
**Nanotechnologies — Nanostructured
porous alumina as catalyst support
for vehicle exhaust emission control
— Specification of characteristics and
measurement methods**

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Foreword

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This document was prepared by Technical Committee ISO/TC 229, *Nanotechnologies*.

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Introduction

Nanostructured porous alumina as catalyst support for vehicle exhaust emission control plays an important role in automotive exhaust treatment^[15]. Three-way catalytic converters (TWCs) have been used in vehicle exhaust control systems worldwide, which can convert carbon monoxide (CO), hydrocarbon (HC) and oxynitride (NO_x) into carbon dioxide (CO₂), nitrogen (N₂) and oxygen (O₂). Nanostructured porous alumina has the advantages of a high specific surface area (SSA) and excellent thermal stability, which makes TWCs keep high catalytic activity at a temperature of 900 °C to 1 000 °C in gasoline cars. As one of the most important materials in the catalytic converter^[16], nanostructured porous alumina with proper performance is in great demand. In the automotive exhaust treatment field, almost 11,000 tons of porous alumina powders are needed per year.

SSA, specific pore volume, impurities and thermal stability are the main characteristics affecting the performance of nanostructured porous alumina as catalyst support^[17]. A high SSA can facilitate homogeneous dispersion of noble metal. A suitable specific pore volume ensures efficient noble metal loading and allows reaction gas to pass through and contact with the catalyst. Impurities can deactivate the noble metal catalyst and thus are harmful. An excellent thermal stability guarantees that TWCs maintain at high activity levels after a long distance running and thus have a prolonged service life. The schematic illustration is shown in [Annex A](#).

The world market demand for nanostructured porous alumina is growing year by year. Currently, however, there are no standards for manufacturers in managing quality control and assurance, and for users in selecting suitable materials for TWCs.

This document provides characteristics and measurements of nanostructured porous alumina as catalyst support for vehicle exhaust emission control. It aims to facilitate worldwide transactions between buyers and sellers of nanostructured porous alumina.

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