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YS

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

YS/T 1030-2017

**Lithium-riched manganese cathode material
(English Translation)**

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1 Scope

This standard specifies the terms and definitions, requirements, test methods, inspection rules, marking, packaging, transportation, storage, quality certificates, purchase orders (or contracts) for lithium-rich manganese cathode materials.

This standard applies to lithium-rich manganese cathode materials, which are used as cathode active materials in lithium-ion batteries.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document;

for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

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 19077.1 Particle size analysis - Laser diffraction methods - Part 1.General principles

GB/T 19587 Determination of the specific surface area of solids by gas adsorption using the BET method

GB/T 20252 Lithium cobalt oxide

GB/T 23365 Electrochemical performance test of lithium cobalt oxide - Test method for the initial discharge specific capacity and the initial efficiency

GB/T 23366 Electrochemical performance test of lithium cobalt oxide - Test method for discharge plateau capacity ratio and cycle life

GB/T 24533-2009 Graphite negative electrode materials for lithium ion battery

YS/T 1006.2 Methods for chemical analysis of lithium nickel cobalt manganese oxide - Part 2.Determination of lithium, nickel, cobalt, manganese, sodium, magnesium, aluminum, potassium, copper, calcium, iron, zinc and silicon content -

Inductively coupled plasma atomic emission spectrometry (ICP-AES)

JCPDS1) (74-8073) Standard X-ray powder diffraction patterns for layered lithium nickel-manganese oxide

JCPDS (27-1252) Standard X-ray powder diffraction patterns for lithium manganese oxide

3 Terms and definitions

The terms and definitions defined in GB/T 20252 apply to this document.

4.1 Product classification

Lithium-rich manganese cathode materials are classified into two categories according to their performance and application. cycle-type and high-voltage type.

4.2 Chemical composition

The chemical composition of the product shall conform to the provisions of Table 1.

1 Joint Committee on Powder Diffraction Standards.

4.15 Other requirements

If the buyer has special requirements for lithium-rich manganese cathode materials, these can be negotiated between the supplier and the buyer.

5.1 Chemical composition

The testing of Mn, Li, Ni, Co, Na, K, Cu, Ca, Fe, Zn, Si in the chemical composition of the product shall be carried out in accordance with the provisions of YS/T 1006.2. The testing of other elements shall be carried out according to the methods agreed upon by both the supplier and the buyer.

5.2 Moisture content

The moisture content of the product shall be determined according to GB/T 6283.

5.3 pH value

The pH value of the product shall be determined according to GB/T 1717.

5.4 Residual alkali content

The residual alkali content of the product shall be determined according to a method agreed upon by both the supplier and the buyer.

5.5 Magnetic foreign matter

The content of magnetic foreign matter in the product shall be determined according to Appendix K of GB/T 24533-2009.

5.6 Particle size distribution

The particle size distribution of the product shall be determined according to GB/T 19077.1.

5.7 Tap density

The tap density of the product shall be determined according to GB/T 5162.

5.8 Specific surface area

The specific surface area of the product shall be determined according to GB/T 19587.

5.9 Appearance quality

The appearance quality of the product shall be visually inspected.

5.10 Crystal structure

The crystal structure of the product shall be determined using X-ray powder diffraction.

5.11 Discharge specific capacity

The initial discharge specific capacity of the product shall be determined in accordance with GB/T 23365. For high-voltage types, the charge/discharge voltage range is 2.0 V

~ 4.8 V, with other conditions remaining unchanged.

5.12 Charge/discharge efficiency

The initial charge/discharge efficiency of the product shall be determined in accordance with GB/T 23365. For high-voltage types, the charge/discharge voltage range is 2.0 V ~ 4.8 V, with other conditions remaining unchanged.

5.13 Cycle life

The cycle life of the product shall be determined in accordance with GB/T 23366. For high-voltage types, the charge/discharge voltage range is 2.0 V ~ 4.6 V, with other conditions remaining unchanged.

6.1 Inspection and acceptance

6.1.1

The supplier shall inspect the product, to ensure that the product quality conforms to this standard and the purchase order (or contract); complete a product quality certificate.

6.1.2

The buyer shall inspect the received product in accordance with this standard and the purchase order (or contract). If the inspection results do not conform to this standard and the purchase order (or contract), the supplier shall be notified within one month from the date of receipt of the products; the matter shall be resolved through negotiation between the supplier and the buyer. If arbitration is required, the arbitration sampling shall be conducted jointly by both the supplier and the buyer at the buyer's location.

6.2 Group-batching

Products shall be submitted for acceptance in batches. Each batch shall consist of the same mixture; the mass of each batch shall not exceed 5000 kg. Special requirements from the buyer shall be determined through negotiation between the supplier and the buyer.

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