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**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 1448-2021

**Coated lithium nickel cobalt manganese oxide
(English Translation)**

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1 Scope

This document specifies the technical requirements, test methods, inspection rules, packaging, marking, transportation, storage, accompanying documents, order form content of coated lithium nickel cobalt manganate.

This document applies to coated lithium nickel cobalt manganate, which is used as positive active material for lithium-ion batteries.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to the date applies to this document; for undated reference documents, the latest version (including all amendments) applies to this document.

GB/T 1717 Determination of pH value of an aqueous suspension of pigments GB/T 5162 Metallic powders - Determination of tap density GB/T 5314 Powders for powder metallurgical purposes - Sampling GB/T 6283 Chemical products - Determination of water - Karl Fischer method (general method) GB/T 19077 Particle size analysis - Laser diffraction methods GB/T 19587 Determination of the specific surface area of solids by gas adsorption using the BET method GB/T 20252-2014 Lithium cobalt oxide GB/T 24533-2019 Graphite negative electrode materials for lithium ion battery GB/T 37201 Electrochemical performance test of lithium nickel cobalt manganese oxide - Test method for discharge specific capacity and charge-discharge coulombic efficiency of the first cycle GB/T 37207 Electrochemical performance test of lithium nickel cobalt manganese oxide - Test method for discharge plateau capacity ratio and cycle life capacity under specified conditions, the

number of cycles shall be no less than 1000.

4.14 Other requirements

If the buyer has special requirements for coated lithium nickel cobalt manganate, it can be as negotiated between supplier and buyer.

5.1 Chemical composition

The determination of the chemical composition of the product shall be carried out, according to the method agreed upon by the supplier and buyer.

5.2 Moisture content

The determination of product moisture content is carried out, in accordance with the provisions of GB/T 6283.

5.3 Magnetic foreign matter

The magnetic foreign matter content of the product is measured, according to the provisions of Appendix K in GB/T 24533-2019.

5.4 Residual lithium content

The residual lithium content of the product is measured according to the method agreed upon by the supplier and the buyer.

5.5 PH

The pH value of the product is measured in accordance with the provisions of GB/T 1717.

5.6 Appearance quality

Product appearance quality is visually inspected.

5.7 Crystal structure

The crystal structure of the product is detected using an X-ray diffractometer.

5.8 Tap density

The measurement of product tap density shall be carried out, in accordance with the provisions of GB/T 5162.

5.9 Particle size distribution

The determination of product particle size distribution shall be carried out, in accordance with the provisions of GB/T 19077.

5.10 Specific surface area

The specific surface area of the product is measured in accordance with the provisions of GB/T 19587.

5.11 First discharge specific capacity

The first discharge specific capacity of the product is measured, in accordance with the provisions of GB/T 37201, in which the charge and discharge voltage range is 2.80 V ~ 4.30 V; other conditions remain unchanged. It can also be carried out, according to the method agreed upon by the supplier and buyer.

5.12 First charge and discharge efficiency

The first charge and discharge efficiency of the product is measured, in accordance with the provisions of GB/T 37201, in which the charge and discharge voltage range is 2.80 V ~ 4.30 V; other conditions remain unchanged. It can also be carried out according to the method agreed upon by the supplier and buyer.

5.13 Cycle life

The product cycle life is measured in accordance with the provisions of GB/T 37207, in which the charge and discharge voltage range is 2.80 V ~ 4.20 V; other conditions remain unchanged. It can also be carried out according to the method agreed upon by the supplier and buyer.

6.1 Inspection and acceptance

6.1.1

The product shall be inspected by the supplier, to ensure that the product quality complies with the provisions of this document and the order form; meanwhile the accompanying documents shall be filled in.

6.1.2

The purchaser may inspect the received products, in accordance with the provisions of this document and the order form. If the inspection results are inconsistent with the provisions of this document and the order form, it shall be reported to the supplier, within 3 months from the date of receipt of the product, to be settled through negotiation between the supplier and buyer. If arbitration is required, arbitration sampling shall be conducted at the buyer's

premises, jointly by both the supplier and the buyer.

6.2 Group-batching

6.3.4.2 The sampling method of products shall be carried out in accordance with the provisions of GB/T 5314. The total sampling volume of each batch shall not be less than 5 kg.

6.4.1 If any of the products' chemical composition, moisture content, magnetic foreign

matter, residual lithium content, pH value, crystal structure, tap density, particle size distribution, specific surface area fails to pass the inspection, the batch of products will be deemed unqualified.

6.4.2 If the appearance quality inspection fails, the barrel (bag) of products will be deemed unqualified.

6.4.3 Prepare 6 test batteries according to the method specified in GB/T 37201.

Randomly select 3 of them to test the first discharge specific capacity and first charge and discharge efficiency. If the performance of 2 batteries does not meet the requirements of this document, it is allowed to take another 3 batteries for repeated testing. If the performance of 2 batteries still fails to meet the requirements of this document, the batch of products will be deemed unqualified.

6.4.4 Prepare 6 test batteries according to the method specified in GB/T 37207.

Randomly select 3 of them for cycle life testing. If the performance of 2 batteries cannot meet the requirements of this document, it is allowed to use 3 more batteries for testing.

After repeated testing, if the performance of 2 batteries still fails to meet the requirements of this document, the batch of products will be deemed unqualified.

7 Packaging, marking, transportation, storage, accompanying documents

7.1 Packaging

7.1.1

The product can be packed in aluminum-plastic lined bags, sealed, put into outer packaging barrels, which have a net weight of 25 kg.

7.1.2

The product can also be packed in woven bags lined with aluminum plastic bags and sealed. Each bag has a net weight of 500 kg.