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

GB/T 13747.21-2017

Replacing GB/T 13747.21-1992

**Methods for chemical analysis of zirconium and zirconium
alloys - Part 21: Determination of hydrogen content - Inert gas
fusion-infrared absorption or thermal conductivity method**

锆及锆合金化学分析方法 第21部分：氢量的测定 惰气熔融红外吸收法/热导法

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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 13747.21-2017 is the Chinese national standard on methods for chemical analysis of zirconium and zirconium alloys - part 21: determination of hydrogen content - inert gas fusion-infrared absorption or thermal conductivity method, 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 the determination of zirconium and zirconium alloy hydrogen content. This section applies to the determination of sponge zirconium, zirconium and zirconium alloy. Measurement range. 0.0005% ~ 0.010%.

2 Method summary

The sample is added with a tin flux, placed in a graphite crucible, heated and melted in an inert atmosphere, and the hydrogen is released in the molecular state and enters the carrier gas stream. Hydrogen molecules and other gases released (such as carbon monoxide, etc.) after the separation in the detection of the thermal conductivity of the pool; or hydrogen molecules with the carrier gas flow through the thermal oxidation After copper into water, in a specific infrared pool test. Detector output signal, the computer system calculates the hydrogen content based on the sample quality, the result In mass fraction display.

3 Reagents and materials

3.1 acetone or other reagents.

3.2 graphite crucible.

3.4 anhydrous magnesium perchlorate.

3.6 rare earth copper oxide.

3.7 pure copper wire.

3.8 Argon or helium (volume fraction $\geq 99.99\%$).

3.9 Standard material/sample Select the standard material or sample with similar hydrogen

content and sample composition.

4 Instrument installation

Inert gas melting infrared/thermal conductivity detection system (including electrode furnace, vacuum cleaner, carrier gas purification and analysis of gas conversion system, infrared detector Or thermal conductivity detector, computer and software control system).

5 Sample

5.1 The sample is machined into 0.05g ~ 0.30g block or column samples, washed with acetone or other reagents (3.1), remove the cold Dry wind.

5.2 treated samples in the analysis before testing can not have any pollution, the detection process should be used to clamp clean tweezers.