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

GB/T 18502-2018

**Critical current measurement -- DC critical current of Ag-and/or
Ag alloy-sheathed Bi-2212 and Bi-2223 oxide superconductors
(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 18502-2001 "Determination of DC critical current of a silver or silver alloy sheathed oxide series superconductor", and

GB/T 18502-2001 compared to the main technical changes are as follows.

--- This standard is equivalent to using IEC 61788-3.2006, and GB/T 18502-2001 is built with the same period as IEC 61788-3.2000

Only the latter has a certain degree of reference and reference;

--- Increased DC critical current measurement of silver and or silver alloy coated Bi-2212 and Bi-2223 oxide superconductors in the back field specification.

This standard uses the translation method equivalent to the use of IEC 61788-3.2006 "Superconductivity Part 3. Critical Current Measurement of Silver and/or Silver

The DC critical current of the alloy sheathing Bi-2212 and Bi-2223 oxide superconductors.

The Chinese documents that have a consistent correspondence with the normatively cited international documents in this standard are as follows.

---GB/T 13811-2003 Electrotechnical term superconductivity (eqvIEC 60050-815.2000)

This standard has made the following editorial changes.

--- To be consistent with the existing standard series, the standard name was changed to "critical current measurement of silver and/or silver alloy sheath Bi-2212 and

Bi-2223 oxide superconductor DC critical current;

--- Modification of editorial errors in individual entries of IEC 61788-3.2006.

Introduction

In 1986, JGB ednorz and KAMueler discovered that some perovskite-type copper oxides exhibit superconductivity and their transition temperatures are much higher.

For metal superconductors. Since then, extensive research and development work on high-temperature oxide superconductors has begun worldwide, and its application research has involved high

Field magnets, low-loss power transmission, electronics, and other technologies [1].

The preparation of high temperature oxide superconductors is extremely important for their application. In the current development of high temperature oxide superconductors, from the preparation

BiSrCaCu oxide superconductors (Bi-2212 and Biline) are used for wire (belt) materials with a certain practical length and good superconductivity.

Bi-2223) was most successfully developed. These superconductors can be used to make magnets [2] and significantly increase the magnetic field strength of superconducting magnets [3].

In the summer of.1993, VAMAS-TWA16 began work on critical current test methods for lanthanide oxide superconductors..1997

In September, TWA16 developed guidelines for critical current measurement methods for silver-clad Bi-2212 and Bi-2223 oxide superconductors. This of VAMAS

The project standardization and pre-research work is the basis for the development of the DC critical current measurement method for Bi-2212 and Bi-2223 oxide superconductors.

The test method given in this standard aims to provide reasonable and consensus technical basis for engineers and technicians in the field of superconductivity technology.

Composite superconductors, such as silver-clad lanthanide oxide superconductors, whose critical current depends on a variety of factors. In material testing and application

Among them, these factors need to be considered. The test conditions for the magnetic field, temperature, relative orientation between the sample and the magnetic field are determined according to the specific application. in

Within the allowable error range, the test system configuration can be determined based on the conditions of a particular sample. The specific critical current criterion can be specified

Determined by conditions. If the result of the test is irregular, you can test more samples.

Critical current measurement

Silver and/or silver alloy sheath Bi-2212 and Bi-2223

DC critical current of oxide superconductor

1 Scope

The test method of this standard is applicable to single-core or multi-core silver and/or silver alloy sheaths with an integral structure in a round, flat or square structure.

Measurement of DC Critical Current of Bi-2212 and Bi-2223 Oxide Superconductors in Short Straight Samples .

This standard test method is applicable to superconductors with a critical current less than 500A and an n-value greater than 5. Measurements can be made with or without an applied magnetic field

Under conditions. When tested in a magnetic environment, the magnetic field should be perpendicular to the length of the sample. In strip test, the magnetic field can be vertical

Or parallel to the wider side of the superconductor (if square, either side can be). The test sample is soaked in liquid nitrogen or liquid helium during the test

in. This standard also gives the deviations allowed by this experimental method in the usual tests and other specific limitations.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this document. For undated references, the latest edition (including all revisions) applies to this document.

IEC 60050-815. International Electrotechnical Term No. 815. Superconductivity
[International electrotechnical vo-

Cabulary(IEV)-Part 815.Superconductivity

3 Terms and definitions

The terms and definitions defined in IEC 60050-815.2000 apply to this document. For ease of use, the following repeats the IEC 60050-

815 Some terms and definitions in.2000.

3.1

Critical current criticalcurrent

I_c

In superconductors, the maximum direct current that is considered to pass through without

hindrance.

Note: I_c is a function of magnetic field strength and temperature.

[IEV815-03-01]

3.2

Critical current criterion critical current criterion

The criterion of the critical current I_c is determined based on the electric field strength E or the resistivity ρ .

Note 1: The commonly used electric field strength criterion is $E=10\mu\text{V/m}$ or $E=100\mu\text{V/m}$, and the resistivity criterion is $\rho=10^{-14}\text{ohm}\cdot\text{m}$ or $\rho=10^{-13}\text{ohm}\cdot\text{m}$.

Note 2: For high temperature oxide superconductor shorts, the lower sensitivity than the Note 1 is also sometimes used.

[IEV815-03-02, with amendments]

3.3

[Superconductor] n -value (of a superconductor)

The index is the n -value of the superconductor.