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

GB/T 26524-2023

Replacing GB/T 26524-2011

Refined nickel sulfates

精制硫酸镍

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents".

This document replaces GB/T 26524-2011 "Refined nickel sulfates". Compared with GB/T 26524-2011, apart from structural and editorial changes, the main technical changes are as follows:

- the scope has been changed (see Clause 1; Clause 1 of the 2011 edition);
- the classification has been changed (see Clause 5; Clause 4 of the 2011 edition);
- the limits for nickel, cobalt, sodium, calcium, magnesium, chromium and mercury have been changed (see 6.2; 5.2 of the 2011 edition);
- limits for the content of magnetic foreign matter and for the oil content of class I products have been added (see 6.2);
- the methods of determination for cobalt, copper, iron, sodium, lead, zinc, calcium, magnesium, manganese, cadmium, chromium and mercury have been changed (see 7.4 and 7.5; 6.5 to 6.16 of the 2011 edition);
- methods for determining the content of magnetic foreign matter and the oil content have

been added (see 7.7 and 7.8).

Attention is drawn to the possibility that some elements of this document may be the subject of patent rights. The issuing body shall not be held responsible for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation and is under the jurisdiction of the National Technical Committee on Chemical Standardization (SAC/TC 63).

The drafting organizations are Jinchuan Group Nickel Salt Co., Ltd., GEM Co., Ltd., Quzhou Huayou Cobalt New Material Co., Ltd., Fu'an Qingmei Energy Materials Co., Ltd., Guangxi Yinyi New Materials Co., Ltd., Guangxi CNGR New Energy Technology Co., Ltd., CNOOC Tianjin Chemical Research and Design Institute Co., Ltd., Guangdong Brunp Recycling Technology Co., Ltd. and Jiangxi Nuclear Industry Zhongxin New Materials Co., Ltd.

This document was first issued in 2011; this is the first revision.

Warning

This product is listed in the Catalogue of Hazardous Chemicals (2015 edition) and is a hazardous chemical: it shall be handled with care. Persons using this document need practical experience of working in a formal laboratory. This document does not set out all the possible safety problems; it is the responsibility of the user to adopt appropriate safety and health measures and to ensure compliance with the conditions laid down by the relevant national regulations. The tetrachloroethylene used in the test methods is irritant and anaesthetic and shall be used strictly in accordance with its safety data sheet; some reagents are corrosive - if splashed on the skin or in the eyes, rinse immediately with water and, in serious cases, seek medical attention at once.

1 Scope

This document specifies the classification, the technical requirements, the test methods, the inspection rules, the marking and accompanying documents, and the packaging, transportation and storage of refined nickel sulfates.

It applies to the production and inspection of refined nickel sulfates.

Note: this product is used mainly in the battery industry, in electroplating, as a catalyst for the hydrogenation of fats and oils, as a catalyst in the pharmaceutical industry, as a mordant for vat dyes, as a colouring agent for metals, and in the production of other industrial nickel salts.

2 Normative references

The contents of the following documents constitute indispensable provisions of this

document through normative reference in the text. For dated references, only the version corresponding to that date applies; for undated references, the latest version - including all amendments - applies.

GB/T 191-2008 Packaging - Pictorial marking for handling of goods · GB/T 6678 General principles for sampling chemical products · GB/T 6682 Water for analytical laboratory use - Specification and test methods · GB/T 8170 Rules of rounding off for numerical values and expression and judgement of limiting values · HG/T 3696.1 Inorganic chemicals - Preparations of standard and reagent solutions for chemical analysis - Part 1: Preparations of standard volumetric solutions · HG/T 3696.2 Inorganic chemicals - Preparations of standard and reagent solutions for chemical analysis - Part 2: Preparations of impurity standard solutions · HG/T 3696.3 Inorganic chemicals - Preparations of standard and reagent solutions for chemical analysis - Part 3: Preparations of reagent solutions · JJG 768 Emission spectrometers

3 Terms and definitions

No terms and definitions need to be defined for this document.

4 Molecular formula and relative molecular mass

Molecular formula: $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$.

Relative molecular mass: 262.86, based on the 2022 international relative atomic masses.

5 Classification

Refined nickel sulfates are classified by use as follows: class I, for the battery industry; class II, for electroplating and other industrial uses.

6 Technical requirements

6.1 The appearance shall be emerald green granular crystals.

6.2 Tested by the methods specified in this document, refined nickel sulfates shall meet the technical requirements of Table 1.

Table 1 sets, for class I and class II respectively, the mass fractions of: nickel, not less than 22.08 % and 22.20 %; cobalt, not more than 0.05 % and 0.001 0 %; copper, not more than 0.000 5 % for both; iron, not more than 0.000 5 % for both; sodium, not more than 0.10 % and 0.02 %; lead, not more than 0.001 0 % for both; zinc, not more than 0.000 5 % for both; calcium, not more than 0.003 0 % and 0.002 0 %; magnesium, not more than 0.003 0 % and 0.002 0 %; manganese, not more than 0.001 0 % for both; cadmium, not more than 0.000 2 % for both; chromium, not more than 0.000 5 % and 0.000 3 %; mercury, not specified for class I and not more than 0.000 2 % for class II; water-insoluble matter, not

more than 0.005 0 % for both; magnetic foreign matter, not more than 0.000 01 % for class I only; and oil content, not more than 0.001 % for class I only.

7 Test methods

7.1 General. Unless otherwise stated, the reagents and the water used in this document shall be of analytical grade and of grade 3 water as specified in GB/T 6682. Unless otherwise stated, the standard volumetric solutions, the impurity standard solutions, the preparations and the products used in the tests shall be prepared in accordance with HG/T 3696.1, HG/T 3696.2 and HG/T 3696.3.

7.8.5 Treatment of test data. The content of each element to be determined - iron, zinc, chromium - is expressed as a mass fraction and calculated from the mass concentrations found on the working curve for the test solution and the blank, the sample mass, and the factor 0.05×10^{-3} . The content of magnetic foreign matter is the sum of the mass fractions of magnetic iron, magnetic zinc and magnetic chromium. In both cases the result is the arithmetic mean of two parallel determinations, whose absolute difference shall not exceed 20 % of that mean.

8 Inspection rules

8.1 All the items specified in Clause 6 are factory inspection items and shall be inspected batch by batch.

8.2 Refined nickel sulfates of the same class, produced by the manufacturer from the same materials, under substantially the same production conditions, continuously or by the same shift, constitute one batch. Each batch shall not exceed 100 t.

8.3 The number of sampling units shall be determined in accordance with GB/T 6678. When sampling, the sampler shall be inserted vertically from the centre of the packaging bag to three quarters of the depth of the material. The samples taken shall be mixed, reduced by quartering to not less than 1 000 g, divided between two clean dry containers, sealed and labelled with the manufacturer's name, the product name, the class, the batch number, the sampling date and the name of the sampler. One portion is for inspection, the other is retained for reference for a period determined by the manufacturer.

8.4 Whether the inspection results conform to this document shall be judged by the rounded-value comparison method specified in GB/T 8170.

8.5 If any item of the inspection results fails to meet the requirements of this document, samples shall be taken again from twice the number of packages and re-tested. If any item of the re-test results fails to meet the requirements, the whole batch is non-conforming.

9 Marking and accompanying documents