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Replacing GB/T 1427-2000

Sample method of carbon material

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Table of Contents

Foreword.....	4
1 Scope.....	6
2 Normative references.....	6
3 Graphite electrodes and joints (including general power, impregnation, high power, ultra-high power), graphite electrode roasting products	6
4 Graphite anodes	7
5 Graphite blocks	8
6 Cathode carbon blocks for aluminum electrolysis cells.....	9
7 Carbon electrodes.....	10
8 Electric furnace carbon blocks, self-baking carbon blocks, blast furnace carbon blocks.....	10
9 Carbon resistance rods	11
10 Carbon paste (electrode paste, anode paste, cathode paste, carbon ramming materials)	12
11 Carbon cement, carbon mud.....	12
12 High purity graphite products	13
13 Isostatic graphite.....	13
14 Carbon substrates for solar power generation	14
15 Fine-particle high-density special graphite products	14
16 Mesophase carbon microspheres, soft carbon, hard carbon	15
17 Spherical graphite	16

18 Graphite anode materials, carbon composite lithium iron phosphate cathode materials, lithium titanate and carbon composite anode materials, etc.	16
19 Other specifications	17

Foreword

This Standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 1427-2000 "Sample method of carbon material". Compared with GB/T 1427-2000, the main technical content changes of this Standard are as follows:

- ADD the normative references (see Clause 2);
- MODIFY the sampling requirements for graphite electrodes and joints (see 3.2, 3.3, 3.4);
- MODIFY the sampling requirements for graphite blocks (see 5.2);
- MODIFY the sampling requirements for cathode carbon blocks for aluminum electrolysis cells (see 6.1, 6.2, 6.3, 6.4);
- MODIFY the sampling requirements for electric furnace carbon blocks, self-baking carbon blocks and blast furnace carbon blocks (see 8.1, 8.3, 8.4);
- MODIFY the sampling batch requirements for carbon resistance rods (see 9.1);
- MODIFY the type and the sampling batch requirements for charcoal paste (see Clause 10);
- ADD the sampling requirements for carbon cement and carbon mud (see Clause 11);
- ADD the sampling requirements for isostatic graphite (see Clause 13);
- ADD the sampling requirements for carbon substrates for solar power generation (see Clause 14);
- ADD the sampling requirements for fine-particle high-density special graphite products (see Clause 15);
- ADD the sampling requirements for mesophase carbon microspheres, soft carbon, hard carbon (see Clause 16);
- ADD the sampling requirements for spherical graphite (see Clause 17);
- ADD the sampling requirements for graphite anode materials, carbon composite lithium iron phosphate cathode materials, lithium titanate and carbon composite anode materials (see Clause 18);

Sample method of carbon material

1 Scope

This Standard specifies the sampling tool, sampling position, sampling quantity and specimen size and precision of carbon materials.

This Standard is applicable to the taking and preparation of carbon material samples such as graphite electrodes, graphite anodes, graphite blocks, cathode carbon blocks, carbon electrodes, electric furnace carbon blocks, carbon paste, high-purity graphite products, mesophase carbon microspheres.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 13732 General rules for sampling inspection of bulk materials with uniform size

3 Graphite electrodes and joints (including general power, impregnation, high power, ultra-high power), graphite electrode roasting products

3.1 Sampling batch

If the output of graphitized products per furnace is greater than or equal to 30 t, the quantity of sampling electrodes is not less than 4 pieces. If it is less than 30 t, the quantity of sampling electrodes is not less than 3 pieces.

NOTE: Samples are uniformly taken in different parts (top, middle and bottom of the furnace) of the graphitization furnace.

3.2 Sampling tool

Hollow drill bits with an inner diameter of not less than 35 mm and a length of 250 mm, or other tools that guarantee the requirements of the specimen.

120 mm at the center of the two end faces of each graphite block. CUT OFF 60 mm from the outer end, and the remaining portion is used for specimen preparation.

5.4 Specimen size and precision

The cylinders are processed into specimens of (40 ± 0.1) mm $\times$ (40 ± 0.1) mm $\times$ (40 ± 0.1) mm or $\varnothing(45 \pm 0.1)$ mm $\times$ (40 ± 0.1) mm.

5.5 Sample appearance

The corners are intact and there are no visible cracks or flaws.

6 Cathode carbon blocks for aluminum electrolysis cells

6.1 Sampling batch

Every 100 t is one batch. Those less than 100 t are regarded as 100 t. The sampling quantity per batch is not less than 3 pieces. 2 cylinders are drilled in each block.

6.2 Sampling tool

Hollow drill bits with an inner diameter of not less than 65 mm and a length of not less than 150 mm or other tools.

6.3 Sampling position and method

The sampling position of carbon blocks without dovetail groove is the portion where the dovetail groove is to be machined. The sample is taken perpendicular to the direction intended to be used as the working surface. The center of sampling is 200 mm from the end of the carbon block.

The sampling position of carbon blocks with dovetail groove is on the dovetail groove 200 mm from the end, perpendicular to the working surface.

6.4 Specimen size and precision

The size and precision of the specimen shall be determined in accordance with the requirements of the tested item. However, the minimum size (usually the diameter) of the specimen is at least 3 times the maximum particle size of the dry aggregate.

According to the test method corresponding to the tested item, it is ensured that the specimen taken from the carbon block has an appropriate size.

9.2 Sampling tool

Saws or machine tools.

9.3 Sampling position and method

Respectively CUT OUT cylinders with a length of 100 mm at a distance of 50 mm ~ 60 mm from the top and bottom ends of the product.

9.4 Specimen size and precision

The cylinders are processed into specimens of (40 ± 0.1) mm $\times$ (40 ± 0.1) mm $\times$ (40 ± 0.1) mm or $\varphi(45 \pm 0.1)$ mm $\times$ (40 ± 0.1) mm. There are not less than 8 specimens per batch. It shall indicate the pressurization direction.

9.5 Sample appearance

The corners are intact and there are no visible cracks or flaws.

10 Carbon paste (electrode paste, anode paste, cathode paste, carbon ramming materials)

10.1 Sampling batch

For electrode paste, anode paste and cathode paste, every 500 t is one batch, and those less than 500 t are regarded as 500 t. For carbon ramming materials, every 100 t is one batch, and those less than 100 t are regarded as 100 t.

10.2 Specimen preparation

The number of subsamples sampled from each batch of carbon paste shall not be less than 3, and each subsample shall not be less than 5 kg. The subsamples are concentrated together, crushed to 35 mm, and reduced to 5 kg for testing of the roasting performance in the laboratory. The remaining specimen is crushed to less than 20 mm, and then reduced to 1 kg for testing of the volatiles and ash in the laboratory. If only the volatiles and ash are to be tested, the concentrated subsample will be directly crushed to 20 mm or less and reduced to 1 kg.

11 Carbon cement, carbon mud

11.1 Sampling batch

For carbon cement and carbon mud, every 100 t is one batch, and those less than 100 t are regarded as 100 t.

MIX them evenly by tumbling (tumble more than 15 times), the sample after mixing shall not be less than 2 kg. PUT the mixed material into the enamel pan, SPREAD evenly, and then TAKE the material on the diagonal until 500 g is dispensed. TAKE two specimens of 250 g, one for test and one for later use.

17 Spherical graphite

17.1 Sampling batch

The sampling is in batches. Spherical graphite produced by the same raw material, the same formula and the same process is one batch, and the number of each batch is not more than 10 t.

17.2 Specimen taking

SAMPLE according to GB/T 13732. The number of minimum sampling unit is not less than 18 (barrel/bag/sack, in the smallest packaging unit); for those less than 200 kg, all units are sampled. OPEN the bag to be sampled in a dry environment; INSERT a clean stainless steel sampling pin into the bag along the axis; the insertion depth shall not be less than 4/5 of the depth of the sampling bag; SAMPLE within 20 mm around the center axis of the material in the bag.

17.3 Specimen preparation

In order to make the collected sample representative of the quality of the batch, COMBINE all the collected samples, PLACE them on a square film of sufficient strength and appropriate size or on a firm and soft dry paper, and repeatedly MIX them evenly by tumbling (tumble more than 15 times), the sample after mixing shall not be less than 2 kg. PUT the mixed material into the enamel pan, SPREAD evenly, and then TAKE the material on the diagonal until 500 g is dispensed. TAKE two specimens of 250 g, one for test and one for later use.

18 Graphite anode materials, carbon composite lithium iron phosphate cathode materials, lithium titanate and carbon composite anode materials, etc.

18.1 Sampling batch

Sampling is in batches, and the quantity of each batch shall not exceed 5 t.

18.2 Specimen taking

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