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# Methods for chemical analysis of titanium sponge, titanium and titanium alloys -- Part 17: Determination of magnesium content - Flame atomic absorption spectrometry

海绵钛、钛及钛合金化学分析方法

第 17 部分:镁量的测定 火焰原子吸收光谱法

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# Foreword

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-- Part *4: Determination of manganese content-Potassium periodate spectrophotometry and inductively coupled plasma atomic emission spectrometry*;

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# Methods for chemical analysis of titanium sponge, titanium and titanium alloys -- Part 17: Determination of magnesium content - Flame atomic absorption spectrometry

## 1 Scope

This Part specifies the determination method for magnesium content in titanium sponge, titanium and titanium alloys.

This Part is applicable to the determination of magnesium content in titanium sponge, titanium and titanium alloys. The determination range is 0.010%~1.00%.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 31981, *Methods of sampling and sample preparation for chemical composition analysis of titanium and titanium alloy*

## 3 Principle

Use hydrochloric acid and hydrofluoric acid to dissolve test material. Use boric acid complexes fluoride ions and strontium chloride as release agents. Use air-acetylene flame, at a wavelength of 285.2nm of atomic absorption spectrometer, to determine the magnesium content.

## 4 Reagents

Unless otherwise specified, the reagents used in this Part are analytical reagents and laboratory grade two water.

**4.1** Hydrochloric acid (ρ=1.19g/mL)。

**4.2** Nitric acid (ρ=1.42g/mL)。

**4.3** Hydrofluoric acid (ρ=1.15g/mL)。

**4.4** Hydrochloric acid (1+1)。

**4.5** Nitric acid (1+1)。

**4.6** Hydrofluoric acid (1+1)。

**4.7** Saturated boric acid solution。

**4.8** Strontium chloride solution (60mg/mL): Weigh 50g of strontium chloride ($SrCl_2 \cdot 6H_2O$) in a 500mL beaker. Add 400mLof water to dissolve. Move into a 500mL volumetric flask. Use water to dilute to the scale. Shake well.

**4.9** Magnesium standard storage solution: Weigh 0.1000g of metal magnesium ($w_{Mg}$≥99.99%) in a 250mL beaker. Add 30mL of water and 10mLof hydrochloric acid (4.4). Heat until they are completely dissolved. Cool to room temperature and move into a 1000mL volumetric flask. Use water to dilute to the scale. Shake well. 1mL of this solution contains 100μg of magnesium.

**4.10** Magnesium standard solution: Move 10.00mLof magnesium standard storage solution (4.9) in a 100mL volumetric flask. Add 2mL of hydrochloric acid (4.4). Use water to dilute to the scale. Shake well. 1mL of this solution contains 10μg of magnesium.

## 5 Equipment

Atomic absorption spectrometer, with magnesium hollow cathode lamp.

Under the optimal working conditions of the instrument, anyone that can meet the following indicators can be used:

-- Characteristic concentration: In a solution consistent with the measurement solution matrix, the characteristic concentration of magnesium shall not be greater than 0.02μg/mL;

-- Precision: Use the highest concentration standard solution to measure absorbance 10 times. The standard deviation shall not exceed 1.0% of the average absorbance. Use the lowest concentration standard solution (not “zero” concentration standard solution) to measure absorbance 10 times. The standard deviation shall not exceed 0.5% of the average absorbance of the highest concentration;

-- Working curve linear: Divide the working curve into five segments by concentration. The ratio of the absorbance difference between the highest

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