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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 45504-2025

**Nanotechnologies - Nanostructured porous alumina as catalyst
support for vehicle exhaust emission control - Characteristics
and measurement methods**

纳米技术 汽车尾气排放控制用纳米结构多孔氧化铝催化剂载体 特性和测量方法
(English Translation)

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is equivalent to ISO/T S23362.2021 "Nanostructured porous alumina catalyst for nanotechnology vehicle exhaust emission control the document type was adjusted from ISO technical specifications to my country's national standards.

The following minimal editorial changes were made to this document.

---The name of the standard was changed to "Characteristics and Measurement of Nanostructured Porous Alumina Catalyst Supports for Nanotechnology Automobile Exhaust Emission Control" Quantitative Methods.

Introduction

Nanostructured porous alumina materials as catalyst carriers are important supporting materials for automobile exhaust emission control.

Three-way catalytic converters (TWCs) are used in automobile exhaust control systems worldwide.

Converts carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) into carbon dioxide (CO₂), nitrogen (N₂) and oxygen (O₂).

In gasoline vehicles, nanostructured porous alumina materials with high specific surface area (SSA) and excellent thermal stability can enable TWCs to be used in the catalytic activity is high at 900°C~1000°C, so the nanostructured porous alumina material with suitable performance is used as a catalyst.

One of the most important materials in the converter[16], it is in high demand. In automobile exhaust treatment, 11,000 tons of porous alumina powder is needed every year.

Nanostructured porous alumina as a catalyst carrier has a lot to do with SSA, specific pore volume, impurities and thermal resistance.

[17]. High SSA can promote the uniform dispersion of noble metals. Appropriate pore volume can ensure the effective loading of noble metals and allow the reaction gas to pass through.

Impurities can deactivate precious metal catalysts and are therefore harmful. Excellent thermal stability ensures that TWCs can be used over long distances.

After the operation, the device can maintain high activity, thus extending its service life. See Appendix A for the schematic diagram.

The international market demand for nanostructured porous alumina is growing year by year. However, there is currently no regulatory quality control for manufacturers.

and guarantee standards, as well as standards for users to select appropriate TWCs materials.

This document provides the characterization and measurement methods of nanostructured porous alumina as a catalyst support for automotive exhaust emission control.

Global trade in nanostructured porous alumina.

Nanotechnology. Nanostructures for automobile exhaust emission control Characteristics and measurement methods of porous alumina catalyst supports

1 Scope

This document specifies the measured properties of nanostructured porous alumina powders used as supports for automotive emission control catalysts.

Based on the agreement between the interested parties, this document contains the key characteristics to be measured and the additional characteristics that are recommended to be measured.

The measurement methods for each characteristic are recommended.

This document applies to the measurement of properties of nanostructured porous alumina for gasoline powered vehicles and is not applicable to health, environment and safety issues.

Characterization of characteristics.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

ISO/T S80004-1 Nanotechnologies-Vocabulary-Part 1: Core terms 1.Core terms) Note. GB/T 30544.1-2014 Nanotechnology Terminology Part 1: Core Terminology (ISO/T S80004-1.2010, IDT) ISO/T S80004-6 Nanotechnologies Vocabulary - Part 6: Characterization of Nanoobjects Note. GB/T 30544.6-2016 Nanotechnology Terminology Part 6: Characterization of Nanoobjects (ISO/T S80004-6.2013, MOD)

3.1 Terms and Definitions

The terms and definitions defined in ISO/T S80004-1 and ISO/T S80004-6 and the following apply to this document.

The terminology databases used for standardization maintained by ISO and IEC are located at.

3.1.1

specific surface area; SSA the surface area per unit mass of a solid substance.

[Source. ISO 9277:2010, 3.11] 3.1.2 specific pore volume the volume of open pores per unit mass of a substance.

3.1.3

porediameter

The diameter of a hole in a model, usually calculated from data obtained by a specific program, assuming the hole is cylindrical.