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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 22587-2017

Matrix to superconductor volume ratio measurement -- Copper to superconductor volume ratio of Cu/Nb-Ti composite superconducting wires

基体与超导体体积比测量铜-铌钛(CuNb-Ti)复合超导线铜-超［体积］比的测量

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB/T 22587-2008 "matrix and superconductor volume ratio of Cu/Nb-Ti composite superconductor copper - super [volume] ratio Measurement". Compared with GB/T 22587-2008, the main technical changes are as follows.

--- With the term "uncertainty" instead of "accuracy" and "accuracy";

--- "Copper dissolved" chapter, delete the original "Note 1" "Note 2", the original "Note 4" into the body;

--- Appendix A from Chapter 6 to Chapter 9, an increase of "Overview" "Remove insulation coating, clean, dry" and "repeat with a second sample Process "Chapter 3;

--- The title of Appendix B is changed from "Density of Nb-Ti" to "Density based on Nb-Ti ratio", adding the header "Table B.1.1Nb-Ti Density "and revised Note 2;

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--- Added information appendix E "about uncertainty";

--- Added information Appendix F "Cu/Nb-Ti composite superconducting copper - ultra [volume] ratio of uncertainty of the test method of assessment";

--- Added "reference".

This standard uses the translation method identical with IEC 61788-5.:2013 (Ed. 2.0) "Superconductivity Part 5. The volume of the substrate and the superconductor Measurement of copper-ultra [volume] ratio of Cu/Nb-Ti composite superconducting wire.

The documents of our country that are consistent with the corresponding international documents that are normative references in this standard are as follows.

--- GB/T 13811-2003 Electrotechnical terminology Superconductivity (eqvIEC 60050-815..2000) this standard made the following editorial changes.

--- Remove the "superconductive Part 5." in the name of this standard in order to be consistent with the existing standard series.

Please note that some of this document may be patentable. The issuing agencies of this document do not bear the responsibility of identifying these patents.

This standard proposed by the Chinese Academy of Sciences.

This standard by the National Superconducting Standardization Technical Committee (SAC/TC265) centralized.

This standard was drafted. Western Superconducting Materials Science and Technology Co., Ltd., Institute of Physics, Chinese Academy of Sciences, Northwest Nonferrous Metal Research Institute, Beijing Nonferrous Metal Research Institute, North China Electric Power University.

Introduction

In composite superconductors, copper - super [volume] ratio is mainly used to calculate the critical current density superconducting wire. The method given in this standard is used Try to provide some information needed to determine the suitability of a particular superconductor. This standard contribute to the quality of Cu/Nb-Ti composite superconducting wire Quantity control, acceptance inspection or pilot study.

The standard test method is prerequisite for the known density of Nb-Ti, or known volume fraction of Nb-Ti alloy can be based on Record B to estimate its density. If the Nb-Ti density, volume fraction of the Nb-Ti alloy and/or Nb barrier is unknown, Appendix A provides Another Method for Determining Copper - Ultra [Volume] Ratio in Composite Superconductors.

Matrix and superconductor volume ratio measurement Copper - niobium titanium

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(Cu/Nb-Ti) composite superconducting wire Copper - ultra [volume] ratio measurement

1 Scope

This standard specifies the Cu/Nb-Ti composite superconducting wire copper - ultra [volume] ratio test method.

The method and the optional method provided in Appendix A apply to a cross-sectional area of 0.1mm2 ~ 3mm2, Nb-Ti wire diameter of 2μm ~ 200 μm, Cu/Nb-Ti composite superconducting wire with a Cu-ultra [volume] ratio of not less than 0.5.

The standard Cu/Nb-Ti composite test conductor with a circular or rectangular cross-section of a single structure. This standard uses nitric acid dissolved copper, the allowable deviations and other specific limitations given by routine tests are given.

The Cu/Nb-Ti composite superconducting wire with cross-sectional area, wire diameter and copper-ultra [volume] ratio outside this range can also be measured using this method but Uncertainty will be reduced. In addition, in special cases, the test sample may have a special geometry for conductors outside the specified limits, However, in order to simplify and maintain low uncertainty, this standard does not address such issues.

After appropriate amendments, the test method given in this standard can be applied to other composite superconducting wire.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version applies to this article Pieces. For undated references, the latest edition (including all amendments) applies to this document.

IEC 60050-815 International Electrotechnical terminology - Part 815. Superconductivity (Internationalelectrotechnical vocabulary-Part 815. Superconductivity)

3 Terms and definitions

IEC 60050-815 defined and the following terms and definitions apply to this document.

Copper - super [volume] than coppertosuperconductorvolumeratio the ratio of the volume of stabilized material copper to the volume of non-copper consisting of Nb-Ti wire and Nb barrier layer.

4 Principle

The test method is the use of Cu/Nb-Ti composite superconducting wire copper can be dissolved in nitric acid, and Nb-Ti wire and Nb barrier is insoluble in nitrate the nature of the acid.

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After measuring the quality of the sample, it is immersed in nitric acid solution to dissolve the copper only.

The mass of the remaining Nb-Ti wire and Nb barrier layer was then measured.

The copper-ultra [volume] ratio is determined using the volume and mass of the initial wire and the quality of the wire. When needed, different proportions of Nb-Ti wire are dense See Appendix B for degrees.

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