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

YS/T 746.16-2010

**Methods for chemical analysis of lead-free tin-based solders.
Part 16: Determination of total rare earth content. Arserazo ?
spectrophotometry**

无铅锡基焊料化学分析方法 第16部分：稀土含量的测定 偶氮胂III分光光度法
(English Translation)

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Foreword

YS/T 746 "non-Pb-based solder chemical analysis method" is divided into 17 parts.

- Part 1 Determination of tin content Coke sexual gallic acid Covering - lead nitrate titration method
- Part 2 of silver content - Flame atomic absorption spectrometry and potentiometric titration with potassium thiocyanate
- Part 3 of copper content - Flame atomic absorption spectrometry and titration with sodium thiosulfate
- Part 4 of lead content - Flame Atomic Absorption Spectrometry
- Part 5 of bismuth content - Flame atomic absorption spectrometry and titration Na₂EDTA
- Part 6 of antimony content - Flame Atomic Absorption Spectrometry
- Part 7 Determination of iron content by flame atomic absorption spectrometry
- Part 8 of arsenic content of arsenic, antimony molybdenum blue spectrophotometric method
- Part 9 Determination of zinc content by flame atomic absorption spectrometry and titration Na₂EDTA Part 10 Determination of aluminum content --- first electrothermal atomic absorption spectrometry
- Part 11 of cadmium content - Flame Atomic Absorption Spectrometry
- Part 12 Determination of indium titration Na₂EDTA
- Part 13 Determination of nickel content by flame atomic absorption spectrometry
- Part 14 Determination of the phosphorus content of the first crystal violet - heteropoly acid phosphovanadomolybdate spectrophotometry
- Part 15 Determination of germanium content salicylfluorone spectrophotometry
- Part 16 Determination of rare earth Arsenazo III spectrophotometry

--- Part 17 silver, copper, lead, bismuth, antimony, iron, arsenic, zinc, aluminum, cadmium, nickel, indium content was measured by inductively coupled plasma optical emission Spectroscopy this is Part 16.

This section is in accordance with GB/T 1.1-2009 given rules drafted.

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

This section is drafted. Yunnan Tin Group Co., Ltd.

Participated in the drafting of this section. Yunnan Tin Company Limited.

1 Scope

YS/T 746 This section specifies the determination method based solder lead-free solder in the total rare earth.

This section applies to the determination of total rare earth-free tin-based solder.

Measurement range. 0.0050% to 0.200%.

2 Method summary

Samples with hydrochloric acid, hydrogen peroxide dissolved in sulfuric acid medium with hydrochloric acid - hydrobromide exclude volatile tin, antimony, germanium and bismuth part; in the pH3 Acetic acid - sodium acetate buffer system, a copper precipitation reagent residual tin, copper, antimony, silver, bismuth, lead, nickel, iron, arsenic, cadmium, indium and other impurity ions;

Sulfosalicylic acid than the masking of calcium, aluminum and other metal ions do not interfere with a small amount of zinc arsenazo III color measurement. Arsenazo III with rare earth elements in pH3 Acetic acid - sodium acetate buffer system form a blue complex with water as a reference, in the spectrophotometer at a wavelength of 660nm absorbance measurement, Absorbance subtracted ammonium hydrogen fluoride so faded blue complex after the complex is the absorbance.

3 Reagents

Unless otherwise indicated in the analysis using only recognized as analytical grade reagents and distilled or deionized water or equivalent purity.

3.1

hydrochloride (rho1.19g/mL).

Nitrate 3.2 (rho1.42g/mL).

3.3

hydrobromide (rho1.38g/mL).

3.4

Ammonia (rho0.90g/mL).

3.5

Hydrogen peroxide (30%).

HCl 3.6 - hydrobromic acid (11).

3.7

sulfate (11).

3.8

acetic acid - sodium acetate buffer solution (pH3). Weigh 25g of anhydrous sodium acetate, dissolved in water, was added 180mL of glacial acetic acid, diluted with water to 1000mL, and mix.

3.9

diethyl dithiocarbamate solution (DDTC) (200g/L). Weigh 20g diethyl dithiocarbamate in 200mL Measuring cup, add water to 100mL, dissolved completely with filter paper, the time is now equipped with.

3.10

sulfosalicylic acid solution (100g/L). Weigh 10g sulfosalicylic acid and 1g of ascorbic acid dissolved in 70mL of water with ammonia (3.4) to adjust the acidity of pH3, water and transferred to 100mL volumetric flask, and dilute to volume, and mix. The time is now equipped with.

3.11

ammonium fluoride solution (pH3). Weigh 30g ammonium hydrogen fluoride, 5g of ammonium fluoride, dissolved in water, diluted with water to 100mL, mix, Stored in plastic containers.

3.12

arsenazo III solution (0.5g/L).

3.13

RE standard stock solution. Weigh 0.2962g cerium sulfate $[\text{Ce}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}]$ (dried at 105 °C and constant weight) in 400mL beaker, 6mL sulfuric acid (3.7), 100mL water, dissolved transferred to 100mL volumetric flask, dilute to the mark with water, mix uniform. 1mL solution containing 1mg cerium.

3.14

RE standard solution. Pipette 10.00mL RE standard stock solution (3.13) in 1000mL volumetric flask, dilute to the mark with water Degree, and mix. This solution 1mL containing 10 μ g cerium. Use this solution within three days.