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YS

**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 276.11-2011

**Methods for chemical analysis of indium. Part 11: Determination of
arsenic, aluminium, lead, iron, copper, cadmium, tin, thallium, zinc and
bismuth content. Inductively coupled plasma mass spectrometry**

铟化学分析方法 第11部分：砷、铝、铅、铁、铜、镉、锡、铊、锌、铋量的测定
电感耦合等离子体质谱法

(English Translation)

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Foreword

YS/T 276 "indium chemical analysis methods," including a total of 11 parts.

--- Part 1. Determination of arsenic content by hydride generation - atomic fluorescence spectrometry;

--- Part 2. Determination of tin content Phenylfluorone - bromo cetyl trimethylamine spectrophotometry;

--- Part 3. Determination of the amount of thallium methyl green spectrophotometry;

--- Part 4. Determination of the amount of chrome aluminum Azure S Spectrophotometry;

--- Part 5. Determination of iron content of 1. electrothermal atomic absorption spectrometry Method 2. Flame atomic absorption spectrometry;

--- Part 6. copper, cadmium, zinc content - Flame atomic absorption spectrometry;

--- Part 7. Determination of lead content by flame atomic absorption spectrometry;

--- Part 8. Determination of bismuth content 1. Hydride Generation - Atomic Fluorescence Spectrometry Method 2. Flame atomic absorption spectrometry;

--- Part 9. Determination of the amount of indium Na₂EDTA titration;

--- Part 10. bismuth, aluminum, lead, iron, copper, cadmium, tin, thallium content - Inductively coupled plasma atomic emission spectrometry;

--- Part 11. arsenic, aluminum, lead, iron, copper, cadmium, tin, thallium, zinc, bismuth content - Inductively Coupled Plasma Mass Spectrometry.

This section drafted in accordance with the rules of GB/T 1.1 is given.

This section YS/T Part 11 276.

The non-ferrous metal part by the National Standardization Technical Committee

(SAC/TC243) centralized.

1 Scope

This section YS/T 276 provides for arsenic, aluminum, copper, cadmium, iron, lead, thallium, tin, zinc, bismuth determination of indium.

This section applies to the determination of indium arsenic, aluminum, copper, cadmium, iron, lead, thallium, tin, zinc, bismuth content was measured in the range of 0.00010% ~ 0.0050%.

2 Principle of the method

The sample is dissolved in nitric acid in acid medium, using ICP-MS- standard addition calibration and the use of added scandium, rhodium, rhenium mixed internal standard method of measurement Given indium arsenic, aluminum, copper, cadmium, iron, lead, thallium, tin, zinc, bismuth content.

3 Reagents

Unless otherwise indicated in the analysis using recognized as excellent pure reagents and distilled or deionized water or equivalent purity. Laboratory are fully cleaned thoroughly soaked with water containers with a solution of nitric acid (119).

3.1

nitric acid ($\rho = 1.42\text{g/mL}$), MOS level.

3.2

nitric acid solution (11).

3.3

nitric acid solution (19).

3.4 Hydrochloric acid ($\rho = 1.19\text{g/mL}$), MOS level

3.5 hydrochloric acid solution (11).

3.6 hydrochloric acid solution (14).

3.7 Pure water (resistance $> 18\text{Mohm} \cdot \text{cm}$)

3.8 standard aluminum stock solution. Weigh 1.0000g aluminum [$w \geq 99.99\%$], placed in 300mL beaker, add 20mL of hydrochloric acid (3.4), drop Add 1mL ~ 2mL nitric acid (3.1), low dissolved and transferred to 1000mL volumetric flask, was added 80mL of hydrochloric acid (3.4) was diluted with water to the mark with Degree, and mix. 1mL solution containing

1mg aluminum.

3.9 iron standard stock solution. Weigh 1.0000g metal wire [$w \geq 99.99\%$], placed in 150mL beaker, add 150mL nitrate Acid solution (3.3), dissolved by heating, cooling, transferred to 1000mL volumetric flask, dilute with water to volume, and mix. This solution containing 1mL 1mg iron.

3.10 copper standard stock solution. Weigh 1.0000g copper [$w \geq 99.99\%$], placed in 300mL beaker, add 10mL nitric acid solution (3.3), low dissolved nitrogen oxide removing the heating, cooling is removed and transferred to 1000mL volumetric flask, nitric acid solution was added 100mL (3.3), dilute to the mark and mix. 1mL solution containing 1mg of copper.

3.11 standard zinc stock solution. Weigh 1.0000g zinc [$w \geq 99.99\%$], placed in 150mL beaker, add 50mL of nitric acid