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**Datasheet for the decision  
of 11 March 2009**

**Case Number:** T 1130/07 - 3.3.05

**Application Number:** 04290616.4

**Publication Number:** 1457249

**IPC:** B01D 53/94

**Language of the proceedings:** EN

**Title of invention:**  
Exhaust-gas purifying catalyst

**Applicant:**  
Cataler Corporation

**Headword:**  
Cerium-zirconium loading layer/CATALER

**Relevant legal provisions:**  
EPC Art. 52(1), 54(1)(2)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**  
"Novelty (yes)"  
"Remittal (yes)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1130/07 - 3.3.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.05  
of 11 March 2009

**Appellant:** Cataler Corporation  
7800, Chihama, Daito-cho  
Ogasa-gun, Shizuoka-ken, 437-1492 (JP)

**Representative:** Geismar, Thierry  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 12 January 2007  
refusing European application No. 04290616.4  
pursuant to Article 97(1) EPC 1973.

**Composition of the Board:**

**Chairman:** G. Raths  
**Members:** J.-M. Schwaller  
S. Hoffmann

## Summary of Facts and Submissions

- I. This appeal lies from the decision of the examining division refusing European patent application No. 04 290 616.4.
- II. The contested decision, in which the examining division relied upon the document

D1: US 5 075 276,

was based on the set of claims submitted as the sole request under cover of the letter dated 3 May 2006.

Independent claim 1 reads as follows:

*"1. An exhaust-gas purifying catalyst, comprising:  
a catalyst support substrate;  
a loading layer formed on the catalyst support substrate, and comprising at least one additive member selected from the group consisting of yttrium, lanthanum, iron and potassium; and  
a catalytic ingredient loaded on the loading layer, characterized in that the loading layer comprises cerium oxide and zirconium oxide in a summed amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight, or a cerium-zirconium compound in an amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight."*

In the decision, the examining division held that claim 1 lacked novelty over D1, arguing that a catalyst carrier layer with a summed amount of cerium oxide and

zirconium oxide of 80% by weight or more with respect to the entire loading layer (cerium oxide + zirconium oxide + yttrium oxide) taken as 100% by weight was disclosed in Examples 1a and 1b of D1, the manufacturing process of which led to a separate carrier layer comprising cerium oxide, zirconium oxide and yttrium oxide.

III. In the grounds of appeal, the applicant (hereinafter "the appellant") argued in essence that the major component of the carrier layer in the catalyst of D1 was alumina and that the manufacturing procedures in D1 did not allow the production of a loading of cerium oxide and zirconium oxide in a summed amount of 80% by weight or more with respect to the entire loading (alumina + cerium oxide + zirconium oxide + yttrium oxide).

IV. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims dated 3 May 2006.

## **Reasons for the Decision**

### 1. *Novelty*

1.1 D1 (column 2, lines 10 to 20; claim 1) discloses an exhaust gas purification catalyst comprising a support substrate, a catalyst carrier layer formed on the support substrate and catalyst ingredients loaded on the catalyst carrier layer, with the catalyst carrier layer comprising a high surface area material selected from alumina and titanium oxide; cerium oxide; zirconium oxide; at least one oxide of a rare earth element other than cerium and lanthanum; and at least part of the cerium oxide, zirconium oxide and/or of the other oxide

of rare earth being present in the form of a composite oxide and/or solid solution.

- 1.2 The catalysts 1a and 1b in table 1 of D1 - considered in the contested decision to anticipate the subject-matter of claim 1 - are prepared as follows:

700 g of alumina sol with an alumina content of 10% by weight, 1000 g of alumina powder and 300 g of distilled water are mixed and stirred to make a slurry in which is immersed a honeycomb-shape cordierite monolith for 1 minute. After it is taken out of the slurry and excess slurry is blown off, the monolithic catalyst support substrate is dried at 150°C for 1 hour and burned at 700°C for 2 hours. This process is repeated twice to form a catalyst carrier layer comprising activated alumina on the monolithic catalyst support substrate.

Next, the monolith with the above catalyst carrier layer formed thereon is immersed for 1 minute in a mixed aqueous solution having dissolved therein 0.30 mol/l of cerium nitrate, 0.05 mol/l of zirconium oxynitrate and 0.05 mol/l of yttrium nitrate. After it is taken out of the mixed aqueous solution and excess water is blown off, the monolithic catalyst support substrate is dried at 200°C for 3 hours and burned at 600°C for 5 hours. Thus, a monolithic catalyst support substrate (A) having the catalyst carrier layer containing cerium oxide, zirconium oxide and yttrium oxide is obtained.

A monolithic catalyst support substrate (B) is obtained in the same manner except that the mixed aqueous solution contains 0.30 mol/l of cerium nitrate, 0.10 mol/l of zirconium oxynitrate and 0.10 mol/l of

yttrium nitrate.

Next, each of the monolithic catalyst support substrates A and B are immersed in distilled water to enable a sufficient amount of water to be absorbed therein and subjected to an air flow to blow off excess water after they are taken out of the distilled water. Then, they are immersed in an aqueous solution containing dinitrodiamine platinum to load platinum for 1 hour, similarly in an aqueous solution containing rhodium chloride to load rhodium, and similarly in an aqueous solution containing palladium chloride to load palladium. After excess water is blown off, they are dried at 200°C for 1 hour, so that the catalysts 1a and 1b, respectively, are obtained.

- 1.3 The board cannot accept the examining division's argument that the above preparation process would lead to a separate carrier layer containing zirconium oxide, cerium oxide and yttrium oxide, because the alumina used in the preparation of exhaust gas catalysts is generally porous and absorbent, and nothing indicates that the alumina used in the present case was a non-porous and non-absorbing one. Furthermore, there is no indication in the above process that the alumina coating or the alumina-coated monolith was rendered non-porous or impervious to the aqueous solution in which the alumina-coated monolith was immersed.

Therefore, in the absence of evidence to the contrary, there is no reason to believe that the zirconium, cerium and yttrium salts dissolved in said solution would be deposited as a separate carrier layer.

1.4 The board can further not accept the examining division's argument that the above preparation process would lead to a catalyst carrier layer with a summed amount of cerium oxide and zirconium oxide of 80% by weight or more with respect to the entire loading layer (cerium oxide + zirconium oxide + yttrium oxide) taken as 100% by weight, because it is unlikely that within the short immersion time used (1 minute) the weight uptake of cerium, zirconium and yttrium in the alumina coating would be such that it would represent at least four times the weight of alumina coated on the monolithic support substrate.

1.5 Taking into account the above considerations and since D1 discloses neither a catalyst with a separate carrier layer of zirconium, cerium and yttrium, nor the respective amounts of zirconium oxide, cerium oxide, yttrium and alumina in the catalyst carrier layer described therein, the board concludes that D1 does not directly and unambiguously disclose "*a loading layer comprising cerium oxide and zirconium oxide in a summed amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight, or a cerium-zirconium compound in an amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight*".

Accordingly, the subject-matter of claim 1 is novel over D1.

1.6 Although the decision is silent as regards the other state of the art documents cited in the search report, the board observes that none of them discloses directly and unambiguously "*a loading layer comprising cerium*

*oxide and zirconium oxide in a summed amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight, or a cerium-zirconium compound in an amount of 80% by weight or more with respect to the entire loading layer taken as 100% by weight".*

1.7 It follows that the subject-matter of claim 1 (and of the dependent claims 2 and 3) is novel within the meaning of Articles 52(1) and 54(1)(2) EPC.

2. *Remittal*

Since the decision to reject the present application did not address in particular the inventive step issue, the board considers it appropriate to exercise its power conferred by Article 111(1) EPC to remit the case for further prosecution.

**Order**

**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

C. Vodz

G. Raths