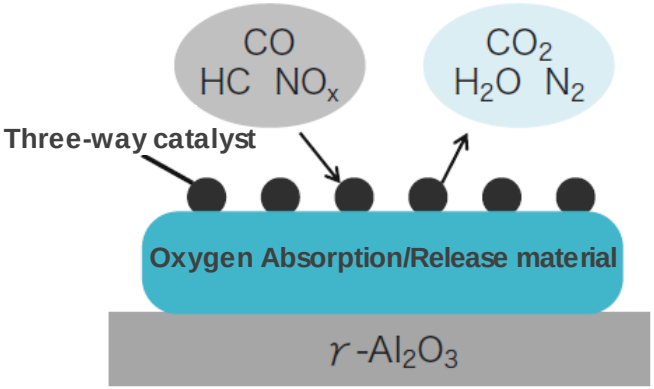
Tohoku Univ. Technology

Oxygen storage material, catalyst for cleaning exhaust gas, and method for manufacturing oxygen storage material

Oxygen storage material comprising oxide containing κ phase having large specific surface area

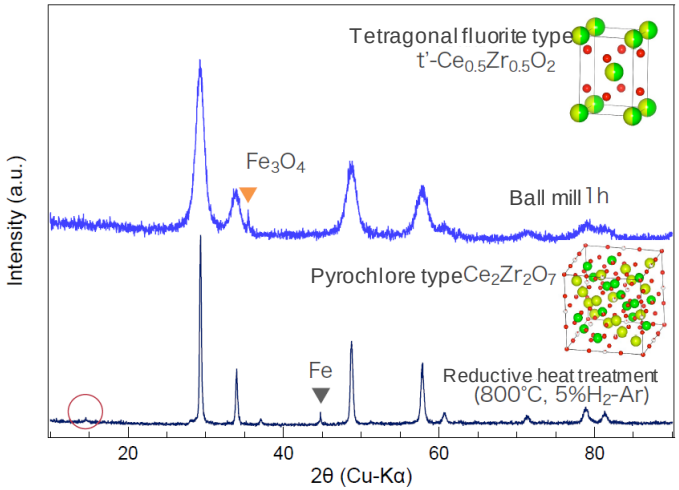


Overview

CeO_2-ZrO_2 composite oxide with excellent oxygen storage capacity (OSC) has been used as an atmosphere control material for ternary catalysts used to purify exhaust gas from automobiles. Among CeO_2-ZrO_2 composite oxides, κ phase (cubic pyrochlore like structure) is known to exhibit the highest OSC. However, due to the high temperature required for the synthesis process of κ phase, the specific surface area is significantly reduced and practical application of κ phase is difficult.

In the present invention, it has become possible to provide an atmosphere-controlling material consisting of an oxide containing κ phase, in which the decrease in the specific surface area is greatly suppressed by the synthesis process at a lower temperature than in the conventional process. The low temperature is realized by adding Fe oxide during the synthesis of the complex oxide. The material by this synthesis process shows a clear XRD pattern assigned to the κ phase and has a specific surface area of 3 m^2/g or more. This shows the possibility of practical application of the κ phase, and it can be said that the technology is expected to improve the purification ability of exhaust gas.

Ordering of cations



Coexistence with Fe_3O_4 → Cation ordering at low temperature

Product Application

- Exhaust gas purification

Related Works

[1] Kazuto Murakami, Yoko Sugawara, Junki Tomita, Akihiro Ishii, Itaru Oikawa and Hitoshi Takamura, J. Mater. Chem. A 2022,10, 21291-21299

IP Data

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