

ICS 77.120.99

CCS H 13

**YS**

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

**YS/T 276.2-2011**

Replacing YS/T 276.2-1994

---

**Methods for chemical analysis of indium. Part 2: Determination  
of tin content. Phenylfluorone-cetyltrimethyl ammonium  
bromide spectrophotometry**

铟化学分析方法 第2部分锡量的测定 苯基荧光酮-溴代十六烷基三甲胺分光光度法  
(English Translation)

**Issued on: December 20, 2011**

**Implemented on: July 1, 2012**

---

**Issued by: Ministry of Industry and Information Technology**

## Table of Contents

Foreword

1 Scope

2 Principle of the method

3 Reagents

### 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 Na<sub>2</sub>EDTA 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 276 of the second portion.

Methods for chemical analysis of indium Phenylfluorone this section instead of YS/T 276.2-1994 "- bromo cetyl trimethylamine spectrophotometry Tin ", compared with the YS/T 276.2-1994, have the following main changes.

- Measuring range extended from 0.0010% - from 0.025 to 0.00050% - 0.500%;
- Complements the precision, quality assurance and control provisions;
- Complements the "test report" requirement.

The non-ferrous metal part by the National Standardization Technical Committee (SAC/TC243) centralized.

## 1 Scope

This section YS/T 276 specifies the method for determination of indium tin content.

This section applies to the determination of the amount of indium tin. Determination of the range of 0.00050% to 0.500%.

## 2 Principle of the method

Sample decomposition with sulfuric acid and nitric acid, heating evaporation to remove excess nitric acid, dilute sulfuric acid solution, tin (IV) and Phenylfluorone - bromo ten Cetyl trimethylamine to form a colored complex, the absorbance was measured at 510nm wavelength.

Antimony (III), Fe (III) interference, adding tartaric acid, ascorbic acid and potassium permanganate to eliminate.

## 3 Reagents

Unless otherwise indicated, used in the analysis confirmed only for the gifted class pure reagents and distilled or deionized water or equivalent purity.

### 3.1

hydrochloric acid ( $\rho = 1.19\text{g/mL}$ ).

### 3.2

sulfate ( $\rho = 1.84\text{g/mL}$ ).

### 3.3

nitric acid solution (13).

### 3.4

sulfuric acid solution (5mol/L). Pipette 278mL sulfuric acid (3.2), with constant stirring, slowly poured into 700mL water and diluted with water to 1000mL, and mix.

### 3.5

tartaric acid solution (50g/L).

**3.6**

potassium permanganate solution (10g/L).

**3.7**

ascorbic acid solution (20g/L). Per 100mL ascorbic acid solution was added 5 drops of sulfuric acid solution (3.4), and mix. The time is now equipped with.

**3.8**

Phenylfluorone solution (0.3g/L). Weigh 0.06g Phenylfluorone in 195mL anhydrous ethanol, add 5mL sulfuric acid solution (3.4), shake to dissolve, the use of 2 days. If the insoluble residue was filtered using.

**3.9**

brominated cetyl trimethylamine (15g/L). Weigh 3g bromo cetyl trimethylamine added 200mL ethanol at 50 °C ~ 60 °C water bath heated to dissolve, and mix. Store in a brown bottle.

**3.10**

Storage tin standard solution. Weigh 0.1000g metal tin ( $w \geq 99.99\%$ ) in 300mL beaker, add 10mL sulfuric acid (3.2), Cover the surface of pan, heat to dissolve, remove cooling, with about 30mL water Beibi carefully washed and transferred to 1000mL volumetric flask with the sulfuric acid solution (3.4) and diluted to the mark. This solution 1mL containing 100 $\mu$ g tin.

**3.11**

tin standard solution. Pipette 15.00mL tin standard stock solution (3.10) in 500mL volumetric flask (3.4) with dilute sulfuric acid solution to the mark, and mix. This solution 1mL containing 3 $\mu$ g tin.