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**INDUSTRY STANDARD OF THE
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Photocatalytic activated carbon for air purification

气相光催化净化用活性炭

(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed and managed by the National Forestry Chemical Product Standardization Technical Committee (SAC/TC558).

This standard was drafted. Forest Products Chemical Industry Research Institute, Chinese Academy of Forestry, Fujian Xinsen Carbon Industry Co., Ltd., Jiangsu Pu Shida Environmental Technology Co., Ltd.

1 Scope

This standard specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation, and storage of activated carbon for gas phase photocatalytic purification.

Save.

This standard applies to granular activated carbon for gas-phase photocatalytic purification using wood and coal as raw materials.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this article. For undated references, the latest version (including all amendments) applies to this document.

GB/T 6678 General sampling rules for chemical products GB/T 6682 Analytical laboratory water specifications and test methods GB/T 12496.4 Test methods for wooden activated carbon-Determination of moisture content GB/T 12496.6 Test method for wooden activated carbon--Determination of strength GB/T 12496.8 Test method for wooden activated carbon-Determination of iodine adsorption value

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

The removal efficiency of toluene the ratio of the reduction of the toluene gas concentration before and after the test to the initial concentration is expressed in%.

3.2

The degradation efficiency of toluene the difference between the toluene removal rate when the UV lamp is on and off is expressed in%.

4 Technical requirements

4.1

Appearance is black granular, odorless.

4.2

The quality index of activated carbon for gas-phase photocatalytic purification shall meet the requirements of Table 1.

Table 1 Quality indicators

Project indicators

Moisture%, ≤ 10

Strength%, ≥ 90

Iodine adsorption value mg/g, ≥ 700 Toluene degradation rate%, ≥ 5

5.1 Moisture

Determine according to GB/T 12496.4.

5.2 Intensity

Determined according to GB/T 12496.6.

5.3 Iodine adsorption value

Determined according to GB/T 12496.8.

5.4.1 Method summary

The sample was placed in a photocatalytic reactor under specified conditions, and the toluene removal rate of the sample under the UV lamp on and off conditions was measured.

The difference between the two was used as the toluene degradation rate of the sample.

5.4.2 Reagents

5.4.2.1

Toluene (GB/T 684), analytical grade.

5.4.2.2

High purity nitrogen (GB/T 8979).

5.4.3 Instrument

5.4.3.1

Gas chromatograph, detection conditions. Agilent 19091J-413 HP-5 capillary chromatographic column (column length 30 m), hydrogen was used as for carrier gas, hydrogen flame detection. Detector temperature was 200 °C, column temperature was 150 °C, inlet temperature was 150 °C, split ratio was 20:1, and injection was performed.

Volume 1 µL.

5.4.3.2

Photocatalytic reactor, 30 cm long, 20 cm wide and 50 cm high opaque box with four 20 W UV lamps (245 nm) with a quartz tube (10 mm diameter and 40 cm height) in the middle.

5.4.3.3

Gas mixing bottle, 500 ml.

5.4.3.4

Gas flowmeter, flow range 60 mL/min ~ 600 mL/min.

5.4.3.5

Analytical balance with a sensitivity of 0.1 mg.

5.4.4 Experimental device and installation instructions

The photocatalytic experimental device is shown in Figure 1. The instruments and equipment used in the experiment are connected, while ensuring the airtightness of the device. By adjusting nitrogen the flow meter ensures a stable and continuous gas flow throughout the system.

1. Air bottle; 2. Nitrogen bottle; 3. Flow meter; 4. Gas generation bottle; 5. Gas mixing bottle; 6. Ultraviolet lamp; 7. Quartz tube; 8. Gas chromatography; 9.

Exhaust absorption bottle

Figure 1 Experimental setup of gas phase photocatalysis

5.4.5.1 Sample preparation

The particle size of the sample is controlled within the range of 0.25 to 2 mm, and dried to a constant weight at 105 to 110 °C, and placed in a dryer for later use.

5.4.5.2 Toluene gas preparation

Add the toluene solution from the inlet tube to a 500 mL gas wash bottle, approximately 10 cm in height in the bottle. Connect the porous gas wash bottle to the system, Put it in a constant temperature water bath (25 ± 1.0) °C vertically.

5.4.5.3 Toluene standard curve drawing

At (25 ± 1.0) °C, take 25 µL of toluene in a 500mL reagent bottle, configure the volume concentration to be 50×10^{-6} , and then take the volume concentration of the gas is gradually diluted to obtain other target concentrations of gas, and a standard curve is drawn. This standard line is used as toluene Used for gas detection marking.

5.4.5.4 Operation process

Bring the toluene gas into the buffer bottle with 500 mL/min nitrogen as the carrier gas, and mix it with 500 mL/min clean air to adjust the N₂ flow the initial toluene concentration was kept at 2.5×10^{-5} . The mixed gas enters the photocatalytic reactor. Gas chromatograph is used for gas detection, the exhaust gas is exhausted after being absorbed.

With the UV lamp turned off, accurately weigh 2.0 g (accurate to 0.0001 g) of the sample