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

GB/T 13747.24-2017

Replacing GB/T 13747.24-1992

**Methods for chemical analysis of zirconium and zirconium
alloys - Part 24: Determination of carbon content - Infrared
absorption method after high frequency combustion**

锆及锆合金化学分析方法 第24部分：碳量的测定 高频燃烧红外吸收法

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Foreword

GB/T 13747 Methods for Chemical Analysis of Zirconium and Zirconium Alloys is planned to be divided into 27 parts.

- 1.Determination of Tin Content - Potassium Iodate Titration and Phenylfluorone-polyethylene Glycoloctyl Phenyl Ether Spectrophotometry;
- 2.Determination of Iron Content - 1,10-phenanthroline Spectrophotometry and Inductively Coupled Plasma Atomic Emission Spectrometry;
- 3.Determination of Nickel Content - Dimethylglyoxime Spectrophotometry and Inductively Coupled Plasma Atomic Emission Spectrometry;
- 4.Determination of Chromium Content - Diphenylcarbazide Spectrophotometry and Inductively Coupled Plasma Atomic Emission Spectrometry;
- 5.Determination of Aluminum Content - Chronic Azurol-S-tetradrcylpyridine Chloride Spectrophotometry;
- 6.Determination of Copper Content - 2,9-Dimethyl-1,10-phenanthroline Spectrophotometry;
- 7.Determination of Manganese Content - Potassium Periodate Spectrometry and Inductively Coupled Plasma Atomic Emission Spectrometry;
- 8.Determination of Cobalt Content - Nitroso-R-salt Spectrophotometry;
- 9.Determination of Magnesium Content - Flame Atomic Absorption Spectrometry and Inductively Coupled Plasma Atomic Emission Spectrometry;
- 10.Determination of Tungsten Content - Thiocyanate Spectrophotometry and Inductively

Coupled Plasma Atomic Emission Spectrometry;

11.Determination of Molybdenum Content - Thiocyanate Spectrophotometry;

12.Determination of Silicon Content - Molybdenum Blue Spectrophotometry;

13.Determination of Lead Content - Polarography;

1 Scope

GB/T 13747.24-2017 is the Chinese national standard on methods for chemical analysis of zirconium and zirconium alloys - part 24: determination of carbon content - infrared absorption method after high frequency combustion, 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.

This Part of GB/T 13747 specifies the method for determining the carbon content in zirconium and zirconium alloys. This Part is applicable to the determination of carbon content in zirconium sponge, zirconium and zirconium alloys. Determination range. 0.002% ~ 0.30%.

2 Method Summary

In an oxygen atmosphere, the carbon in the specimen is oxidized into carbon monoxide or carbon dioxide in a high frequency induction furnace. The mixed gas enters the infrared detector with the carrier gas, the detector outputs a signal, and the calculation system calculates the carbon content based on the sample mass, and the result is expressed as a mass fraction.

3 Reagents and Materials

3.1 Acetone or other organic reagents.

3.2 Tin particles.

3.3 Iron filings.

3.4 Tungsten particles.

3.5 Oxygen (volume fraction 99.99%).

3.6 Anhydrous magnesium perchlorate.

3.7 Alkali asbestos.

3.8 Rare earth copper oxide.

3.9 Platinum-coated silica gel.

3.10 Standard substances / samples. select standard substances with similar composition and carbon content to the test portions, or other applicable standard substances / samples.

3.11 Crucible and crucible cover. before use, heat the crucible and crucible cover in a muffle furnace at 900 C ~ 1,000 C for 2 h. After cooling to room temperature, place them in a desiccator for later use.

4 Instrumentation

High frequency induction furnace combustion infrared detection system (including high frequency induction furnace, dust collection device, carrier gas purification and analysis gas conversion system, infrared detection system, computer and software control system).

5 Specimens

5.1 The specimens are in the form of small blocks, chips or powder. The small blocks and chips shall be cleaned by acetone or other organic reagents (3.1), then, blown dry with cold air.

5.2 The processed specimens must not be contaminated before analysis and testing. During the test, clean tweezers shall be used to pick them up.

6 Analysis steps

6.1 Instrument Preparation In accordance with the instrument manufacturer's requirements, assemble all components, and connect the power supply, carrier gas and power gas as required. Replace chemical reagent tubes and filter units as required.

6.2 Instrument Pre-heating Before analysis, the instrument must be fully pre-heated, so that all indicators of the instrument reach the set values.

6.3 Instrument Leak Detection Use the instrument leak detection program or other auxiliary equipment to confirm that the instrument has no leaks.

6.4 Blank Detection The blank value includes the blanks of the crucible, crucible cover and flux. The flux is an iron- tin-tungsten mixed flux [

0.1 g of tin particles (3.2), covered by

0.5 g of iron filings (3.3) and