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

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**Critical temperature measurement -- Critical temperature of
composite superconductors by a resistance method**

临界温度测量 电阻法测复合超导体临界温度

(English Translation)

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Foreword

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

The use of translation method is equivalent to using the standard IEC 61788-10:2006 (Ed.2.0) "Superconductivity - Part 10. Critical temperature measurement Composite volume resistivity measured critical temperature superconducting wire. " Correspondence between the consistency of the standards of international documents and normative references of the following documents.

--- GB/T 13811-2003 Electrotechnical terminology superconductivity (IEC 60050-815:2000, MOD);

--- GB/T 25897-2010 Superconductivity. Nb - Ti composite superconductors residual resistance ratio measurement (IEC 61788-4:2007, IDT).

Please note that some of the content of this document may involve patents. Release mechanism of the present document does not assume responsibility for the identification of these patents.

This standard was proposed by the Chinese Academy of Sciences.

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

This standard was drafted. Western superconducting materials Technology Co., Ltd., Chinese Academy of Sciences Institute of Physics, University of Science and Technology of China.

Introduction

Critical current, critical magnetic field and critical temperature are three important performance parameters of the superconducting material. In particular, the critical temperature superconductor applications Important, the higher the critical temperature, the greater the temperature margin. The current international standards on the critical temperature of composite superconductors have been established and published. along with Domestic production of composite superconducting material professional AMSC's establishment and development, as well as composite superconducting materials in domestic and international trade increase Canada, for the promotion of research, production and domestic and foreign trade development of the domestic superconducting material, while the user's specification measurement, and to establish international access Track national standards for critical temperature measurements.

Critical temperature superconductor existing measurement methods are many, such as resistance method using SQUID magnetometer and VSM (vibrating sample magnetometer Meter) dc magnetic susceptibility measurement method, ac susceptibility method, specific heat method. Typically, the test method is applicable to other non-homogeneous material or a thick film, thin film, block and powder samples and other materials requiring higher sensitivity and resistance method difficult to measure material. However, the criteria used resistive method is simple and reliable Practical and suitable for most industrial complex superconductor characteristics, and thus more in line with the actual needs of industrial production.

Critical temperature measurement Measuring the resistance of composite superconductor critical temperature

1 Scope

This standard specifies the use of industrial measuring the resistance of the composite superconductor critical temperature measurement method.

This standard applies to single or multi-core composite superconductor round, flat or square cross-section of the integrated structure, including the Cu/Nb-Ti, Cu /Cu-Ni/Nb-Ti and Cu-Ni/Nb-Ti composite superconductors, Cu/Nb₃Sn and Cu/Nb₃Al composite superconductors, and metal sheath of MgB₂ composite superconductors, metal is Bi-based oxide superconductor body stable, Y or a rare earth metal-based coating line conductors.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

IEC 60050-815 International Electrotechnical Vocabulary - Part 815. Superconductivity (Internationalelectrotechnicalvocabulary-Part 815. Superconductivity) IEC 61788-4 Superconductivity - Part 4. Residual resistance ratio measurement Nb - Ti composite superconductors residual resistance ratio (Supercon-ductivity-Part 4. Residualresistanceratio measurement-Residualresistanceratio of Nb-Ti compositesuperconductors)

3 Terms and Definitions

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

(Superconductor) critical temperature (ofasuperconductor) Under conditions of zero current and magnetic field, superconductor exhibits the highest temperature superconductivity.

4 Establishment of critical temperature

The standard critical temperature (TC) was established as the sample in addition to the geomagnetic field and off-site without applying the minimum DC link current (current sample) under Normal state to the superconducting transition temperature corresponding to the midpoint of the curve.

Figure 1 is a composite superconductor resistance - temperature curve. Normal state region of the curve tangent defined as 100% higher, 50% higher and the line tangent

Transition temperature corresponding to the intersection of the curve is the critical temperature.

The intersection of straight lines and curves shift 10% higher tangent lines and 90% higher, respectively, is defined as the tangent TC0.1 and TC0.9, see Figure 1.

deltaTC superconducting transition width is defined as TC0.9-TC0.1.

NOTE: Other possible ways to determine the critical temperature (see A.1), this standard does not address.