1001 | 0.1006 | 0.1004 | 0.1003 | 0.1007 |
| 8 | 0.1032 | 0.1037 | 0.1038 | 0.1037 | 0.1034 | 0.1033 | 0.1037 |
| 9 | 0.0992 | 0.1001 | 0.1012 | 0.0991 | 0.0978 | 0.0983 | 0.1002 |
| 10 | 0.1011 | 0.1000 | 0.0983 | 0.1005 | 0.1028 | 0.1008 | 0.1003 |
| 11 | 0.0977 | 0.1031 | 0.1011 | 0.0989 | 0.0987 | 0.1022 | 0.1004 |
| 12 | 0.1019 | 0.0999 | 0.0986 | 0.1019 | 0.1019 | 0.0983 | 0.0989 |
| 13 | 0.1005 | 0.1008 | 0.1005 | 0.1005 | 0.1003 | 0.0999 | 0.1007 |
| 14 | 0.1033 | 0.1042 | 0.1040 | 0.1043 | 0.1044 | 0.1045 | 0.1044 |
| 15 | 0.1015 | 0.1017 | 0.1015 | 0.1067 | 0.1015 | 0.1015 | 0.1006 |

表A.2 锰的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mn元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 1# | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 2 | 0.0002 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0002 | 0.0002 |
| 3 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 4 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 5 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 6 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 7 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 8 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 9 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 10 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 11 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 2# | 0.0052 | 0.0051 | 0.0051 | 0.0052 | 0.0051 | 0.0052 | 0.0051 |
| 2 | 0.0053 | 0.0050 | 0.0050 | 0.0045 | 0.0043 | 0.0046 | 0.0043 |
| 3 | 0.0049 | 0.0050 | 0.0049 | 0.0051 | 0.0051 | 0.0049 | 0.0050 |
| 4 | 0.0049 | 0.0049 | 0.0048 | 0.0050 | 0.0051 | 0.0050 | 0.0051 |
| 5 | 0.0049 | 0.0050 | 0.0051 | 0.0048 | 0.0047 | 0.0046 | 0.0049 |
| 6 | 0.0050 | 0.0049 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0049 |
| 7 | 0.0050 | 0.0051 | 0.0051 | 0.0050 | 0.0049 | 0.0050 | 0.0051 |
| 8 | 0.0048 | 0.0049 | 0.0049 | 0.0050 | 0.0051 | 0.0050 | 0.0048 |
| 9 | 0.0050 | 0.0053 | 0.0054 | 0.0050 | 0.0051 | 0.0050 | 0.0052 |
| 10 | 0.0050 | 0.0051 | 0.0050 | 0.0051 | 0.0051 | 0.0051 | 0.0050 |
| 11 | 0.0051 | 0.0051 | 0.0049 | 0.0049 | 0.0052 | 0.0050 | 0.0050 |
| 12 | 0.0052 | 0.0051 | 0.0052 | 0.0052 | 0.0051 | 0.0052 | 0.0052 |
| 13 | 0.0052 | 0.0052 | 0.0051 | 0.0050 | 0.0050 | 0.0052 | 0.0050 |
| 14 | 0.0051 | 0.0052 | 0.0051 | 0.0050 | 0.0051 | 0.0051 | 0.0051 |
| 15 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 |
| 16 | 0.0052 | 0.0050 | 0.0050 | 0.0051 | 0.0052 | 0.0050 | 0.0050 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 3# | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0104 | 0.0104 | 0.0104 |
| 2 | 0.0090 | 0.0093 | 0.0092 | 0.0090 | 0.0096 | 0.0093 | 0.0092 |
| 3 | 0.0099 | 0.0098 | 0.0096 | 0.0097 | 0.0100 | 0.0098 | 0.0101 |
| 4 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0104 | 0.0093 | 0.0104 |
| 5 | 0.0102 | 0.0094 | 0.0094 | 0.0094 | 0.0095 | 0.0092 | 0.0105 |
| 6 | 0.0104 | 0.0103 | 0.0103 | 0.0102 | 0.0102 | 0.0102 | 0.0102 |
| 7 | 0.0099 | 0.0097 | 0.0101 | 0.0098 | 0.0100 | 0.0098 | 0.0097 |
| 8 | 0.0100 | 0.0100 | 0.0100 | 0.0110 | 0.0100 | 0.0110 | 0.0100 |
| 9 | 0.0099 | 0.0101 | 0.0098 | 0.0099 | 0.0099 | 0.0101 | 0.0100 |
| 10 | 0.0104 | 0.0102 | 0.0099 | 0.0102 | 0.0100 | 0.0101 | 0.0101 |
| 11 | 0.0100 | 0.0104 | 0.0101 | 0.0101 | 0.0103 | 0.0102 | 0.0101 |
| 12 | 0.0101 | 0.0100 | 0.0101 | 0.0101 | 0.0100 | 0.0099 | 0.0102 |
| 13 | 0.0102 | 0.0101 | 0.0106 | 0.0100 | 0.0104 | 0.0103 | 0.0106 |
| 14 | 0.0100 | 0.0101 | 0.0100 | 0.0100 | 0.0100 | 0.0102 | 0.0103 |
| 15 | 0.0099 | 0.0094 | 0.0096 | 0.0090 | 0.0100 | 0.0094 | 0.0095 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 4# | 0.0202 | 0.0200 | 0.0203 | 0.0202 | 0.0203 | 0.0199 | 0.0200 |
| 2 | 0.0197 | 0.0189 | 0.0194 | 0.0192 | 0.0187 | 0.0196 | 0.0194 |
| 3 | 0.0201 | 0.0200 | 0.0200 | 0.0201 | 0.0199 | 0.0201 | 0.0200 |
| 4 | 0.0202 | 0.0200 | 0.0203 | 0.0201 | 0.0204 | 0.0199 | 0.0197 |
| 5 | 0.0189 | 0.0186 | 0.0190 | 0.0189 | 0.0188 | 0.0193 | 0.0190 |
| 6 | 0.0205 | 0.0204 | 0.0203 | 0.0204 | 0.0205 | 0.0205 | 0.0202 |
| 7 | 0.0203 | 0.0199 | 0.0202 | 0.0201 | 0.0203 | 0.0204 | 0.0199 |
| 8 | 0.0214 | 0.0215 | 0.0202 | 0.0215 | 0.0204 | 0.0203 | 0.0209 |
| 9 | 0.0205 | 0.0198 | 0.0201 | 0.0201 | 0.0205 | 0.0202 | 0.0195 |
| 10 | 0.0198 | 0.0199 | 0.0202 | 0.0196 | 0.0209 | 0.0200 | 0.0206 |
| 11 | 0.0200 | 0.0204 | 0.0203 | 0.0205 | 0.0208 | 0.0208 | 0.0206 |
| 12 | 0.0200 | 0.0203 | 0.0204 | 0.0203 | 0.0202 | 0.0202 | 0.0202 |
| 13 | 0.0202 | 0.0209 | 0.0211 | 0.0206 | 0.0199 | 0.0204 | 0.0200 |
| 14 | 0.0205 | 0.0199 | 0.0203 | 0.0202 | 0.0203 | 0.0199 | 0.0200 |
| 15 | 0.0196 | 0.0199 | 0.0194 | 0.0196 | 0.0196 | 0.0194 | 0.0196 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 5# | 0.0485 | 0.0491 | 0.0485 | 0.0487 | 0.0485 | 0.0490 | 0.0495 |
| 2 | 0.0510 | 0.0508 | 0.0509 | 0.0505 | 0.0502 | 0.0503 | 0.0494 |
| 3 | 0.0495 | 0.0498 | 0.0502 | 0.0504 | 0.0501 | 0.0499 | 0.0500 |
| 4 | 0.0502 | 0.0500 | 0.0498 | 0.0496 | 0.0502 | 0.0504 | 0.0500 |
| 5 | 0.0501 | 0.0500 | 0.0495 | 0.0487 | 0.0497 | 0.0499 | 0.0488 |
| 6 | 0.0476 | 0.0479 | 0.0476 | 0.0477 | 0.0479 | 0.0480 | 0.0477 |
| 7 | 0.0500 | 0.0498 | 0.0498 | 0.0491 | 0.0496 | 0.0500 | 0.0495 |
| 8 | 0.0510 | 0.0507 | 0.0502 | 0.0508 | 0.0506 | 0.0503 | 0.0504 |
| 9 | 0.0488 | 0.0491 | 0.0485 | 0.0495 | 0.0488 | 0.0487 | 0.0492 |
| 10 | 0.0498 | 0.0506 | 0.0499 | 0.0510 | 0.0497 | 0.0499 | 0.0496 |
| 11 | 0.0497 | 0.0495 | 0.0501 | 0.0502 | 0.0503 | 0.0502 | 0.0500 |
| 12 | 0.0509 | 0.0499 | 0.0504 | 0.0507 | 0.0500 | 0.0503 | 0.0494 |
| 13 | 0.0508 | 0.0497 | 0.0500 | 0.0503 | 0.0509 | 0.0499 | 0.0502 |
| 14 | 0.0501 | 0.0501 | 0.0498 | 0.0502 | 0.0505 | 0.0501 | 0.0506 |
| 15 | 0.0492 | 0.0491 | 0.0493 | 0.0497 | 0.0495 | 0.0494 | 0.0495 |
| 16 | 0.0509 | 0.0506 | 0.0508 | 0.0502 | 0.0506 | 0.0508 | 0.0506 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mn | 1 | 6# | 0.0956 | 0.0958 | 0.0961 | 0.0958 | 0.0958 | 0.0963 | 0.0966 |
| 2 | 0.0956 | 0.0961 | 0.0965 | 0.0954 | 0.0957 | 0.0964 | 0.0946 |
| 3 | 0.1001 | 0.1000 | 0.0998 | 0.0992 | 0.0995 | 0.0988 | 0.0996 |
| 4 | 0.0956 | 0.0958 | 0.0961 | 0.0958 | 0.0958 | 0.0963 | 0.0966 |
| 5 | 0.0973 | 0.0988 | 0.0974 | 0.0977 | 0.0990 | 0.0972 | 0.0984 |
| 6 | 0.0983 | 0.0979 | 0.0986 | 0.0979 | 0.0983 | 0.0991 | 0.0983 |
| 7 | 0.0994 | 0.0992 | 0.0989 | 0.0991 | 0.0995 | 0.0988 | 0.0987 |
| 8 | 0.0955 | 0.0957 | 0.0954 | 0.0961 | 0.0957 | 0.0962 | 0.0965 |
| 9 | 0.0957 | 0.0957 | 0.0973 | 0.0971 | 0.0967 | 0.0957 | 0.0971 |
| 10 | 0.0973 | 0.0964 | 0.0967 | 0.0972 | 0.0966 | 0.0981 | 0.0982 |
| 11 | 0.0975 | 0.0966 | 0.0982 | 0.0983 | 0.0965 | 0.0974 | 0.0976 |
| 12 | 0.0985 | 0.0986 | 0.0975 | 0.0980 | 0.0983 | 0.0969 | 0.0976 |
| 13 | 0.1001 | 0.1008 | 0.1012 | 0.1002 | 0.1004 | 0.1001 | 0.1011 |
| 14 | 0.0966 | 0.0965 | 0.0963 | 0.0963 | 0.0960 | 0.0963 | 0.0966 |
| 15 | 0.0926 | 0.0926 | 0.0958 | 0.0926 | 0.0984 | 0.0936 | 0.0946 |

表A.3 铬的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cr元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 1# | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| 2 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0001 | 0.0002 |
| 3 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0002 |
| 4 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 5 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 6 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 7 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 8 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 9 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 10 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 11 | 0.0009 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 |
| 12 | 0.0008 | 0.0008 | 0.0007 | 0.0007 | 0.0007 | 0.0008 | 0.0007 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 2# | 0.0050 | 0.0049 | 0.0050 | 0.0050 | 0.0049 | 0.0050 | 0.0049 |
| 2 | 0.0048 | 0.0046 | 0.0048 | 0.0051 | 0.0049 | 0.0045 | 0.0047 |
| 3 | 0.0049 | 0.0049 | 0.0051 | 0.0049 | 0.0051 | 0.0049 | 0.0051 |
| 4 | 0.0051 | 0.0051 | 0.0049 | 0.0048 | 0.0050 | 0.0049 | 0.0049 |
| 5 | 0.0047 | 0.0050 | 0.0049 | 0.0046 | 0.0048 | 0.0051 | 0.0048 |
| 6 | 0.0048 | 0.0050 | 0.0050 | 0.0049 | 0.0049 | 0.0050 | 0.0050 |
| 7 | 0.0049 | 0.0050 | 0.0049 | 0.0049 | 0.0048 | 0.0049 | 0.0049 |
| 8 | 0.0051 | 0.0052 | 0.0050 | 0.0052 | 0.0051 | 0.0050 | 0.0053 |
| 9 | 0.0053 | 0.0050 | 0.0052 | 0.0050 | 0.0051 | 0.0050 | 0.0051 |
| 10 | 0.0051 | 0.0049 | 0.0052 | 0.0049 | 0.0053 | 0.0049 | 0.0052 |
| 11 | 0.0049 | 0.0051 | 0.0051 | 0.0053 | 0.0050 | 0.0051 | 0.0052 |
| 12 | 0.0050 | 0.0052 | 0.0050 | 0.0053 | 0.0052 | 0.0053 | 0.0049 |
| 13 | 0.0049 | 0.0048 | 0.0048 | 0.0050 | 0.0051 | 0.0051 | 0.0050 |
| 14 | 0.0052 | 0.0050 | 0.0051 | 0.0051 | 0.0051 | 0.0053 | 0.0052 |
| 15 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 |
| 16 | 0.0051 | 0.0050 | 0.0049 | 0.0050 | 0.0050 | 0.0051 | 0.0050 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 3# | 0.0100 | 0.0100 | 0.0100 | 0.0101 | 0.0101 | 0.0100 | 0.0101 |
| 2 | 0.0097 | 0.0097 | 0.0096 | 0.0095 | 0.0091 | 0.0098 | 0.0096 |
| 3 | 0.0100 | 0.0102 | 0.0099 | 0.0098 | 0.0101 | 0.0097 | 0.0100 |
| 4 | 0.0100 | 0.0100 | 0.0100 | 0.0101 | 0.0101 | 0.0090 | 0.0101 |
| 5 | 0.0099 | 0.0095 | 0.0098 | 0.0104 | 0.0099 | 0.0104 | 0.0098 |
| 6 | 0.0101 | 0.0102 | 0.0101 | 0.0100 | 0.0102 | 0.0102 | 0.0102 |
| 7 | 0.0101 | 0.0104 | 0.0102 | 0.0105 | 0.0102 | 0.0101 | 0.0104 |
| 8 | 0.0100 | 0.0110 | 0.0100 | 0.0100 | 0.0110 | 0.0100 | 0.0100 |
| 9 | 0.0101 | 0.0100 | 0.0101 | 0.0102 | 0.0102 | 0.0104 | 0.0104 |
| 10 | 0.0104 | 0.0104 | 0.0103 | 0.0100 | 0.0100 | 0.0103 | 0.0102 |
| 11 | 0.0099 | 0.0103 | 0.0104 | 0.0100 | 0.0102 | 0.0102 | 0.0103 |
| 12 | 0.0100 | 0.0101 | 0.0100 | 0.0104 | 0.0101 | 0.0102 | 0.0102 |
| 13 | 0.0112 | 0.0118 | 0.0119 | 0.0117 | 0.0123 | 0.0126 | 0.0118 |
| 14 | 0.0101 | 0.0103 | 0.0103 | 0.0102 | 0.0101 | 0.0102 | 0.0103 |
| 15 | 0.0102 | 0.0101 | 0.0103 | 0.0101 | 0.0103 | 0.0102 | 0.0103 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 4# | 0.0209 | 0.0209 | 0.0210 | 0.0209 | 0.0210 | 0.0209 | 0.0211 |
| 2 | 0.0199 | 0.0204 | 0.0195 | 0.0207 | 0.0197 | 0.0196 | 0.0202 |
| 3 | 0.0204 | 0.0202 | 0.0205 | 0.0203 | 0.0207 | 0.0200 | 0.0200 |
| 4 | 0.0210 | 0.0210 | 0.0209 | 0.0208 | 0.0212 | 0.0210 | 0.0210 |
| 5 | 0.0212 | 0.0211 | 0.0210 | 0.0211 | 0.0213 | 0.0214 | 0.0213 |
| 6 | 0.0211 | 0.0210 | 0.0209 | 0.0208 | 0.0207 | 0.0206 | 0.0211 |
| 7 | 0.0204 | 0.0209 | 0.0202 | 0.0209 | 0.0210 | 0.0211 | 0.0203 |
| 8 | 0.0213 | 0.0214 | 0.0213 | 0.0211 | 0.0208 | 0.0206 | 0.0211 |
| 9 | 0.0208 | 0.0213 | 0.0209 | 0.0209 | 0.0206 | 0.0210 | 0.0209 |
| 10 | 0.0212 | 0.0215 | 0.0214 | 0.0210 | 0.0207 | 0.0210 | 0.0212 |
| 11 | 0.0214 | 0.0213 | 0.0212 | 0.0206 | 0.0211 | 0.0208 | 0.0213 |
| 12 | 0.0203 | 0.0202 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0202 |
| 13 | 0.0203 | 0.0200 | 0.0202 | 0.0207 | 0.0200 | 0.0197 | 0.0200 |
| 14 | 0.0201 | 0.0202 | 0.0202 | 0.0202 | 0.0199 | 0.0199 | 0.0199 |
| 15 | 0.0202 | 0.0202 | 0.0202 | 0.0201 | 0.0201 | 0.0201 | 0.0201 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 5# | 0.0481 | 0.0481 | 0.0482 | 0.0480 | 0.0482 | 0.0484 | 0.0486 |
| 2 | 0.0465 | 0.0472 | 0.0485 | 0.0468 | 0.0471 | 0.0469 | 0.0459 |
| 3 | 0.0498 | 0.0497 | 0.0496 | 0.0491 | 0.0498 | 0.0499 | 0.0496 |
| 4 | 0.0496 | 0.0498 | 0.0500 | 0.0498 | 0.0496 | 0.0500 | 0.0502 |
| 5 | 0.0501 | 0.0498 | 0.0488 | 0.0496 | 0.0494 | 0.0499 | 0.0500 |
| 6 | 0.0494 | 0.0497 | 0.0485 | 0.0491 | 0.0482 | 0.0497 | 0.0495 |
| 7 | 0.0492 | 0.0496 | 0.0493 | 0.0493 | 0.0493 | 0.0490 | 0.0493 |
| 8 | 0.0493 | 0.0491 | 0.0495 | 0.0490 | 0.0493 | 0.0494 | 0.0496 |
| 9 | 0.0481 | 0.0483 | 0.0485 | 0.0488 | 0.0490 | 0.0492 | 0.0487 |
| 10 | 0.0489 | 0.0502 | 0.0513 | 0.0513 | 0.0486 | 0.0503 | 0.0494 |
| 11 | 0.0508 | 0.0493 | 0.0514 | 0.0514 | 0.0499 | 0.0484 | 0.0490 |
| 12 | 0.0499 | 0.0497 | 0.0509 | 0.0491 | 0.0488 | 0.0501 | 0.0498 |
| 13 | 0.0504 | 0.0487 | 0.0486 | 0.0489 | 0.0507 | 0.0495 | 0.0504 |
| 14 | 0.0511 | 0.0519 | 0.0499 | 0.0508 | 0.0513 | 0.0511 | 0.0508 |
| 15 | 0.0488 | 0.0481 | 0.0489 | 0.0485 | 0.0483 | 0.0484 | 0.0486 |
| 16 | 0.0512 | 0.0513 | 0.0511 | 0.0512 | 0.0511 | 0.0509 | 0.0512 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cr | 1 | 6# | 0.0937 | 0.0942 | 0.0939 | 0.0942 | 0.0942 | 0.0945 | 0.0947 |
| 2 | 0.0986 | 0.0984 | 0.0985 | 0.0993 | 0.0983 | 0.0995 | 0.0985 |
| 3 | 0.0998 | 0.1001 | 0.0996 | 0.0989 | 0.1000 | 0.0995 | 0.0988 |
| 4 | 0.0937 | 0.0942 | 0.0939 | 0.0942 | 0.0942 | 0.0945 | 0.0947 |
| 5 | 0.0997 | 0.0995 | 0.0995 | 0.0995 | 0.0997 | 0.0997 | 0.0995 |
| 6 | 0.0987 | 0.0977 | 0.0977 | 0.0986 | 0.0990 | 0.0973 | 0.0983 |
| 7 | 0.1003 | 0.1004 | 0.1002 | 0.1005 | 0.0995 | 0.0993 | 0.1002 |
| 8 | 0.0931 | 0.0940 | 0.0936 | 0.0936 | 0.0938 | 0.0933 | 0.0936 |
| 9 | 0.0997 | 0.0974 | 0.0955 | 0.0975 | 0.0987 | 0.0983 | 0.0938 |
| 10 | 0.0956 | 0.0975 | 0.0964 | 0.0947 | 0.0952 | 0.0943 | 0.0944 |
| 11 | 0.0956 | 0.0985 | 0.0989 | 0.0987 | 0.0969 | 0.0948 | 0.0949 |
| 12 | 0.0972 | 0.0964 | 0.0951 | 0.0949 | 0.0990 | 0.0987 | 0.0979 |
| 13 | 0.1020 | 0.1028 | 0.1021 | 0.1017 | 0.1021 | 0.1015 | 0.1020 |
| 14 | 0.0945 | 0.0942 | 0.0947 | 0.0942 | 0.0945 | 0.0945 | 0.0950 |
| 15 | 0.0944 | 0.0943 | 0.0947 | 0.0945 | 0.0946 | 0.0948 | 0.0943 |

表A.4 镉的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cd元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 1# | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 2 | 0.0002 | 0.0001 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0002 |
| 3 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 4 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 5 | 0.0001 | 0.0002 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 6 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 7 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0002 |
| 8 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 9 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 10 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 2# | 0.0053 | 0.0053 | 0.0053 | 0.0052 | 0.0053 | 0.0053 | 0.0053 |
| 2 | 0.0050 | 0.0049 | 0.0049 | 0.0050 | 0.0050 | 0.0049 | 0.0049 |
| 3 | 0.0049 | 0.0049 | 0.0052 | 0.0051 | 0.0049 | 0.0050 | 0.0052 |
| 4 | 0.0049 | 0.0049 | 0.0050 | 0.0051 | 0.0048 | 0.0050 | 0.0049 |
| 5 | 0.0049 | 0.0050 | 0.0047 | 0.0048 | 0.0051 | 0.0049 | 0.0046 |
| 6 | 0.0051 | 0.0049 | 0.0049 | 0.0050 | 0.0050 | 0.0050 | 0.0051 |
| 7 | 0.0051 | 0.0052 | 0.0052 | 0.0052 | 0.0051 | 0.0051 | 0.0051 |
| 8 | 0.0048 | 0.0049 | 0.0051 | 0.0049 | 0.0049 | 0.0048 | 0.0048 |
| 9 | 0.0050 | 0.0052 | 0.0050 | 0.0054 | 0.0051 | 0.0051 | 0.0050 |
| 10 | 0.0051 | 0.0052 | 0.0052 | 0.0049 | 0.0053 | 0.0052 | 0.0052 |
| 11 | 0.0052 | 0.0049 | 0.0050 | 0.0050 | 0.0050 | 0.0052 | 0.0053 |
| 12 | 0.0052 | 0.0052 | 0.0051 | 0.0051 | 0.0053 | 0.0051 | 0.0049 |
| 13 | 0.0052 | 0.0052 | 0.0053 | 0.0050 | 0.0051 | 0.0052 | 0.0053 |
| 14 | 0.0051 | 0.0050 | 0.0052 | 0.0051 | 0.0051 | 0.0050 | 0.0051 |
| 15 | 0.0053 | 0.0053 | 0.0053 | 0.0053 | 0.0053 | 0.0053 | 0.0053 |
| 16 | 0.0053 | 0.0052 | 0.0052 | 0.0053 | 0.0051 | 0.0051 | 0.0052 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 3# | 0.0106 | 0.0106 | 0.0105 | 0.0106 | 0.0106 | 0.0106 | 0.0106 |
| 2 | 0.0095 | 0.0098 | 0.0097 | 0.0095 | 0.0096 | 0.0095 | 0.0093 |
| 3 | 0.0101 | 0.0099 | 0.0100 | 0.0098 | 0.0102 | 0.0099 | 0.0101 |
| 4 | 0.0106 | 0.0106 | 0.0105 | 0.0106 | 0.0106 | 0.0106 | 0.0106 |
| 5 | 0.0094 | 0.0095 | 0.0095 | 0.0096 | 0.0097 | 0.0096 | 0.0095 |
| 6 | 0.0104 | 0.0104 | 0.0104 | 0.0103 | 0.0103 | 0.0104 | 0.0104 |
| 7 | 0.0100 | 0.0100 | 0.0103 | 0.0105 | 0.0100 | 0.0101 | 0.0102 |
| 8 | 0.0120 | 0.0110 | 0.0110 | 0.0110 | 0.0100 | 0.0110 | 0.0110 |
| 9 | 0.0103 | 0.0098 | 0.0104 | 0.0098 | 0.0099 | 0.0103 | 0.0101 |
| 10 | 0.0101 | 0.0103 | 0.0101 | 0.0099 | 0.0102 | 0.0097 | 0.0099 |
| 11 | 0.0103 | 0.0099 | 0.0105 | 0.0105 | 0.0097 | 0.0099 | 0.0097 |
| 12 | 0.0097 | 0.0099 | 0.0102 | 0.0099 | 0.0105 | 0.0104 | 0.0103 |
| 13 | 0.0101 | 0.0100 | 0.0102 | 0.0099 | 0.0103 | 0.0103 | 0.0104 |
| 14 | 0.0100 | 0.0102 | 0.0103 | 0.0102 | 0.0101 | 0.0100 | 0.0101 |
| 15 | 0.0094 | 0.0094 | 0.0094 | 0.0094 | 0.0096 | 0.0095 | 0.0096 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 4# | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0200 |
| 2 | 0.0188 | 0.0190 | 0.0192 | 0.0195 | 0.0192 | 0.0191 | 0.0187 |
| 3 | 0.0199 | 0.0200 | 0.0198 | 0.0195 | 0.0197 | 0.0198 | 0.0201 |
| 4 | 0.0209 | 0.0208 | 0.0210 | 0.0209 | 0.0211 | 0.0206 | 0.0204 |
| 5 | 0.0192 | 0.0193 | 0.0192 | 0.0192 | 0.0190 | 0.0193 | 0.0192 |
| 6 | 0.0198 | 0.0201 | 0.0201 | 0.0201 | 0.0202 | 0.0200 | 0.0201 |
| 7 | 0.0203 | 0.0201 | 0.0202 | 0.0201 | 0.0203 | 0.0203 | 0.0205 |
| 8 | 0.0204 | 0.0210 | 0.0203 | 0.0200 | 0.0203 | 0.0200 | 0.0209 |
| 9 | 0.0207 | 0.0200 | 0.0200 | 0.0207 | 0.0201 | 0.0202 | 0.0201 |
| 10 | 0.0204 | 0.0206 | 0.0205 | 0.0207 | 0.0204 | 0.0205 | 0.0205 |
| 11 | 0.0205 | 0.0202 | 0.0205 | 0.0199 | 0.0200 | 0.0202 | 0.0200 |
| 12 | 0.0207 | 0.0199 | 0.0204 | 0.0201 | 0.0202 | 0.0201 | 0.0207 |
| 13 | 0.0200 | 0.0200 | 0.0202 | 0.0200 | 0.0203 | 0.0203 | 0.0201 |
| 14 | 0.0208 | 0.0200 | 0.0204 | 0.0201 | 0.0198 | 0.0199 | 0.0200 |
| 15 | 0.0198 | 0.0200 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0200 |
| 16 | 0.0200 | 0.0228 | 0.0242 | 0.0219 | 0.0221 | 0.0200 | 0.0228 |
| 17 | 0.0205 | 0.0191 | 0.0191 | 0.0205 | 0.0201 | 0.0191 | 0.0198 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 5# | 0.0507 | 0.0504 | 0.0503 | 0.0504 | 0.0502 | 0.0504 | 0.0502 |
| 2 | 0.0505 | 0.0512 | 0.0512 | 0.0508 | 0.0506 | 0.0509 | 0.0510 |
| 3 | 0.0497 | 0.0501 | 0.0499 | 0.0502 | 0.0497 | 0.0504 | 0.0499 |
| 4 | 0.0506 | 0.0504 | 0.0504 | 0.0502 | 0.0500 | 0.0498 | 0.0500 |
| 5 | 0.0496 | 0.0499 | 0.0501 | 0.0498 | 0.0486 | 0.0497 | 0.0489 |
| 6 | 0.0482 | 0.0487 | 0.0489 | 0.0493 | 0.0486 | 0.0494 | 0.0490 |
| 7 | 0.0502 | 0.0502 | 0.0501 | 0.0502 | 0.0501 | 0.0500 | 0.0500 |
| 8 | 0.0498 | 0.0501 | 0.0499 | 0.0504 | 0.0502 | 0.0495 | 0.0499 |
| 9 | 0.0505 | 0.0507 | 0.0500 | 0.0507 | 0.0503 | 0.0507 | 0.0510 |
| 10 | 0.0495 | 0.0510 | 0.0497 | 0.0503 | 0.0507 | 0.0493 | 0.0495 |
| 11 | 0.0512 | 0.0502 | 0.0518 | 0.0513 | 0.0519 | 0.0509 | 0.0519 |
| 12 | 0.0503 | 0.0513 | 0.0514 | 0.0508 | 0.0500 | 0.0497 | 0.0507 |
| 13 | 0.0508 | 0.0516 | 0.0515 | 0.0514 | 0.0497 | 0.0514 | 0.0511 |
| 14 | 0.0501 | 0.0502 | 0.0496 | 0.0502 | 0.0503 | 0.0501 | 0.0500 |
| 15 | 0.0502 | 0.0504 | 0.0503 | 0.0504 | 0.0505 | 0.0504 | 0.0502 |
| 16 | 0.0515 | 0.0513 | 0.0512 | 0.0514 | 0.0518 | 0.0513 | 0.0511 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cd | 1 | 6# | 0.0999 | 0.1003 | 0.1002 | 0.1003 | 0.1002 | 0.0996 | 0.1001 |
| 2 | 0.0955 | 0.0971 | 0.0962 | 0.0963 | 0.0969 | 0.0974 | 0.0959 |
| 3 | 0.0992 | 0.1001 | 0.1000 | 0.0996 | 0.0989 | 0.0994 | 0.0995 |
| 4 | 0.1035 | 0.1039 | 0.1038 | 0.1040 | 0.1037 | 0.1040 | 0.1038 |
| 5 | 0.0960 | 0.0969 | 0.0959 | 0.0966 | 0.0975 | 0.0960 | 0.0967 |
| 6 | 0.0999 | 0.1000 | 0.0997 | 0.0998 | 0.0999 | 0.0996 | 0.1002 |
| 7 | 0.0993 | 0.0994 | 0.0996 | 0.0994 | 0.1002 | 0.0996 | 0.1001 |
| 8 | 0.0989 | 0.0990 | 0.0998 | 0.0991 | 0.0998 | 0.0995 | 0.0998 |
| 9 | 0.0996 | 0.1014 | 0.0999 | 0.1015 | 0.1008 | 0.1012 | 0.1012 |
| 10 | 0.1006 | 0.1014 | 0.1019 | 0.1002 | 0.1006 | 0.1007 | 0.1015 |
| 11 | 0.0999 | 0.1001 | 0.0996 | 0.0997 | 0.0997 | 0.0998 | 0.1003 |
| 12 | 0.1008 | 0.1010 | 0.1013 | 0.1009 | 0.1016 | 0.1015 | 0.0999 |
| 13 | 0.1011 | 0.1010 | 0.1020 | 0.1012 | 0.1007 | 0.0999 | 0.1011 |
| 14 | 0.1005 | 0.1003 | 0.1002 | 0.0998 | 0.1002 | 0.0996 | 0.1001 |
| 15 | 0.0964 | 0.0964 | 0.0968 | 0.0975 | 0.0970 | 0.0978 | 0.0987 |

表A.5 铅的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pb元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 1# | 0.0004 | 0.0005 | 0.0004 | 0.0005 | 0.0004 | 0.0005 | 0.0005 |
| 2 | 0.0003 | 0.0004 | 0.0003 | 0.0005 | 0.0004 | 0.0003 | 0.0004 |
| 3 | 0.0005 | 0.0006 | 0.0004 | 0.0002 | 0.0003 | 0.0003 | 0.0005 |
| 4 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| 5 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |
| 6 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0004 | 0.0005 | 0.0004 |
| 7 | 0.0004 | 0.0005 | 0.0004 | 0.0005 | 0.0005 | 0.0005 | 0.0004 |
| 8 | 0.0005 | 0.0005 | 0.0004 | 0.0005 | 0.0005 | 0.0004 | 0.0005 |
| 9 | 0.0005 | 0.0004 | 0.0005 | 0.0005 | 0.0004 | 0.0004 | 0.0004 |
| 10 | 0.0005 | 0.0005 | 0.0004 | 0.0004 | 0.0005 | 0.0005 | 0.0005 |
| 11 | 0.0004 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| 12 | 0.0002 | 0.0005 | 0.0003 | 0.0002 | 0.0006 | 0.0001 | 0.0004 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 2# | 0.0049 | 0.0048 | 0.0049 | 0.0051 | 0.0050 | 0.0051 | 0.0049 |
| 2 | 0.0051 | 0.0050 | 0.0056 | 0.0052 | 0.0051 | 0.0052 | 0.0051 |
| 3 | 0.0051 | 0.0049 | 0.0051 | 0.0051 | 0.0049 | 0.0050 | 0.0051 |
| 4 | 0.0048 | 0.0047 | 0.0049 | 0.0050 | 0.0051 | 0.0050 | 0.0050 |
| 5 | 0.0048 | 0.0046 | 0.0045 | 0.0049 | 0.0050 | 0.0051 | 0.0047 |
| 6 | 0.0051 | 0.0051 | 0.0050 | 0.0050 | 0.0050 | 0.0049 | 0.0050 |
| 7 | 0.0050 | 0.0051 | 0.0054 | 0.0053 | 0.0051 | 0.0053 | 0.0052 |
| 8 | 0.0049 | 0.0048 | 0.0049 | 0.0050 | 0.0051 | 0.0048 | 0.0049 |
| 9 | 0.0050 | 0.0053 | 0.0050 | 0.0054 | 0.0050 | 0.0055 | 0.0050 |
| 10 | 0.0052 | 0.0052 | 0.0051 | 0.0052 | 0.0055 | 0.0055 | 0.0052 |
| 11 | 0.0055 | 0.0050 | 0.0055 | 0.0050 | 0.0049 | 0.0052 | 0.0055 |
| 12 | 0.0053 | 0.0054 | 0.0055 | 0.0054 | 0.0052 | 0.0053 | 0.0049 |
| 13 | 0.0053 | 0.0049 | 0.0052 | 0.0055 | 0.0050 | 0.0052 | 0.0050 |
| 14 | 0.0052 | 0.0052 | 0.0051 | 0.0051 | 0.0050 | 0.0050 | 0.0051 |
| 15 | 0.0049 | 0.0049 | 0.0049 | 0.0051 | 0.0050 | 0.0051 | 0.0049 |
| 16 | 0.0053 | 0.0053 | 0.0051 | 0.0051 | 0.0052 | 0.0051 | 0.0051 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 3# | 0.0103 | 0.0106 | 0.0106 | 0.0104 | 0.0106 | 0.0106 | 0.0105 |
| 2 | 0.0101 | 0.0099 | 0.0098 | 0.0100 | 0.0104 | 0.0096 | 0.0103 |
| 3 | 0.0108 | 0.0106 | 0.0107 | 0.0105 | 0.0106 | 0.0107 | 0.0106 |
| 4 | 0.0103 | 0.0106 | 0.0106 | 0.0104 | 0.0106 | 0.0095 | 0.0091 |
| 5 | 0.0094 | 0.0097 | 0.0103 | 0.0094 | 0.0099 | 0.0105 | 0.0097 |
| 6 | 0.0103 | 0.0107 | 0.0106 | 0.0106 | 0.0107 | 0.0108 | 0.0108 |
| 7 | 0.0107 | 0.0105 | 0.0111 | 0.0109 | 0.0106 | 0.0107 | 0.0109 |
| 8 | 0.0100 | 0.0100 | 0.0110 | 0.0110 | 0.0100 | 0.0100 | 0.0100 |
| 9 | 0.0103 | 0.0099 | 0.0099 | 0.0099 | 0.0102 | 0.0099 | 0.0103 |
| 10 | 0.0098 | 0.0100 | 0.0101 | 0.0102 | 0.0101 | 0.0100 | 0.0102 |
| 11 | 0.0101 | 0.0104 | 0.0101 | 0.0103 | 0.0099 | 0.0100 | 0.0103 |
| 12 | 0.0100 | 0.0099 | 0.0101 | 0.0102 | 0.0102 | 0.0104 | 0.0104 |
| 13 | 0.0106 | 0.0101 | 0.0102 | 0.0099 | 0.0104 | 0.0102 | 0.0101 |
| 14 | 0.0103 | 0.0101 | 0.0101 | 0.0104 | 0.0101 | 0.0102 | 0.0102 |
| 15 | 0.0098 | 0.0105 | 0.0098 | 0.0097 | 0.0104 | 0.0098 | 0.0099 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 4# | 0.0202 | 0.0201 | 0.0201 | 0.0198 | 0.0202 | 0.0195 | 0.0194 |
| 2 | 0.0189 | 0.0190 | 0.0198 | 0.0192 | 0.0193 | 0.0198 | 0.0198 |
| 3 | 0.0202 | 0.0201 | 0.0201 | 0.0198 | 0.0202 | 0.0195 | 0.0194 |
| 4 | 0.0194 | 0.0198 | 0.0199 | 0.0196 | 0.0196 | 0.0195 | 0.0198 |
| 5 | 0.0201 | 0.0202 | 0.0202 | 0.0203 | 0.0201 | 0.0201 | 0.0203 |
| 6 | 0.0203 | 0.0205 | 0.0205 | 0.0204 | 0.0201 | 0.0199 | 0.0202 |
| 7 | 0.0205 | 0.0202 | 0.0207 | 0.0202 | 0.0204 | 0.0202 | 0.0200 |
| 8 | 0.0204 | 0.0194 | 0.0204 | 0.0201 | 0.0198 | 0.0193 | 0.0206 |
| 9 | 0.0201 | 0.0203 | 0.0211 | 0.0205 | 0.0215 | 0.0211 | 0.0214 |
| 10 | 0.0211 | 0.0194 | 0.0200 | 0.0213 | 0.0195 | 0.0191 | 0.0201 |
| 11 | 0.0187 | 0.0202 | 0.0199 | 0.0212 | 0.0204 | 0.0188 | 0.0211 |
| 12 | 0.0199 | 0.0200 | 0.0199 | 0.0201 | 0.0200 | 0.0200 | 0.0200 |
| 13 | 0.0203 | 0.0200 | 0.0202 | 0.0206 | 0.0199 | 0.0200 | 0.0201 |
| 14 | 0.0205 | 0.0206 | 0.0199 | 0.0203 | 0.0205 | 0.0199 | 0.0203 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 5# | 0.0501 | 0.0501 | 0.0500 | 0.0499 | 0.0502 | 0.0506 | 0.0507 |
| 2 | 0.0516 | 0.0510 | 0.0509 | 0.0511 | 0.0510 | 0.0509 | 0.0508 |
| 3 | 0.0494 | 0.0499 | 0.0498 | 0.0496 | 0.0501 | 0.0498 | 0.0498 |
| 4 | 0.0498 | 0.0496 | 0.0502 | 0.0504 | 0.0502 | 0.0504 | 0.0504 |
| 5 | 0.0500 | 0.0501 | 0.0495 | 0.0489 | 0.0486 | 0.0494 | 0.0492 |
| 6 | 0.0495 | 0.0496 | 0.0502 | 0.0500 | 0.0495 | 0.0501 | 0.0505 |
| 7 | 0.0499 | 0.0498 | 0.0499 | 0.0499 | 0.0499 | 0.0500 | 0.0498 |
| 8 | 0.0497 | 0.0500 | 0.0496 | 0.0496 | 0.0497 | 0.0501 | 0.0495 |
| 9 | 0.0501 | 0.0505 | 0.0500 | 0.0495 | 0.0500 | 0.0494 | 0.0500 |
| 10 | 0.0492 | 0.0484 | 0.0501 | 0.0502 | 0.0508 | 0.0489 | 0.0500 |
| 11 | 0.0485 | 0.0498 | 0.0494 | 0.0489 | 0.0505 | 0.0491 | 0.0504 |
| 12 | 0.0496 | 0.0504 | 0.0509 | 0.0513 | 0.0509 | 0.0514 | 0.0512 |
| 13 | 0.0502 | 0.0486 | 0.0503 | 0.0500 | 0.0513 | 0.0509 | 0.0511 |
| 14 | 0.0505 | 0.0503 | 0.0499 | 0.0503 | 0.0508 | 0.0506 | 0.0512 |
| 15 | 0.0500 | 0.0503 | 0.0500 | 0.0499 | 0.0502 | 0.0505 | 0.0505 |
| 16 | 0.0506 | 0.0508 | 0.0504 | 0.0505 | 0.0506 | 0.0504 | 0.0504 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pb | 1 | 6# | 0.0997 | 0.1005 | 0.1000 | 0.1005 | 0.1001 | 0.1010 | 0.1006 |
| 2 | 0.0976 | 0.0984 | 0.0982 | 0.0972 | 0.0979 | 0.0984 | 0.0981 |
| 3 | 0.0998 | 0.1001 | 0.0994 | 0.0986 | 0.1000 | 0.0993 | 0.0985 |
| 4 | 0.0997 | 0.1005 | 0.1000 | 0.1005 | 0.1001 | 0.1010 | 0.1006 |
| 5 | 0.0954 | 0.0957 | 0.0974 | 0.0963 | 0.0972 | 0.0955 | 0.0971 |
| 6 | 0.1006 | 0.1010 | 0.1011 | 0.1007 | 0.1008 | 0.1007 | 0.1006 |
| 7 | 0.0992 | 0.0991 | 0.0997 | 0.0995 | 0.0998 | 0.0989 | 0.0993 |
| 8 | 0.0996 | 0.0976 | 0.0981 | 0.0968 | 0.0992 | 0.1000 | 0.0973 |
| 9 | 0.0987 | 0.0976 | 0.0980 | 0.1008 | 0.0981 | 0.0969 | 0.0980 |
| 10 | 0.1010 | 0.0969 | 0.0970 | 0.0997 | 0.0975 | 0.1004 | 0.1003 |
| 11 | 0.0973 | 0.1007 | 0.0977 | 0.0985 | 0.0972 | 0.0988 | 0.1002 |
| 12 | 0.1009 | 0.1011 | 0.1005 | 0.1005 | 0.1007 | 0.0997 | 0.1002 |
| 13 | 0.0997 | 0.1001 | 0.1000 | 0.0995 | 0.1001 | 0.0998 | 0.1006 |
| 14 | 0.0944 | 0.0945 | 0.0949 | 0.0956 | 0.0949 | 0.0948 | 0.0943 |

表A.6 铁的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fe元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 1# | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 2 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 3 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 4 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 5 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 6 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 7 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 8 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 9 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 10 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 11 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 12 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 2# | 0.0052 | 0.0051 | 0.0052 | 0.0052 | 0.0052 | 0.0052 | 0.0051 |
| 2 | 0.0045 | 0.0046 | 0.0048 | 0.0049 | 0.0050 | 0.0046 | 0.0047 |
| 3 | 0.0051 | 0.0051 | 0.0051 | 0.0049 | 0.0051 | 0.0048 | 0.0052 |
| 4 | 0.0050 | 0.0049 | 0.0048 | 0.0052 | 0.0050 | 0.0049 | 0.0048 |
| 5 | 0.0047 | 0.0048 | 0.0050 | 0.0051 | 0.0049 | 0.0048 | 0.0050 |
| 6 | 0.0050 | 0.0048 | 0.0049 | 0.0049 | 0.0048 | 0.0049 | 0.0048 |
| 7 | 0.0050 | 0.0052 | 0.0051 | 0.0053 | 0.0051 | 0.0052 | 0.0052 |
| 8 | 0.0047 | 0.0046 | 0.0048 | 0.0049 | 0.0048 | 0.0047 | 0.0048 |
| 9 | 0.0050 | 0.0050 | 0.0051 | 0.0051 | 0.0050 | 0.0052 | 0.0050 |
| 10 | 0.0051 | 0.0050 | 0.0050 | 0.0051 | 0.0052 | 0.0052 | 0.0053 |
| 11 | 0.0049 | 0.0048 | 0.0049 | 0.0052 | 0.0049 | 0.0050 | 0.0048 |
| 12 | 0.0051 | 0.0052 | 0.0053 | 0.0053 | 0.0052 | 0.0051 | 0.0051 |
| 13 | 0.0050 | 0.0053 | 0.0052 | 0.0052 | 0.0051 | 0.0053 | 0.0050 |
| 14 | 0.0050 | 0.0052 | 0.0051 | 0.0052 | 0.0052 | 0.0051 | 0.0052 |
| 15 | 0.0050 | 0.0051 | 0.0050 | 0.0049 | 0.0052 | 0.0050 | 0.0051 |
| 16 | 0.0069 | 0.0073 | 0.0077 | 0.0071 | 0.0075 | 0.0071 | 0.0071 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 3# | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0103 |
| 2 | 0.0107 | 0.0102 | 0.0106 | 0.0103 | 0.0108 | 0.0102 | 0.0110 |
| 3 | 0.0098 | 0.0097 | 0.0099 | 0.0096 | 0.0100 | 0.0101 | 0.0098 |
| 4 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0100 | 0.0095 |
| 5 | 0.0106 | 0.0104 | 0.0115 | 0.0102 | 0.0115 | 0.0116 | 0.0107 |
| 6 | 0.0099 | 0.0099 | 0.0100 | 0.0101 | 0.0111 | 0.0099 | 0.0103 |
| 7 | 0.0105 | 0.0106 | 0.0106 | 0.0107 | 0.0105 | 0.0107 | 0.0108 |
| 8 | 0.0100 | 0.0100 | 0.0110 | 0.0100 | 0.0100 | 0.0100 | 0.0100 |
| 9 | 0.0103 | 0.0102 | 0.0103 | 0.0103 | 0.0101 | 0.0103 | 0.0100 |
| 10 | 0.0103 | 0.0100 | 0.0102 | 0.0100 | 0.0100 | 0.0100 | 0.0101 |
| 11 | 0.0103 | 0.0102 | 0.0100 | 0.0104 | 0.0103 | 0.0103 | 0.0102 |
| 12 | 0.0099 | 0.0101 | 0.0101 | 0.0100 | 0.0101 | 0.0100 | 0.0102 |
| 13 | 0.0155 | 0.0147 | 0.0150 | 0.0148 | 0.0149 | 0.0153 | 0.0151 |
| 14 | 0.0101 | 0.0103 | 0.0102 | 0.0102 | 0.0103 | 0.0102 | 0.0102 |
| 15 | 0.0166 | 0.0171 | 0.0174 | 0.0169 | 0.0170 | 0.0172 | 0.0168 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 4# | 0.0247 | 0.0245 | 0.0249 | 0.0247 | 0.0251 | 0.0246 | 0.0249 |
| 2 | 0.0251 | 0.0245 | 0.0248 | 0.0242 | 0.0239 | 0.0248 | 0.0246 |
| 3 | 0.0264 | 0.0262 | 0.0266 | 0.0264 | 0.0269 | 0.0261 | 0.0259 |
| 4 | 0.0208 | 0.0224 | 0.0210 | 0.0200 | 0.0210 | 0.0209 | 0.0212 |
| 5 | 0.0250 | 0.0252 | 0.0253 | 0.0253 | 0.0250 | 0.0252 | 0.0253 |
| 6 | 0.0251 | 0.0250 | 0.0249 | 0.0248 | 0.0253 | 0.0252 | 0.0249 |
| 7 | 0.0247 | 0.0244 | 0.0247 | 0.0246 | 0.0247 | 0.0244 | 0.0247 |
| 8 | 0.0252 | 0.0250 | 0.0246 | 0.0249 | 0.0254 | 0.0235 | 0.0248 |
| 9 | 0.0242 | 0.0248 | 0.0250 | 0.0254 | 0.0254 | 0.0246 | 0.0251 |
| 10 | 0.0247 | 0.0249 | 0.0249 | 0.0250 | 0.0246 | 0.0249 | 0.0254 |
| 11 | 0.0251 | 0.0254 | 0.0246 | 0.0247 | 0.0240 | 0.0240 | 0.0253 |
| 12 | 0.0214 | 0.0214 | 0.0214 | 0.0213 | 0.0213 | 0.0214 | 0.0214 |
| 13 | 0.0206 | 0.0210 | 0.0204 | 0.0209 | 0.0208 | 0.0211 | 0.0203 |
| 14 | 0.0247 | 0.0249 | 0.0250 | 0.0249 | 0.0250 | 0.0249 | 0.0249 |
| 15 | 0.0227 | 0.0227 | 0.0231 | 0.0230 | 0.0229 | 0.0233 | 0.0231 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 5# | 0.0498 | 0.0498 | 0.0499 | 0.0497 | 0.0501 | 0.0500 | 0.0502 |
| 2 | 0.0487 | 0.0495 | 0.0478 | 0.0483 | 0.0489 | 0.0490 | 0.0488 |
| 3 | 0.0495 | 0.0495 | 0.0499 | 0.0499 | 0.0501 | 0.0503 | 0.0496 |
| 4 | 0.0498 | 0.0506 | 0.0504 | 0.0500 | 0.0506 | 0.0504 | 0.0502 |
| 5 | 0.0499 | 0.0500 | 0.0501 | 0.0495 | 0.0488 | 0.0489 | 0.0496 |
| 6 | 0.0509 | 0.0504 | 0.0520 | 0.0505 | 0.0500 | 0.0499 | 0.0522 |
| 7 | 0.0501 | 0.0504 | 0.0500 | 0.0505 | 0.0503 | 0.0499 | 0.0498 |
| 8 | 0.0505 | 0.0504 | 0.0500 | 0.0501 | 0.0503 | 0.0502 | 0.0501 |
| 9 | 0.0498 | 0.0495 | 0.0496 | 0.0492 | 0.0501 | 0.0498 | 0.0500 |
| 10 | 0.0511 | 0.0488 | 0.0496 | 0.0504 | 0.0502 | 0.0497 | 0.0493 |
| 11 | 0.0504 | 0.0489 | 0.0502 | 0.0510 | 0.0500 | 0.0504 | 0.0505 |
| 12 | 0.0511 | 0.0514 | 0.0488 | 0.0500 | 0.0491 | 0.0492 | 0.0509 |
| 13 | 0.0498 | 0.0500 | 0.0495 | 0.0489 | 0.0501 | 0.0505 | 0.0492 |
| 14 | 0.0518 | 0.0522 | 0.0513 | 0.0506 | 0.0505 | 0.0504 | 0.0508 |
| 15 | 0.0498 | 0.0498 | 0.0499 | 0.0499 | 0.0501 | 0.0500 | 0.0502 |
| 16 | 0.0531 | 0.0553 | 0.0533 | 0.0555 | 0.0525 | 0.0533 | 0.0515 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Fe | 1 | 6# | 0.1112 | 0.1105 | 0.1104 | 0.1105 | 0.1102 | 0.1109 | 0.1110 |
| 2 | 0.0983 | 0.0995 | 0.0993 | 0.0983 | 0.0990 | 0.0992 | 0.0977 |
| 3 | 0.1010 | 0.1009 | 0.1008 | 0.1011 | 0.1010 | 0.1009 | 0.1008 |
| 4 | 0.0990 | 0.0994 | 0.0994 | 0.0995 | 0.0994 | 0.0999 | 0.1001 |
| 5 | 0.1001 | 0.1024 | 0.0995 | 0.1016 | 0.1036 | 0.0981 | 0.0991 |
| 6 | 0.1022 | 0.1027 | 0.1018 | 0.1011 | 0.1022 | 0.1021 | 0.1022 |
| 7 | 0.1015 | 0.1013 | 0.1014 | 0.1010 | 0.1012 | 0.1013 | 0.1014 |
| 8 | 0.1111 | 0.1120 | 0.1112 | 0.1115 | 0.1111 | 0.1113 | 0.1121 |
| 9 | 0.0998 | 0.1003 | 0.1022 | 0.1037 | 0.1057 | 0.1014 | 0.1029 |
| 10 | 0.1020 | 0.1026 | 0.1022 | 0.1015 | 0.1051 | 0.1011 | 0.1037 |
| 11 | 0.1035 | 0.1031 | 0.1047 | 0.1048 | 0.1033 | 0.1034 | 0.1038 |
| 12 | 0.1034 | 0.1028 | 0.1036 | 0.1029 | 0.1051 | 0.1028 | 0.1024 |
| 13 | 0.1053 | 0.1022 | 0.1021 | 0.1031 | 0.1022 | 0.1041 | 0.1031 |
| 14 | 0.1098 | 0.1092 | 0.1096 | 0.1105 | 0.1102 | 0.1100 | 0.1105 |
| 15 | 0.0995 | 0.0998 | 0.1010 | 0.1015 | 0.0998 | 0.0996 | 0.0995 |

表A.7 铝的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Al元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 1# | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 2 | 0.0005 | 0.0006 | 0.0006 | 0.0005 | 0.0005 | 0.0006 | 0.0006 |
| 3 | 0.0002 | 0.0002 | 0.0003 | 0.0002 | 0.0001 | 0.0003 | 0.0002 |
| 4 | 0.0003 | 0.0003 | 0.0004 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 5 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 6 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 7 | 0.0003 | 0.0003 | 0.0004 | 0.0003 | 0.0004 | 0.0003 | 0.0004 |
| 8 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 9 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 10 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 11 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 12 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 2# | 0.0050 | 0.0050 | 0.0050 | 0.0051 | 0.0050 | 0.0050 | 0.0050 |
| 2 | 0.0053 | 0.0054 | 0.0054 | 0.0050 | 0.0049 | 0.0052 | 0.0051 |
| 3 | 0.0051 | 0.0052 | 0.0050 | 0.0052 | 0.0050 | 0.0051 | 0.0050 |
| 4 | 0.0050 | 0.0052 | 0.0051 | 0.0049 | 0.0048 | 0.0050 | 0.0051 |
| 5 | 0.0048 | 0.0051 | 0.0047 | 0.0049 | 0.0048 | 0.0046 | 0.0050 |
| 6 | 0.0050 | 0.0052 | 0.0051 | 0.0051 | 0.0052 | 0.0052 | 0.0051 |
| 7 | 0.0050 | 0.0050 | 0.0050 | 0.0049 | 0.0050 | 0.0049 | 0.0049 |
| 8 | 0.0052 | 0.0051 | 0.0050 | 0.0049 | 0.0050 | 0.0052 | 0.0051 |
| 9 | 0.0050 | 0.0052 | 0.0053 | 0.0055 | 0.0050 | 0.0054 | 0.0050 |
| 10 | 0.0049 | 0.0052 | 0.0050 | 0.0052 | 0.0049 | 0.0049 | 0.0051 |
| 11 | 0.0050 | 0.0052 | 0.0049 | 0.0049 | 0.0052 | 0.0050 | 0.0051 |
| 12 | 0.0051 | 0.0051 | 0.0051 | 0.0051 | 0.0051 | 0.0052 | 0.0050 |
| 13 | 0.0049 | 0.0051 | 0.0051 | 0.0050 | 0.0050 | 0.0049 | 0.0051 |
| 14 | 0.0050 | 0.0050 | 0.0052 | 0.0051 | 0.0051 | 0.0051 | 0.0053 |
| 15 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 |
| 16 | 0.0049 | 0.0050 | 0.0052 | 0.0054 | 0.0052 | 0.0050 | 0.0048 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 3# | 0.0101 | 0.0103 | 0.0103 | 0.0102 | 0.0101 | 0.0102 | 0.0103 |
| 2 | 0.0113 | 0.0108 | 0.0110 | 0.0106 | 0.0115 | 0.0109 | 0.0111 |
| 3 | 0.0100 | 0.0099 | 0.0099 | 0.0101 | 0.0100 | 0.0102 | 0.0103 |
| 4 | 0.0111 | 0.0110 | 0.0110 | 0.0111 | 0.0111 | 0.0098 | 0.0104 |
| 5 | 0.0112 | 0.0097 | 0.0111 | 0.0105 | 0.0107 | 0.0099 | 0.0102 |
| 6 | 0.0103 | 0.0103 | 0.0103 | 0.0102 | 0.0103 | 0.0103 | 0.0103 |
| 7 | 0.0101 | 0.0099 | 0.0102 | 0.0104 | 0.0099 | 0.0101 | 0.0103 |
| 8 | 0.0100 | 0.0110 | 0.0100 | 0.0100 | 0.0110 | 0.0100 | 0.0110 |
| 9 | 0.0101 | 0.0102 | 0.0100 | 0.0103 | 0.0102 | 0.0103 | 0.0101 |
| 10 | 0.0100 | 0.0100 | 0.0101 | 0.0100 | 0.0103 | 0.0101 | 0.0104 |
| 11 | 0.0100 | 0.0102 | 0.0100 | 0.0101 | 0.0102 | 0.0102 | 0.0102 |
| 12 | 0.0101 | 0.0104 | 0.0102 | 0.0100 | 0.0101 | 0.0101 | 0.0103 |
| 13 | 0.0122 | 0.0127 | 0.0120 | 0.0119 | 0.0124 | 0.0124 | 0.0128 |
| 14 | 0.0099 | 0.0101 | 0.0103 | 0.0104 | 0.0101 | 0.0102 | 0.0103 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 4# | 0.0221 | 0.0222 | 0.0223 | 0.0224 | 0.0223 | 0.0222 | 0.0222 |
| 2 | 0.0205 | 0.0214 | 0.0200 | 0.0203 | 0.0214 | 0.0211 | 0.0209 |
| 3 | 0.0218 | 0.0215 | 0.0217 | 0.0219 | 0.0220 | 0.0216 | 0.0218 |
| 4 | 0.0221 | 0.0218 | 0.0228 | 0.0224 | 0.0229 | 0.0220 | 0.0216 |
| 5 | 0.0211 | 0.0204 | 0.0196 | 0.0203 | 0.0209 | 0.0219 | 0.0213 |
| 6 | 0.0225 | 0.0224 | 0.0224 | 0.0222 | 0.0223 | 0.0222 | 0.0221 |
| 7 | 0.0219 | 0.0220 | 0.0221 | 0.0221 | 0.0220 | 0.0221 | 0.0217 |
| 8 | 0.0222 | 0.0220 | 0.0223 | 0.0224 | 0.0220 | 0.0227 | 0.0220 |
| 9 | 0.0215 | 0.0218 | 0.0214 | 0.0213 | 0.0222 | 0.0224 | 0.0224 |
| 10 | 0.0222 | 0.0218 | 0.0218 | 0.0222 | 0.0222 | 0.0217 | 0.0218 |
| 11 | 0.0219 | 0.0208 | 0.0222 | 0.0211 | 0.0219 | 0.0210 | 0.0210 |
| 12 | 0.0221 | 0.0225 | 0.0213 | 0.0220 | 0.0211 | 0.0220 | 0.0221 |
| 13 | 0.0202 | 0.0202 | 0.0202 | 0.0201 | 0.0201 | 0.0202 | 0.0201 |
| 14 | 0.0202 | 0.0205 | 0.0200 | 0.0215 | 0.0200 | 0.0202 | 0.0208 |
| 15 | 0.0222 | 0.0220 | 0.0223 | 0.0224 | 0.0218 | 0.0219 | 0.0217 |
| 16 | 0.0220 | 0.0204 | 0.0202 | 0.0205 | 0.0223 | 0.0220 | 0.0204 |
| 17 | 0.0235 | 0.0230 | 0.0232 | 0.0234 | 0.0237 | 0.0231 | 0.0233 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 5# | 0.0510 | 0.0511 | 0.0511 | 0.0507 | 0.0512 | 0.0512 | 0.0517 |
| 2 | 0.0509 | 0.0507 | 0.0506 | 0.0503 | 0.0508 | 0.0512 | 0.0511 |
| 3 | 0.0499 | 0.0496 | 0.0496 | 0.0501 | 0.0499 | 0.0502 | 0.0500 |
| 4 | 0.0500 | 0.0504 | 0.0496 | 0.0498 | 0.0494 | 0.0494 | 0.0504 |
| 5 | 0.0488 | 0.0492 | 0.0501 | 0.0486 | 0.0487 | 0.0491 | 0.0489 |
| 6 | 0.0489 | 0.0486 | 0.0495 | 0.0494 | 0.0491 | 0.0484 | 0.0500 |
| 7 | 0.0501 | 0.0510 | 0.0506 | 0.0503 | 0.0504 | 0.0508 | 0.0508 |
| 8 | 0.0496 | 0.0495 | 0.0498 | 0.0495 | 0.0498 | 0.0494 | 0.0502 |
| 9 | 0.0511 | 0.0505 | 0.0517 | 0.0510 | 0.0518 | 0.0510 | 0.0515 |
| 10 | 0.0500 | 0.0489 | 0.0503 | 0.0511 | 0.0513 | 0.0511 | 0.0512 |
| 11 | 0.0500 | 0.0492 | 0.0511 | 0.0515 | 0.0499 | 0.0506 | 0.0507 |
| 12 | 0.0513 | 0.0501 | 0.0507 | 0.0509 | 0.0514 | 0.0515 | 0.0509 |
| 13 | 0.0512 | 0.0495 | 0.0509 | 0.0497 | 0.0509 | 0.0498 | 0.0511 |
| 14 | 0.0504 | 0.0501 | 0.0503 | 0.0511 | 0.0524 | 0.0509 | 0.0501 |
| 15 | 0.0510 | 0.0511 | 0.0508 | 0.0507 | 0.0510 | 0.0513 | 0.0515 |
| 16 | 0.0532 | 0.0534 | 0.0526 | 0.0528 | 0.0533 | 0.0536 | 0.0525 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Al | 1 | 6# | 0.1004 | 0.1004 | 0.1004 | 0.1005 | 0.1005 | 0.1006 | 0.1006 |
| 2 | 0.1005 | 0.1028 | 0.1025 | 0.1018 | 0.1019 | 0.1026 | 0.1020 |
| 3 | 0.1002 | 0.1003 | 0.1000 | 0.1001 | 0.1002 | 0.1002 | 0.1001 |
| 4 | 0.1041 | 0.1048 | 0.1045 | 0.1050 | 0.1047 | 0.1053 | 0.1053 |
| 5 | 0.1058 | 0.1096 | 0.1218 | 0.1092 | 0.1132 | 0.1076 | 0.1102 |
| 6 | 0.0999 | 0.0999 | 0.1001 | 0.0998 | 0.0999 | 0.1001 | 0.0997 |
| 7 | 0.1002 | 0.1004 | 0.1003 | 0.1002 | 0.1005 | 0.1003 | 0.1004 |
| 8 | 0.1006 | 0.1004 | 0.1008 | 0.1004 | 0.1005 | 0.1003 | 0.1004 |
| 9 | 0.0997 | 0.1054 | 0.1055 | 0.1022 | 0.1065 | 0.1075 | 0.1017 |
| 10 | 0.1059 | 0.1038 | 0.1065 | 0.1089 | 0.1043 | 0.1048 | 0.1061 |
| 11 | 0.1047 | 0.1017 | 0.1010 | 0.1035 | 0.1037 | 0.1047 | 0.1013 |
| 12 | 0.1058 | 0.1034 | 0.1024 | 0.1041 | 0.1069 | 0.1071 | 0.1020 |
| 13 | 0.1023 | 0.1021 | 0.1000 | 0.1028 | 0.1028 | 0.1021 | 0.1016 |
| 14 | 0.1000 | 0.1002 | 0.1001 | 0.1003 | 0.1002 | 0.1003 | 0.1001 |
| 15 | 0.1018 | 0.1017 | 0.1023 | 0.1015 | 0.1032 | 0.1012 | 0.1015 |

表A.8 镍的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ni元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 1# | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 |
| 2 | 0.0007 | 0.0008 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 |
| 3 | 0.0008 | 0.0007 | 0.0009 | 0.0006 | 0.0008 | 0.0007 | 0.0009 |
| 4 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0010 | 0.0009 |
| 5 | 0.0009 | 0.0010 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0010 |
| 6 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 | 0.0008 |
| 7 | 0.0009 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0009 |
| 8 | 0.0010 | 0.0009 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0010 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 2# | 0.0056 | 0.0056 | 0.0057 | 0.0056 | 0.0056 | 0.0056 | 0.0057 |
| 2 | 0.0048 | 0.0058 | 0.005 | 0.0053 | 0.0049 | 0.0051 | 0.0055 |
| 3 | 0.0052 | 0.0055 | 0.005 | 0.0049 | 0.0054 | 0.0051 | 0.0048 |
| 4 | 0.0056 | 0.0056 | 0.0057 | 0.0056 | 0.0056 | 0.0056 | 0.0057 |
| 5 | 0.0057 | 0.0056 | 0.0057 | 0.0058 | 0.0057 | 0.0057 | 0.0058 |
| 6 | 0.0052 | 0.0051 | 0.0051 | 0.005 | 0.0052 | 0.0049 | 0.0049 |
| 7 | 0.0055 | 0.0054 | 0.0052 | 0.0057 | 0.0056 | 0.0052 | 0.0057 |
| 8 | 0.0053 | 0.0051 | 0.0054 | 0.0054 | 0.0051 | 0.0051 | 0.005 |
| 9 | 0.0053 | 0.0054 | 0.005 | 0.0049 | 0.0052 | 0.005 | 0.005 |
| 10 | 0.0049 | 0.0049 | 0.0049 | 0.005 | 0.0051 | 0.0055 | 0.0053 |
| 11 | 0.0053 | 0.0052 | 0.0051 | 0.0049 | 0.0051 | 0.0049 | 0.0052 |
| 12 | 0.0051 | 0.0051 | 0.0051 | 0.005 | 0.0051 | 0.005 | 0.005 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 3# | 0.0161 | 0.0162 | 0.0162 | 0.0163 | 0.0163 | 0.0165 | 0.0161 |
| 2 | 0.0152 | 0.0159 | 0.0152 | 0.0161 | 0.0157 | 0.0151 | 0.0163 |
| 3 | 0.0151 | 0.0153 | 0.0150 | 0.0148 | 0.0152 | 0.0150 | 0.0146 |
| 4 | 0.0161 | 0.0162 | 0.0162 | 0.0163 | 0.0163 | 0.0146 | 0.0022 |
| 5 | 0.0103 | 0.0102 | 0.0102 | 0.0103 | 0.0104 | 0.0104 | 0.0104 |
| 6 | 0.0154 | 0.0159 | 0.0153 | 0.0157 | 0.0157 | 0.0157 | 0.0154 |
| 7 | 0.0155 | 0.0152 | 0.0153 | 0.0152 | 0.0154 | 0.0154 | 0.0151 |
| 8 | 0.0160 | 0.0150 | 0.0160 | 0.0160 | 0.0150 | 0.0160 | 0.0160 |
| 9 | 0.0155 | 0.0160 | 0.0157 | 0.0157 | 0.0164 | 0.0161 | 0.0157 |
| 10 | 0.0162 | 0.0158 | 0.0159 | 0.0163 | 0.0157 | 0.0162 | 0.0160 |
| 11 | 0.0164 | 0.0164 | 0.0160 | 0.0163 | 0.0160 | 0.0158 | 0.0159 |
| 12 | 0.0161 | 0.0160 | 0.0158 | 0.0162 | 0.0163 | 0.0155 | 0.0157 |
| 13 | 0.0104 | 0.0112 | 0.0109 | 0.0105 | 0.0107 | 0.0109 | 0.0111 |
| 14 | 0.0159 | 0.0161 | 0.0162 | 0.0162 | 0.0163 | 0.0163 | 0.0160 |
| 15 | 0.0102 | 0.0103 | 0.0103 | 0.0098 | 0.0103 | 0.0103 | 0.0098 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 4# | 0.0212 | 0.0213 | 0.0214 | 0.0212 | 0.0214 | 0.0209 | 0.0210 |
| 2 | 0.0217 | 0.0228 | 0.0207 | 0.0211 | 0.0221 | 0.0210 | 0.0214 |
| 3 | 0.0212 | 0.0213 | 0.0214 | 0.0212 | 0.0214 | 0.0209 | 0.0208 |
| 4 | 0.0246 | 0.0247 | 0.0249 | 0.0247 | 0.0247 | 0.0249 | 0.0249 |
| 5 | 0.0206 | 0.0209 | 0.0209 | 0.0207 | 0.0208 | 0.0207 | 0.0208 |
| 6 | 0.0202 | 0.0205 | 0.0204 | 0.0208 | 0.0205 | 0.0206 | 0.0204 |
| 7 | 0.0214 | 0.0212 | 0.0215 | 0.0216 | 0.0212 | 0.0218 | 0.0212 |
| 8 | 0.0208 | 0.0207 | 0.0209 | 0.0206 | 0.0207 | 0.0210 | 0.0206 |
| 9 | 0.0206 | 0.0210 | 0.0209 | 0.0208 | 0.0210 | 0.0210 | 0.0206 |
| 10 | 0.0208 | 0.0213 | 0.0208 | 0.0210 | 0.0207 | 0.0211 | 0.0211 |
| 11 | 0.0212 | 0.0211 | 0.0215 | 0.0214 | 0.0214 | 0.0215 | 0.0212 |
| 12 | 0.0253 | 0.0253 | 0.0255 | 0.0253 | 0.0253 | 0.0253 | 0.0253 |
| 13 | 0.0258 | 0.0259 | 0.0261 | 0.0260 | 0.0261 | 0.0265 | 0.0266 |
| 14 | 0.0205 | 0.0206 | 0.0202 | 0.0203 | 0.0205 | 0.0204 | 0.0204 |
| 15 | 0.0261 | 0.0250 | 0.0250 | 0.0257 | 0.0250 | 0.0252 | 0.0252 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 5# | 0.0499 | 0.0498 | 0.0498 | 0.0496 | 0.0500 | 0.0500 | 0.0503 |
| 2 | 0.0489 | 0.0489 | 0.0494 | 0.0499 | 0.0501 | 0.0500 | 0.0495 |
| 3 | 0.0500 | 0.0495 | 0.0495 | 0.0499 | 0.0502 | 0.0501 | 0.0499 |
| 4 | 0.0496 | 0.0498 | 0.0496 | 0.0502 | 0.0500 | 0.0502 | 0.0504 |
| 5 | 0.0496 | 0.0501 | 0.0500 | 0.0499 | 0.0489 | 0.0486 | 0.0492 |
| 6 | 0.0482 | 0.0488 | 0.0489 | 0.0493 | 0.0486 | 0.0490 | 0.0489 |
| 7 | 0.0493 | 0.0494 | 0.0497 | 0.0499 | 0.0496 | 0.0497 | 0.0499 |
| 8 | 0.0495 | 0.0498 | 0.0496 | 0.0497 | 0.0495 | 0.0499 | 0.0498 |
| 9 | 0.0493 | 0.0499 | 0.0495 | 0.0499 | 0.0493 | 0.0503 | 0.0505 |
| 10 | 0.0495 | 0.0508 | 0.0488 | 0.0500 | 0.0509 | 0.0491 | 0.0497 |
| 11 | 0.0489 | 0.0508 | 0.0486 | 0.0500 | 0.0507 | 0.0500 | 0.0508 |
| 12 | 0.0510 | 0.0511 | 0.0505 | 0.0502 | 0.0500 | 0.0506 | 0.0511 |
| 13 | 0.0501 | 0.0492 | 0.0501 | 0.0493 | 0.0496 | 0.0497 | 0.0498 |
| 14 | 0.0508 | 0.0504 | 0.0501 | 0.0503 | 0.0505 | 0.0503 | 0.0503 |
| 15 | 0.0502 | 0.0503 | 0.0498 | 0.0498 | 0.0499 | 0.0500 | 0.0500 |
| 16 | 0.0516 | 0.0520 | 0.0512 | 0.0516 | 0.0514 | 0.0510 | 0.0512 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Ni | 1 | 6# | 0.0981 | 0.0988 | 0.0987 | 0.0986 | 0.0985 | 0.0992 | 0.0993 |
| 2 | 0.0958 | 0.0965 | 0.0950 | 0.0966 | 0.0971 | 0.0967 | 0.0969 |
| 3 | 0.1000 | 0.1001 | 0.0988 | 0.0989 | 0.0995 | 0.0992 | 0.0998 |
| 4 | 0.0981 | 0.0988 | 0.0987 | 0.0986 | 0.0985 | 0.0992 | 0.0993 |
| 5 | 0.0954 | 0.0967 | 0.0955 | 0.0963 | 0.0980 | 0.0957 | 0.0973 |
| 6 | 0.0993 | 0.0988 | 0.0994 | 0.0993 | 0.0993 | 0.0994 | 0.0995 |
| 7 | 0.1003 | 0.1005 | 0.1000 | 0.1002 | 0.1000 | 0.1004 | 0.1006 |
| 8 | 0.0975 | 0.0980 | 0.0981 | 0.0988 | 0.0981 | 0.0983 | 0.0984 |
| 9 | 0.0982 | 0.0977 | 0.0992 | 0.0988 | 0.0982 | 0.0984 | 0.1002 |
| 10 | 0.0977 | 0.0988 | 0.0995 | 0.1005 | 0.0981 | 0.0970 | 0.1004 |
| 11 | 0.0992 | 0.1003 | 0.0992 | 0.0993 | 0.0994 | 0.0971 | 0.1003 |
| 12 | 0.0984 | 0.0983 | 0.0985 | 0.0997 | 0.0977 | 0.0991 | 0.0987 |
| 13 | 0.1011 | 0.1002 | 0.1005 | 0.1001 | 0.0999 | 0.1002 | 0.1010 |
| 14 | 0.0985 | 0.0981 | 0.0988 | 0.0987 | 0.0985 | 0.0985 | 0.0992 |
| 15 | 0.0952 | 0.0948 | 0.0962 | 0.0958 | 0.0964 | 0.0959 | 0.0956 |

表A.9 铜的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cu元素1#-6#样品精密度试验数据 | | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 1# | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 2 | 0.0001 | 0.0001 | 0.0000 | 0.0001 | 0.0000 | 0.0001 | 0.0001 |
| 3 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 4 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 5 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 6 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 7 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 8 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 9 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 10 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 11 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 12 | 0.0003 | 0.0003 | 0.0003 | 0.0002 | 0.0003 | 0.0002 | 0.0002 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 2# | 0.0049 | 0.0049 | 0.0049 | 0.0050 | 0.0050 | 0.0049 | 0.0049 |
| 2 | 0.0043 | 0.0041 | 0.0042 | 0.0045 | 0.0043 | 0.0046 | 0.0043 |
| 3 | 0.0049 | 0.0049 | 0.0050 | 0.0050 | 0.0051 | 0.0050 | 0.0049 |
| 4 | 0.0050 | 0.0051 | 0.0048 | 0.0049 | 0.0049 | 0.0050 | 0.0049 |
| 5 | 0.0046 | 0.0048 | 0.0050 | 0.0051 | 0.0049 | 0.0048 | 0.0047 |
| 6 | 0.0051 | 0.0045 | 0.0048 | 0.0052 | 0.0051 | 0.0051 | 0.0051 |
| 7 | 0.0051 | 0.0052 | 0.0050 | 0.0052 | 0.0051 | 0.0050 | 0.0053 |
| 8 | 0.0049 | 0.0051 | 0.0050 | 0.0052 | 0.0050 | 0.0048 | 0.0049 |
| 9 | 0.0050 | 0.0052 | 0.0050 | 0.0053 | 0.0051 | 0.0050 | 0.0050 |
| 10 | 0.0049 | 0.0053 | 0.0053 | 0.0049 | 0.0050 | 0.0051 | 0.0052 |
| 11 | 0.0052 | 0.0051 | 0.0052 | 0.0051 | 0.0053 | 0.0053 | 0.0052 |
| 12 | 0.0049 | 0.0052 | 0.0049 | 0.0052 | 0.0052 | 0.0051 | 0.0051 |
| 13 | 0.0053 | 0.0053 | 0.0052 | 0.0053 | 0.0053 | 0.0052 | 0.0051 |
| 14 | 0.0051 | 0.0052 | 0.0050 | 0.0051 | 0.0051 | 0.0053 | 0.0052 |
| 15 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0049 | 0.0050 |
| 16 | 0.0049 | 0.0050 | 0.0050 | 0.0048 | 0.0049 | 0.0050 | 0.0050 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 3# | 0.0473 | 0.0477 | 0.0476 | 0.0477 | 0.0484 | 0.0477 | 0.0475 |
| 2 | 0.0465 | 0.0471 | 0.0468 | 0.0476 | 0.0465 | 0.0480 | 0.0462 |
| 3 | 0.0472 | 0.0470 | 0.0476 | 0.0482 | 0.0469 | 0.0465 | 0.0475 |
| 4 | 0.0473 | 0.0467 | 0.0464 | 0.0448 | 0.0440 | 0.0471 | 0.0454 |
| 5 | 0.0473 | 0.0477 | 0.0476 | 0.0477 | 0.0484 | 0.0477 | 0.0475 |
| 6 | 0.0465 | 0.0471 | 0.0468 | 0.0476 | 0.0465 | 0.0480 | 0.0462 |
| 7 | 0.0472 | 0.0470 | 0.0476 | 0.0482 | 0.0469 | 0.0465 | 0.0475 |
| 8 | 0.0473 | 0.0467 | 0.0464 | 0.0448 | 0.0440 | 0.0471 | 0.0454 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 4# | 0.0498 | 0.0496 | 0.0501 | 0.0497 | 0.0502 | 0.0504 | 0.0504 |
| 2 | 0.0479 | 0.0483 | 0.0492 | 0.0484 | 0.0482 | 0.0475 | 0.0471 |
| 3 | 0.0493 | 0.0500 | 0.0497 | 0.0499 | 0.0497 | 0.0499 | 0.0499 |
| 4 | 0.0500 | 0.0498 | 0.0498 | 0.0496 | 0.0502 | 0.0506 | 0.0496 |
| 5 | 0.0500 | 0.0501 | 0.0496 | 0.0488 | 0.0497 | 0.0499 | 0.0489 |
| 6 | 0.0474 | 0.0472 | 0.0471 | 0.0475 | 0.0469 | 0.0473 | 0.0469 |
| 7 | 0.0502 | 0.0503 | 0.0508 | 0.0505 | 0.0507 | 0.0502 | 0.0504 |
| 8 | 0.0498 | 0.0497 | 0.0497 | 0.0496 | 0.0499 | 0.0501 | 0.0500 |
| 9 | 0.0492 | 0.0498 | 0.0496 | 0.0498 | 0.0492 | 0.0501 | 0.0498 |
| 10 | 0.0503 | 0.0504 | 0.0500 | 0.0493 | 0.0496 | 0.0507 | 0.0488 |
| 11 | 0.0505 | 0.0502 | 0.0505 | 0.0499 | 0.0497 | 0.0496 | 0.0499 |
| 12 | 0.0498 | 0.0501 | 0.0497 | 0.0490 | 0.0500 | 0.0503 | 0.0499 |
| 13 | 0.0514 | 0.0500 | 0.0509 | 0.0501 | 0.0502 | 0.0507 | 0.0505 |
| 14 | 0.0508 | 0.0512 | 0.0503 | 0.0501 | 0.0504 | 0.0509 | 0.0511 |
| 15 | 0.0497 | 0.0500 | 0.0497 | 0.0500 | 0.0499 | 0.0500 | 0.0501 |
| 16 | 0.0507 | 0.0507 | 0.0506 | 0.0506 | 0.0504 | 0.0506 | 0.0506 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 5# | 0.0752 | 0.0757 | 0.0754 | 0.0752 | 0.0756 | 0.0757 | 0.0753 |
| 2 | 0.0777 | 0.0782 | 0.0786 | 0.0788 | 0.0795 | 0.0791 | 0.0775 |
| 3 | 0.0740 | 0.0737 | 0.0740 | 0.0733 | 0.0732 | 0.0742 | 0.0732 |
| 4 | 0.0752 | 0.0757 | 0.0754 | 0.0752 | 0.0756 | 0.0757 | 0.0753 |
| 5 | 0.0761 | 0.0760 | 0.0764 | 0.0760 | 0.0757 | 0.0757 | 0.0757 |
| 6 | 0.0757 | 0.0756 | 0.0758 | 0.0754 | 0.0753 | 0.0755 | 0.0758 |
| 7 | 0.0750 | 0.0740 | 0.0750 | 0.0750 | 0.0740 | 0.0750 | 0.0750 |
| 8 | 0.0752 | 0.0753 | 0.0755 | 0.0755 | 0.0756 | 0.0755 | 0.0751 |
| 9 | 0.0754 | 0.0748 | 0.0751 | 0.0750 | 0.0753 | 0.0754 | 0.0754 |
| 10 | 0.0749 | 0.0751 | 0.0755 | 0.0753 | 0.0753 | 0.0751 | 0.0752 |
| 11 | 0.0752 | 0.0751 | 0.0753 | 0.0751 | 0.0755 | 0.0751 | 0.0752 |
| 12 | 0.0745 | 0.0746 | 0.0747 | 0.0745 | 0.0745 | 0.0744 | 0.0746 |
| 13 | 0.0755 | 0.0757 | 0.0754 | 0.0751 | 0.0756 | 0.0753 | 0.0753 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Cu | 1 | 6# | 0.1010 | 0.1013 | 0.1011 | 0.1015 | 0.1015 | 0.1019 | 0.1020 |
| 2 | 0.1007 | 0.1018 | 0.1024 | 0.1018 | 0.1015 | 0.1026 | 0.1014 |
| 3 | 0.1000 | 0.0998 | 0.0985 | 0.1001 | 0.0989 | 0.0979 | 0.0996 |
| 4 | 0.1008 | 0.1013 | 0.1011 | 0.1015 | 0.1015 | 0.1019 | 0.1020 |
| 5 | 0.0991 | 0.0995 | 0.0986 | 0.0981 | 0.0996 | 0.0994 | 0.0991 |
| 6 | 0.1003 | 0.1007 | 0.1007 | 0.1010 | 0.1008 | 0.1006 | 0.1009 |
| 7 | 0.1008 | 0.1010 | 0.1011 | 0.1007 | 0.1005 | 0.1008 | 0.1012 |
| 8 | 0.1010 | 0.1009 | 0.1011 | 0.1032 | 0.1013 | 0.1021 | 0.1009 |
| 9 | 0.1049 | 0.1034 | 0.1056 | 0.1033 | 0.1035 | 0.1034 | 0.1035 |
| 10 | 0.1050 | 0.1058 | 0.1047 | 0.1044 | 0.1044 | 0.1058 | 0.1045 |
| 11 | 0.1039 | 0.1044 | 0.1043 | 0.1048 | 0.1038 | 0.1042 | 0.1041 |
| 12 | 0.1033 | 0.1045 | 0.1026 | 0.1045 | 0.1049 | 0.1045 | 0.1042 |
| 13 | 0.1033 | 0.1015 | 0.1018 | 0.1033 | 0.1015 | 0.1041 | 0.1032 |
| 14 | 0.0997 | 0.0995 | 0.0996 | 0.1001 | 0.1003 | 0.1003 | 0.1004 |
| 15 | 0.0977 | 0.0975 | 0.0983 | 0.0989 | 0.0983 | 0.0975 | 0.0983 |

表A.10 铍的精密度原始数据 单位：mg/mL

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Be元素1#-6#样品精密度试验数据 | | | | | | | | | |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 1# | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 2 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 3 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 4 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 5 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 6 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 7 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 8 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 9 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 10 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 11 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 12 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 2# | 0.0050 | 0.0049 | 0.0049 | 0.0049 | 0.0050 | 0.0050 | 0.0049 |
| 2 | 0.0050 | 0.0051 | 0.0050 | 0.0052 | 0.0052 | 0.0052 | 0.0050 |
| 3 | 0.0049 | 0.0050 | 0.0048 | 0.0050 | 0.0050 | 0.0050 | 0.0049 |
| 4 | 0.0050 | 0.0050 | 0.0050 | 0.0049 | 0.0052 | 0.0051 | 0.0051 |
| 5 | 0.0048 | 0.0049 | 0.0050 | 0.0051 | 0.0047 | 0.0048 | 0.0046 |
| 6 | 0.0050 | 0.0048 | 0.0048 | 0.0050 | 0.0049 | 0.0049 | 0.0050 |
| 7 | 0.0050 | 0.0051 | 0.0053 | 0.0052 | 0.0052 | 0.0054 | 0.0051 |
| 8 | 0.0051 | 0.0047 | 0.0049 | 0.0048 | 0.0049 | 0.0048 | 0.0047 |
| 9 | 0.0051 | 0.0051 | 0.0050 | 0.0052 | 0.0050 | 0.0053 | 0.0050 |
| 10 | 0.0049 | 0.0049 | 0.0051 | 0.0048 | 0.0049 | 0.0051 | 0.0049 |
| 11 | 0.0051 | 0.0050 | 0.0052 | 0.0049 | 0.0051 | 0.0049 | 0.0051 |
| 12 | 0.0050 | 0.0048 | 0.0050 | 0.0049 | 0.0052 | 0.0049 | 0.0048 |
| 13 | 0.0048 | 0.0052 | 0.0049 | 0.0051 | 0.0050 | 0.0048 | 0.0052 |
| 14 | 0.0052 | 0.0051 | 0.0053 | 0.0052 | 0.0052 | 0.0051 | 0.0052 |
| 15 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 | 0.0050 |
| 16 | 0.0051 | 0.0050 | 0.0050 | 0.0051 | 0.0050 | 0.0051 | 0.0050 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 3# | 0.0108 | 0.0108 | 0.0108 | 0.0108 | 0.0108 | 0.0110 | 0.0109 |
| 2 | 0.0094 | 0.0095 | 0.0093 | 0.0092 | 0.0095 | 0.0096 | 0.0095 |
| 3 | 0.0098 | 0.0097 | 0.0099 | 0.0100 | 0.0096 | 0.0097 | 0.0099 |
| 4 | 0.0108 | 0.0108 | 0.0108 | 0.0108 | 0.0108 | 0.0095 | 0.0093 |
| 5 | 0.0095 | 0.0095 | 0.0095 | 0.0096 | 0.0097 | 0.0097 | 0.0095 |
| 6 | 0.0108 | 0.0108 | 0.0107 | 0.0107 | 0.0107 | 0.0109 | 0.0108 |
| 7 | 0.0102 | 0.0103 | 0.0103 | 0.0101 | 0.0106 | 0.0105 | 0.0106 |
| 8 | 0.0110 | 0.0120 | 0.0110 | 0.0120 | 0.0110 | 0.0110 | 0.0110 |
| 9 | 0.0101 | 0.0103 | 0.0102 | 0.0103 | 0.0100 | 0.0102 | 0.0102 |
| 10 | 0.0100 | 0.0100 | 0.0101 | 0.0103 | 0.0102 | 0.0103 | 0.0100 |
| 11 | 0.0103 | 0.0103 | 0.0103 | 0.0103 | 0.0104 | 0.0103 | 0.0102 |
| 12 | 0.0101 | 0.0102 | 0.0104 | 0.0102 | 0.0101 | 0.0102 | 0.0103 |
| 13 | 0.0104 | 0.0101 | 0.0107 | 0.0102 | 0.0109 | 0.0103 | 0.0106 |
| 14 | 0.0100 | 0.0102 | 0.0098 | 0.0103 | 0.0102 | 0.0103 | 0.0102 |
| 15 | 0.0096 | 0.0095 | 0.0095 | 0.0095 | 0.0096 | 0.0096 | 0.0097 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 4# | 0.0209 | 0.0206 | 0.0209 | 0.0207 | 0.0206 | 0.0205 | 0.0207 |
| 2 | 0.0185 | 0.0184 | 0.0183 | 0.0184 | 0.0186 | 0.0185 | 0.0181 |
| 3 | 0.0201 | 0.0198 | 0.0199 | 0.0197 | 0.0200 | 0.0199 | 0.0196 |
| 4 | 0.0209 | 0.0206 | 0.0209 | 0.0207 | 0.0211 | 0.0205 | 0.0203 |
| 5 | 0.0193 | 0.0194 | 0.0194 | 0.0191 | 0.0192 | 0.0195 | 0.0193 |
| 6 | 0.0209 | 0.0205 | 0.0209 | 0.0207 | 0.0207 | 0.0205 | 0.0207 |
| 7 | 0.0196 | 0.0202 | 0.0200 | 0.0203 | 0.0204 | 0.0203 | 0.0197 |
| 8 | 0.0205 | 0.0200 | 0.0210 | 0.0200 | 0.0208 | 0.0200 | 0.0211 |
| 9 | 0.0205 | 0.0204 | 0.0206 | 0.0201 | 0.0206 | 0.0199 | 0.0205 |
| 10 | 0.0204 | 0.0211 | 0.0204 | 0.0200 | 0.0207 | 0.0206 | 0.0213 |
| 11 | 0.0195 | 0.0194 | 0.0190 | 0.0198 | 0.0197 | 0.0201 | 0.0193 |
| 12 | 0.0218 | 0.0219 | 0.0212 | 0.0200 | 0.0210 | 0.0212 | 0.0220 |
| 13 | 0.0200 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0201 | 0.0201 |
| 14 | 0.0210 | 0.0201 | 0.0208 | 0.0202 | 0.0199 | 0.0198 | 0.0199 |
| 15 | 0.0200 | 0.0202 | 0.0206 | 0.0203 | 0.0206 | 0.0204 | 0.0205 |
| 16 | 0.0203 | 0.0195 | 0.0195 | 0.0203 | 0.0201 | 0.0198 | 0.0199 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 5# | 0.0490 | 0.0490 | 0.0492 | 0.0493 | 0.0496 | 0.0497 | 0.0497 |
| 2 | 0.0520 | 0.0514 | 0.0518 | 0.0508 | 0.0516 | 0.0506 | 0.0511 |
| 3 | 0.0495 | 0.0498 | 0.0498 | 0.0498 | 0.0501 | 0.0497 | 0.0499 |
| 4 | 0.0504 | 0.0502 | 0.0502 | 0.0500 | 0.0494 | 0.0496 | 0.0502 |
| 5 | 0.0499 | 0.0501 | 0.0486 | 0.0492 | 0.0488 | 0.0487 | 0.0496 |
| 6 | 0.0485 | 0.0486 | 0.0487 | 0.0497 | 0.0488 | 0.0494 | 0.0490 |
| 7 | 0.0501 | 0.0500 | 0.0499 | 0.0501 | 0.0499 | 0.0500 | 0.0501 |
| 8 | 0.0505 | 0.0503 | 0.0507 | 0.0508 | 0.0506 | 0.0501 | 0.0504 |
| 9 | 0.0489 | 0.0481 | 0.0489 | 0.0490 | 0.0489 | 0.0491 | 0.0480 |
| 10 | 0.0494 | 0.0513 | 0.0505 | 0.0514 | 0.0489 | 0.0505 | 0.0513 |
| 11 | 0.0496 | 0.0506 | 0.0498 | 0.0499 | 0.0502 | 0.0493 | 0.0486 |
| 12 | 0.0492 | 0.0508 | 0.0509 | 0.0505 | 0.0499 | 0.0499 | 0.0495 |
| 13 | 0.0503 | 0.0508 | 0.0496 | 0.0498 | 0.0488 | 0.0494 | 0.0509 |
| 14 | 0.0501 | 0.0504 | 0.0498 | 0.0502 | 0.0502 | 0.0502 | 0.0505 |
| 15 | 0.0498 | 0.0497 | 0.0495 | 0.0498 | 0.0496 | 0.0497 | 0.0498 |
| 16 | 0.0507 | 0.0513 | 0.0507 | 0.0513 | 0.0504 | 0.0510 | 0.0506 |
| 元素 | 实验室 | 样品 编号 | 水平数 | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Be | 1 | 6# | 0.0996 | 0.0997 | 0.0997 | 0.1000 | 0.0997 | 0.0998 | 0.0997 |
| 2 | 0.0973 | 0.0991 | 0.0987 | 0.0976 | 0.0977 | 0.0997 | 0.0985 |
| 3 | 0.0998 | 0.1000 | 0.0988 | 0.0994 | 0.1001 | 0.0996 | 0.0985 |
| 4 | 0.0967 | 0.0971 | 0.0965 | 0.0972 | 0.0975 | 0.0977 | 0.0982 |
| 5 | 0.0960 | 0.0965 | 0.0957 | 0.0967 | 0.0964 | 0.0958 | 0.0962 |
| 6 | 0.1000 | 0.1002 | 0.1005 | 0.1001 | 0.1003 | 0.1003 | 0.1002 |
| 7 | 0.1004 | 0.1005 | 0.1007 | 0.1000 | 0.1005 | 0.1002 | 0.1005 |
| 8 | 0.0995 | 0.0991 | 0.0995 | 0.0998 | 0.0995 | 0.0992 | 0.0996 |
| 9 | 0.1015 | 0.1023 | 0.0998 | 0.0990 | 0.1011 | 0.1016 | 0.0989 |
| 10 | 0.1008 | 0.1012 | 0.1023 | 0.1004 | 0.1024 | 0.1025 | 0.1017 |
| 11 | 0.1015 | 0.1011 | 0.0995 | 0.0987 | 0.1001 | 0.1006 | 0.1000 |
| 12 | 0.0988 | 0.1018 | 0.1013 | 0.0993 | 0.1015 | 0.0992 | 0.1013 |
| 13 | 0.1008 | 0.1014 | 0.1040 | 0.1020 | 0.1012 | 0.0998 | 0.1014 |
| 14 | 0.1002 | 0.1003 | 0.1001 | 0.1000 | 0.0997 | 0.0998 | 0.1001 |
| 15 | 0.0986 | 0.0975 | 0.0984 | 0.0978 | 0.0983 | 0.0989 | 0.0984 |

附 录B

（资料性）

推荐分析谱线波长和仪器工作参数

B.1 测试元素推荐分析谱线波长

使用电感耦合等离子体原子发射光谱仪，其测定锌、锰、铬、镉、铅、铁、铝、镍、铜、铍的谱线波长如表B.1。

表B.1 测试元素推荐分析谱线波长

|  |  |  |  |
| --- | --- | --- | --- |
| 元素 | 波长  nm | 元素 | 波长  nm |
| Al | 309.271 | Fe | 259.937 |
| Be | 313.041 | Mn | 257.606 |
| Cd | 226.502 | Ni | 231.605 |
| Cr | 283.565 | Pb | 220.352 |
| Cu | 327.393 | Zn | 213.855 |

B.2 仪器测量参数

使用电感耦合等离子体原子发射光谱仪，其测定锌、锰、铬、镉、铅、铁、铝、镍、铜、铍的仪器测量参数如表B.2。

表B.2 仪器测量参数

|  |  |  |  |
| --- | --- | --- | --- |
| 工作参数 | 设定值 | 工作参数 | 设定值 |
| 功率  冷却气（Ar）  辅助气（Ar）接口  雾化器流速（Ar）  进样泵速 | 1200W  12.0L/min  1.0L/min  0.8L/min  12rpm | 积分时间  进样冲洗时间  稳定时间  观测位高度  观测方式  积分方式 | 5s  15s  30s  8mm  双向（轴）  峰面积 |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_