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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 13747.15-2017

Replacing GB/T 13747.15-1992

**Methods for chemical analysis of zirconium and zirconium
alloys - Part 15: Determination of boron content - Curcumin
spectrophotometry**

锆及锆合金化学分析方法 第15部分：硼量的测定 姜黄素分光光度法

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Foreword

GB/T 13747 "zirconium and zirconium alloy chemical analysis method" is divided into 27 parts.

- Part 1. Determination of tin content potassium iodate titration and phenylfluorone - polyethylene glycol octyl phenyl ether spectrophotometry;
- Part 2. Determination of iron content 1,10-phenanthroline spectrophotometry and inductively coupled plasma atomic emission spectrometry;
- Part 3. Determination of nickel content dimethylglyoxime spectrophotometry and inductively coupled plasma atomic emission spectrometry;
- Part 4. Determination of chromium content Diphenylcarbazide spectrophotometry and inductively coupled plasma atomic emission spectrometry;
- Part 5. Determination of aluminum content chrome azure S-tetradecyl pyridine chloride spectrophotometry;
- Part 6. Determination of copper content 2,9-dimethyl-1,10-phenanthroline spectrophotometry;
- Part 7. Determination of manganese content potassium periodate spectrophotometry and inductively coupled plasma atomic emission spectrometry;
- Part 8. Determination of cobalt content Nitroso R salt spectrophotometry;
- Part 9. Determination of magnesium content by flame atomic absorption spectrometry;
- Part 10. Determination of tungsten content thiocyanate spectrophotometry;
- Part 11. Determination of molybdenum content thiocyanate spectrophotometry;
- Part 12. Determination of silicon content Molybdenum blue spectrophotometry;
- Part 13. Determination of lead content polarographic method;

1 Scope

GB/T 13747.15-2017 is the Chinese national standard on methods for chemical analysis of zirconium and zirconium alloys - part 15: determination of boron content - curcumin spectrophotometry, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 29 September 2017 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 April 2018. Classification: ICS 77.120.99, CCS H63. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

GB/T 13747 provisions of this part of zirconium and zirconium alloys Determination of boron content. This section applies to sponge zirconium, zirconium and zirconium alloy determination of boron content. Determination range. 0.00005% ~ 0.00050%.

2 Method summary

The sample was decomposed with ammonium sulfate-ammonium sulfate. In the sulfuric acid-glacial acetic acid medium, boron and curcumin generated Rose Bengal complex, and in dilute hydrochloric acid Precipitate, dissolved in ethanol after separation. Absorbance was measured at a spectrophotometer wavelength of 550 nm.

3 Reagent

Unless otherwise specified, only reagents that are identified as analytically pure and laboratory-grade water are used in the analysis.

3.1 Metal zirconium (wZr 99.95%, wB < 0.000001%).

3.2 Ammonium sulfate, excellent grade pure.

3.3 sulfuric acid. Measure.200mL sulfuric acid ($\rho = 1.84\text{g/mL}$, excellent grade pure) into platinum dish, add about 10mL of hydrofluoric acid ($\rho = 1.15\text{g/mL}$, Excellent grade pure), stir with platinum wire, heated to take sulfuric acid smoke 30min, cooled and moved into the quartz bottle spare.

3.4 Glacial acetic acid ($\rho =$

3.5 anhydrous ethanol.

3.7 curcumin ethanol solution (1.25g/L). Weigh 0.50g of curcumin ($\text{C}_{21}\text{H}_{20}\text{O}_6$), was

dissolved in 400mL of absolute ethanol.

3.8 Hydrochloric acid (2 1).

3.9 Sodium hydroxide solution (100g/L). Prepared by premium pure sodium hydroxide.

3.10 Boron standard storage solution. Pre-boric acid (superior grade pure) dried at 105 °C 1h, cooled to room temperature, weighed 0.5711g placed 100mL beaker, add a small amount of water to dissolve slightly into the 1000mL volumetric flask, diluted with water to the mark, mix well. Store in plastic bottle 1 mL of this solution contains 100 [mu] g of boron.

3.11 Boron standard solution Pipette 5.00mL boron standard stock solution (3.10) in 1000mL volumetric flask, diluted with water to the mark, mixed uniform. Stored in plastic bottles, this solution 1mL 0.5µg boron.

Spectrophotometer.

5.1 Sampling Sponge zirconium, zirconium and zirconium alloy sampling should be in accordance with the promulgation of the corresponding standard methods.