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Spherical graphite

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Spherical graphite

1 Scope

This Standard specifies the terms and definitions, grading, code, technical requirements, test methods, inspection rules, packaging, storage and transportation of spherical graphite.

This Standard applies to spherical graphite used in the negative electrode of lithium-ion batteries.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) is applicable to this document.

GB/T 191 Packaging - Pictorial marking for handling of goods

GB/T 1427 Sample method of carbon material

GB/T 3521 Method for chemical analysis of graphite

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

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

GB/T 24533-2019 Graphite negative electrode materials for lithium ion battery

GB/T 26125 Electrical and electronic products - Determination of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)

3 Terms and definitions

The following term and definition apply to this document.

6 Test methods

6.1 Appearance

Observe visually under natural light conditions.

6.2 Particle size distribution

Determine in accordance with the provisions of Appendix A in GB/T 24533-2019.

6.3 Moisture

Determine in accordance with the provisions of Appendix B in GB/T 24533-2019.

6.4 pH value

Determine in accordance with the provisions of Appendix C in GB/T 24533-2019.

6.5 Fixed carbon content

Determine in accordance with the provisions of GB/T 3521.

6.6 Specific surface area

Determine in accordance with the provisions of GB/T 19587.

6.7 Degree of sphericity

Determine in accordance with the provisions of Appendix A.

6.8 Tap density

Determine in accordance with the provisions of Appendix M in GB/T 24533-2019.

6.9 Magnetic substance

Determine in accordance with the provisions of Appendix K in GB/T 24533-2019.

6.10 Trace metal elements

Determine in accordance with the provisions of Appendix B.

6.11 Sulfur content

Determine in accordance with the provisions of Appendix J in GB/T 24533-2019.

c) When the equipment has been shut down for more than half a year and production is started again;

d) When the client has special requirements.

7.3 Acceptance rules

7.3.1 The product is qualified if it meets all technical indexes in Table 1, Table 3, Table 4 and Table 5. If 1 index fails to meet the requirements of the standard, double number of samples shall be taken from the sampling bag of the same lot of products, to re-inspect the unqualified item. If all the re-inspections are qualified, it is judged as qualified; if there is one unqualified, it will be judged as unqualified.

7.3.2 The re-inspection period of the receiver is 2 months. If there is any objection, double number of samples will be taken for re-inspection. If there is still a dispute, it will be inspected by a qualified third-party testing agency.

8 Product packaging, storage and transportation

8.1 The packaging of the product meets the requirements of GB/T 191. The net weight is negotiated between the supplier and the purchaser.

8.2 The packaging shall be carried out in a dry environmental conditions. First put the product into a waterproof packaging bag (PE sealed bag and aluminum-plastic sealed bag are recommended). Special packaging requirements shall be negotiated between the supplier and the purchaser.

8.3 The packaged product is then packaged with outer packaging materials, which shall be negotiated between the supplier and the purchaser.

8.4 Products shall be stored in a ventilated and dry warehouse.

8.5 The stacking of products shall be neat and clean. Markings such as production lot number shall be clearly identifiable.

8.6 Avoid mixed storage and transportation with items that can deteriorate the product or damage the packaging bag.

8.7 During storage and transportation, it shall be ensured that the product packaging is clean and undamaged. Any product, which leaks out of the package, must not be returned to the package.

the concentration is 1000 µg/mL;

h) Molybdenum standard solution: The standard number is GSB04-1737-2004; the concentration is 1000 µg/mL;

i) Sodium standard solution: The standard number is GSB04-1738-2004; the concentration is 1000 µg/mL;

j) Silicon standard solution: The standard number is GSB04-1752-2004; the concentration is 1000 µg/mL.

B.2.5 Preparation of the stock mixed standard solution (50 mg/L): Respectively pipette 5 mL of iron, sodium, chromium, copper, nickel, aluminum, molybdenum, cobalt, zinc, and silicon standard solutions into 100 mL volumetric flask; ADD 5 mL of nitric acid; DILUTE to the scale mark, shake well and set aside. The shelf life is 1 month.

B.3 Instruments and equipment

B.3.1 Inductively coupled plasma emission spectrometer or equivalent-performance instrument.

B.3.2 Microwave digestion apparatus or digestion device with equivalent performance: Working temperature is not less than 180 °C.

B.3.3 Sample tank: Matched with microwave digestion apparatus.

B.3.4 Analytical balance: Sensitivity is 0.0001 g.

B.4 Preparation of a series of mixed standard solutions

Accurately pipette 0 mL, 0.2 mL, 0.50 mL, 1.00 mL, 2.00 mL, 5 mL of the stock mixed standard solution (see B.2.5) respectively into six 100 mL volumetric flasks; ADD 5 mL of nitric acid to each; DILUTE to the scale mark and shake well; prepare the calibration blank and series mixed standard solutions of Fe, Na, Cr, Cu, Ni, Al, Mo, Co and Zn with concentrations of 0 mg/L, 0.10 mg/L, 0.25 mg/L, 0.50 mg/L, 1.00 mg/L and 2.50 mg/L, respectively.

B.5 Sample preparation

WEIGH 0.4 g~0.5 g of sample in a clean digestion tank; ADD 3 mL of nitric acid, 9 mL of hydrochloric acid; SHAKE well and tighten the sample cover; PLACE it in a microwave digestion apparatus for digestion (the digestion temperature is not less than 180 °C; the time is not less than 15 min). After digestion, cool to room temperature, filter, and dilute to 100 mL. MAKE a sample blank in the same way.

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