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**YB**

FERROUS METALLURGY INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

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**YB/T 077-2017**

Replacing YB/T 077-1995

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**Method for determining optical texture of coke**

焦炭光学组织的测定方法

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## Table of Contents

|                                                                                                          |    |
|----------------------------------------------------------------------------------------------------------|----|
| Foreword .....                                                                                           | 3  |
| 1 Scope .....                                                                                            | 4  |
| 2 Normative references .....                                                                             | 4  |
| 3 Terms and definitions .....                                                                            | 4  |
| 4 Principle .....                                                                                        | 6  |
| 5 Instruments and materials .....                                                                        | 6  |
| 6 Sampling and preparation of specimens.....                                                             | 7  |
| 7 Determination procedures .....                                                                         | 7  |
| 8 Result calculation .....                                                                               | 9  |
| 9 Test report.....                                                                                       | 9  |
| Annex A (informative) Report format and content of measurement results for optical texture of coke ..... | 10 |

# Method for determining optical texture of coke

## 1 Scope

This Standard specifies the measurement principles, instruments, sampling and preparation of specimens, measurement procedures and result calculations for each optical texture of the coke pore wall.

This Standard applies to metallurgical coke. It can be used as a reference for other types of coke.

## 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 1997, *Coke -- Sampling and preparation of samples*

GB/T 8899, *Determination of maceral group composition and minerals in coal*

GB/T 16773, *Method of preparing coal samples for the coal petrographic analysis*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1 optical texture of coke

When the total magnification is 400 times to 600 times under the oil immersion objective lens with a polarized reflection microscope, the observed coke pore wall texture (expressed as a map).

### 3.2 isotropic texture

The texture with the same optical properties in all directions formed by the softening and melting of the active components when the coal is dry. The structure is dense. The surface is flat. The edges of pores are smooth. After inserting the test board, the interference color is first-grade red. The color does not change (represented as a map) when the stage is rotated.

### 3.3 anisotropic texture

When the coal is dried and melted, the active components are softened and melted to form a texture with different shapes, different sizes of isochromatic regions, and different optical properties in each direction. After inserting the test board, it will appear in different colors such as red, yellow and green. The colors alternately change when the stage is rotated. Generally, anisotropic textures with similar size and shape under the microscope are divided into the same type.

### **3.4 fine mosaic texture**

The texture with an equichromatic zone size  $<1.0\text{ }\mu\text{m}$  under the microscope. When the stage is rotated, red and yellow are alternately displayed (represented by a spectrum).

### **3.5 medium mosaic texture**

The texture with equichromatic zone size  $\geq 1.0\text{ }\mu\text{m} \sim 5.0\text{ }\mu\text{m}$  under the microscope. When the stage is rotated, red, yellow and green are alternately displayed (represented by a spectrum).

### **3.6 coarse mosaic texture**

The texture with equichromatic zone size  $\geq 5.0\text{ }\mu\text{m} \sim 10.0\text{ }\mu\text{m}$  under the microscope. When the stage is rotated, red, yellow and green are alternately displayed (expressed by a spectrum).

### **3.7 uncompletely fibrous texture**

The texture that seems to flow in one direction, with equichromatic zone size under the microscope: width  $<10.0\text{ }\mu\text{m}$ , length  $\geq 10.0\text{ }\mu\text{m} \sim 30.0\text{ }\mu\text{m}$ . When the stage is rotated, red, yellow and green are alternately displayed (represented by a spectrum).

### **3.8 completely fibrous texture**

The texture that is mostly arranged in fascicles in parallel, with equichromatic zone size under the microscope: width  $<10.0\text{ }\mu\text{m}$ , length  $\geq 30.0\text{ }\mu\text{m}$ . When the stage is rotated, red, yellow and green are alternately displayed (represented by a spectrum).

### **3.9 leaflet texture**

The texture with equichromatic zone size under the microscope: length and width about  $\geq 10.0\text{ }\mu\text{m}$ . When the stage is rotated, red, yellow and green are alternately displayed (represented by a spectrum).

### **3.10 fusinite and frag mental texture**

When the coal is dry, the texture that is formed by not softening molten microcomponents (inertites). Some preserve the original form of the silk structure in coal. Some have no definite forms. Generally, the particle interface is clear. There are many edges and corners and protrusions. After inserting the test board, it turns first-

## 6 Sampling and preparation of specimens

**6.1** Coke samples are taken in accordance with GB/T 1997.

**6.2** Coke samples are prepared according to the provisions of GB/T 1997. Prepare representative < 3mm coke samples, not less than 2 kg. Mix and shrink to 1 kg. Crush all to less than 1 mm. Crush to 1 mm specimens and mix well. Divide to 40 g ~ 50 g. The particle size must be all less than 1.0 mm (square hole sieve). Discard the fine particles smaller than 0.071 mm. They shall not be crushed too much. It is required that fine particles smaller than 0.071 mm shall not exceed 15% of the total amount. If the mass of the particle size less than 0.071 mm is more than 15% of the total weight, re-prepare the sample until it meets the requirements. Take 4 g ~ 5 g of 0.071 mm ~ 1.0 mm class sample for sheet making.

**6.3** The preparation method of powder coke and block coke shall refer to the provisions of GB/T 16773. The polishing material can be aluminum oxide, silicon oxide or chromium oxide solution. The diameter of the powder focal plate shall not be less than 22 mm. The volume occupied by the cement shall be less than 1/3. After polishing, the surface shall be smooth and clean, without obvious pitting, scratches and dirt. The interface of the optical texture shall be clear and well-defined.

## 7 Determination procedures

### 7.1 Adjust the microscope

**7.1.1** Place the specimen on a slide with cement. Flatten it. Then place it on the stage for quasi-focus. Correct the objective lens center.

**7.1.2** Adjust the light source, aperture diaphragm and field diaphragm, so that the brightness of the field of view is moderate, the light is uniform, and the image is clear.

**7.1.3** Adjust the polarizer and analyzer to make them orthogonal. Insert the gypsum inspection board ( $1\lambda$ ), so that the visual field presents the first-grade red interference color.

### 7.2 Determination of powder focal light film

**7.2.1** Determine the moving step size of the stage. Ensure that more than 500 effective measuring points evenly cover the entire film. The dot pitch is preferably 0.3 mm ~ 0.5 mm. The line spacing is preferably 0.4 mm ~ 0.8 mm, which shall not be less than the dot pitch.

**7.2.2** Starting from one end of the specimen, identify what kind of optical texture the substance under the intersection of the crosshairs (see Table 1 for the classification diagram) belongs to. Count into the corresponding count key. Then move one step in a

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Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

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