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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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GB/T 16476-2018

Replacing GB/T 16476-2010

Scandium Metal

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China.**

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Foreword

This Standard is drafted in accordance with stipulations in GB/T 1.1-2009.

This Standard serves as a replacement of GB/T 16476-2010 Scandium Metal.

In comparison with GB/T 16476-2010, there are the following main technical changes:

- Normative reference GB/T 17803 is added (please refer to Chapter 2);
- “3.1 Product Nameplate” is added (please refer to 3.1);
- Character nameplates Sc-5N5, Sc-5N, Sc-4N5 and Sc-4N are added (please refer to 3.1 and 3.2);
- The method of expressing rare earth impurity content is modified; “(La + Ce + Pr + Nd + Sm + Eu + Gd + Tb + Dy + Ho + Er + Tm + Yb + Lu + Y)” is replaced by “rare earth impurity” (please refer to 3.2; 3.1 in Version 2010);
- The assessment index of aluminum (Al) in nameplate Sc-4N is adjusted from 0.0050% to 0.0070% (please refer to 3.2; 3.1 in Version 2010);
- The assessment index of copper (Cu) in nameplate Sc-4N is adjusted from 0.0025% to 0.0050% (please refer to 3.2; 3.1 in Version 2010);
- The assessment index of tantalum (Ta) in nameplate Sc-5N5, Sc-5N, Sc-4N5 and Sc-4N is adjusted respectively from 0.0020%, 0.0050% and 0.0080% to 0.0050% (please refer to 3.2; 3.1 in Version 2010);
- The assessment index of zirconium (Zr) in nameplate Sc-5N5, Sc-5N, Sc-4N5 and Sc-4N is adjusted respectively from 0.0010%, 0.0025% and 0.0040% to 0.0010% (please refer to 3.2; 3.1 in Version 2010);
- The assessment index of titanium (Ti) is added (please refer to 3.2);
- Note 1 and Note 2 are modified (please refer to 3.2; 3.1 in Version 2010);
- The requirement in 3.2 appearance quality is modified from one statement to divided statement in 3.3.1 and 3.3.2 (please refer to 3.3; 3.2 in Version 2010);
- The method of calculating the absolute purity and relative purity of scandium (Sc) is added; the number of relevant terms is adjusted (please refer to 4.1.4 and 4.1.5);
- “5.4 sampling and sample preparation” is modified from one statement to divided statement in 5.4.1, 5.4.2 and 5.4.3 (please refer to 5.4; 5.4 in Version 2010);

Scandium Metal

1 Scope

This Standard specifies the requirements, test methods, inspection rules, packaging, marking, transportation, storage and quality certificate of scandium metal.

This Standard is applicable to scandium metal that is manufactured with the method of metallothermic reduction or the method of intermediate alloy, and then, the method of vacuum distillation. The scandium metal shall be applied to aviation, aerospace (space navigation, rocket and missile), electronic technology (electronics, nuclear, laser, electric light source) and metallurgy, etc.

2 Normative References

The following documents are indispensable to the application of this Standard. In terms of references with a specified date, only versions with a specified date are applicable to this Standard. The latest version (including all the modifications) of references without a specified date is also applicable to this Standard.

GB/T 8170 Rules of Rounding off for Numerical Values & Expression and Judgement of Limiting Values

GB/T 13219-2018 Scandium Oxide

GB/T 17803 Designation System for Rare Earth Products

3 Requirements

3.1 Product Nameplate

In terms of chemical composition, products shall be divided into 4 nameplates, namely, Sc-5N5, Sc-5N, Sc-4N5 and Sc-4N. The designation method for product nameplates shall comply with the stipulation in GB/T 17803.

3.2 Chemical Composition

Product nameplate and chemical composition shall comply with the stipulation in Table 1. If the demand side has special requirements, the demand side and the supply side can have further negotiation.

4 Test Methods

4.1 Chemical Composition

4.1.1 The method of analyzing the total amount of rare earth (RE) shall comply with the stipulation in Appendix A in GB/T 13219-2018. When the total amount of rare earth being measured is above 99%, take subtraction method to calculate the practical value of the total amount of rare earth, namely, $(100\% - \sum \text{non-rare earth impurity content})$.

4.1.2 The method of analyzing rare earth impurity content shall comply with the stipulation in Appendix B in GB/T 13219-2018.

4.1.3 The method of analyzing non-rare earth impurity content shall comply with the stipulation in Appendix C in GB/T 13219-2018.

4.1.4 The absolute purity of scandium (Sc) can be obtained through calculation, namely, $[100\% - (\sum \text{rare earth impurity content} + \sum \text{non-rare earth impurity content})]$.

4.1.5 The relative purity (Sc/RE) of scandium (Sc) can be obtained through calculation, namely, $(100\% - \sum \text{rare earth impurity content}/\text{RE})$.

4.2 Rounding-off of Numerical Value

The rounding-off of numerical value shall comply with the stipulation in GB/T 8170.

4.3 Appearance Quality

Under the natural scattering light, conduct visual inspection to inspect the appearance quality.

5 Inspection Rules

5.1 Inspection and Acceptance Check

5.1.1 The supply side's quality inspection department shall inspect products and guarantee that product quality complies with the stipulation in this Standard. In addition, a quality certificate shall be filled out.

5.1.2 The demand side shall inspect the received products. If the inspection result is inconsistent with the stipulation in this Standard, the demand side shall propose it to the supply side within 2 months after receiving the products. The demand side and the supply side shall negotiate and reach a solution. If arbitration is needed, an organization that is acknowledged by both parties can be authorized; samples shall be taken jointly with the demand side.

5.2 Group Batch

6 Marking, Packaging, Transportation, Storage and Quality Certificate

6.1 Marking and Packaging

6.1.1 Outside the package, there shall be an obvious moisture-proof mark that will not become decolorized. Outside each package (bottle, case and bucket), it shall at least indicate:

- a) Name of the supply side;
- b) Name of raw material manufacturer;
- c) Name of product manufacturer;
- d) Name and nameplate of product;
- e) Batch number;
- f) Gross weight and net weight;
- g) Date of packaging;
- h) Mark or sign of "moisture-proof".

6.1.2 Products shall be sub-packed into a double-layer plastic bag or plastic bottle. The net weight of each bag (bottle) shall be 0.1 kg, 0.25 kg, 0.5 kg and 1 kg. Then, place the bag (bottle) in a sealed metal bucket (wooden case, carton or plastic case) that adopts anti-oxidation measures. The net weight of each metal bucket (wooden case, carton or plastic case) shall be 0.5 kg, 1 kg, 5 kg and 10 kg. If the demand side has any special requirements towards the packaging, the demand side and the supply side shall negotiate.

6.2 Transportation and Storage

During transportation, products shall be prevented from moisture. Products shall be stored in a dry place. Avoid exposing metal ingot in the air, which can prevent it from oxidization.

6.3 Quality Certificate

Each batch of products shall be attached with a quality certificate, on which, it shall indicate:

- a) Name of product;
- b) Name, address, telephone number and fax of the supply side;

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