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D E C I S I O N
of 10 December 1998

Case Number: T 0117/95 - 3.3.5

Application Number: 91301143.3

Publication Number: 0443765

IPC: B01J 37/02

Language of the proceedings: EN

Title of invention:

Catalyst composition containing segregated platinum and rhodium components

Applicant:

ENGELHARD CORPORATION

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 123(2), 54, 56

Keyword:

"Novelty (main request, auxiliary request 1: no), process features or use features in a product claim"
"Inventive step (auxiliary request 2: no)"

Decisions cited:

-

Catchword:



Case Number: T 0117/95 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 10 December 1998

Appellant: ENGELHARD CORPORATION
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 16 September 1994
refusing European patent application
No. 91 301 143.3 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: M. M. Eberhard
M. B. Günzel

Summary of Facts and Submissions

- I. European patent application No. 91 301 143.3 was refused by the Examining Division on the grounds of lack of novelty and lack of inventive step.

The Examining Division considered that the subject-matter of amended claim 1 filed on 7 September 1993 lacked novelty over the disclosure of D2 (EP-A-0 427 494). It took the view that the relative disposition of the first and second coats with respect to the flow of gas as defined in claim 1 was a pure process feature which did not permit the claimed catalyst to be distinguished from that of D2. It was further held that the subject-matter of claim 1 lacked an inventive step over the teaching of D1 (English translation of JP-A-63-240 947) since the skilled person knew that platinum and palladium were more or less equivalent in three-way conversion (TWC) catalysts and could therefore be interchanged where circumstances made it desirable.

- II. The Appellant lodged an appeal against this decision. He referred to four articles in support of his arguments in the statement of grounds of appeal, in particular Ind. Eng. Chem. Prod. Res. Dev., 19 (1980), pages 293-298, Yu Ya, Y.-F. (hereinafter article 1) and Ind. Eng. Chem. Prod. Res. Dev., 24 (1985), pages 43-49, Muraki, H. et al. (article 2). In a communication from the Board, reference was made to a paper entitled "Durability of Palladium Only Three-Way Automative Emission Control Catalysts", J.C. Summers et al., SAE Technical Paper Series, 890794, 1989, pages 1-16 (hereinafter D3). In reply to this communication, the Appellant submitted five sets of amended claims on 9 November 1998.

III. Oral proceedings were held on 10 December 1998. To overcome objections to the amended claims on file, the Appellant, at the oral proceedings, submitted six sets of amended claims in replacement of the previous sets of claims. Claim 1 of the main request and of each of the first to fourth auxiliary requests reads as follows:

Main request:

"1. A catalyst composition comprising a carrier on which is disposed a catalytic material, the catalytic material comprising:

a first coat carried on the carrier and comprising a first activated alumina support, a catalytically effective amount of a first platinum catalytic component dispersed on the first alumina support, and a catalytically effective amount of bulk ceria; and

a second coat carried by the carrier and comprising an yttrium oxide-zirconia support or rare earth oxide-zirconia support, wherein yttrium oxide and/or rare earth oxide or oxides are dispersed substantially throughout the entire matrix of the zirconia, a catalytically effective amount of a first rhodium catalytic component dispersed on the said yttrium oxide-zirconia support or rare earth oxide-zirconia support, a second activated alumina support, and a catalytically effective amount of a second platinum catalytic component dispersed on the second alumina support wherein the second coat overlies the first coat or is located on the carrier upstream, as sensed in the direction of gas flow through the catalyst, of the first coat, or is located on a separate carrier upstream, as sensed in the direction of gas flow through the catalyst, of the first coat."

First auxiliary request:

"1. A catalyst composition comprising a carrier on which is disposed a catalytic material, the catalytic material comprising:

a first coat carried on the carrier and comprising a first activated alumina support, a catalytically effective amount of a first platinum catalytic component dispersed on the first alumina support, and a catalytically effective amount of bulk ceria; and

a second coat carried by the carrier and comprising an yttrium oxide-zirconia support or rare earth oxide-zirconia support, wherein yttrium oxide and/or rare earth oxide or oxides are dispersed substantially throughout the entire matrix of the zirconia, a catalytically effective amount of a first rhodium catalytic component dispersed on the said yttrium oxide-zirconia support or rare earth oxide-zirconia support, a second activated alumina support, and a catalytically effective amount of a second platinum catalytic component dispersed on the second alumina support, in which the second coat overlies the first coat, or in which the second coat is located on the same carrier as, but upstream (as sensed in the direction of gas flow through the catalyst) of, the first coat, the catalyst composition being located in an exhaust gas line for carrying a gas containing noxious components comprising one or more of carbon monoxide, hydrocarbons and nitrogen oxides, or in which the second coat is located on a separate carrier upstream (as sensed in the direction of gas flow through the catalyst) of the first coat, the catalyst composition being located in an exhaust gas line for carrying a gas containing noxious components comprising one or more of carbon monoxide, hydrocarbons and nitrogen oxides."

Second auxiliary request:

"1. A catalyst composition comprising a carrier on which is disposed a catalytic material, the catalytic material comprising:

a first coat carried on the carrier and comprising a first activated alumina support, a catalytically effective amount of a first platinum catalytic component dispersed on the first alumina support, and a catalytically effective amount of bulk ceria; and

a second coat carried by the carrier and comprising a yttrium oxide-zirconia support or rare earth oxide-zirconia support, wherein yttrium oxide and/or rare earth oxide or oxides are dispersed substantially throughout the entire matrix of the zirconia, a catalytically effective amount of a first rhodium catalytic component dispersed on the said yttrium oxide-zirconia support or rare earth oxide-zirconia support, a second activated alumina support, and a catalytically effective amount of a second platinum catalytic component dispersed on the second alumina support wherein the second coat overlies the first coat".

Third auxiliary request:

"1. A catalyst composition comprising a carrier on which is disposed a catalytic material, the catalytic material comprising:

a first coat carried on the carrier and comprising a first activated alumina support, a catalytically effective amount of a first platinum catalytic component dispersed on the first alumina support, and a catalytically effective amount of bulk ceria; and

a second coat carried by the carrier and comprising an yttrium oxide-zirconia support or rare earth oxide-zirconia support, wherein oxide or oxides

selected from the oxides of cerium, neodymium and yttrium are dispersed substantially throughout the entire matrix of the zirconia, a catalytically effective amount of a first rhodium catalytic component dispersed on the said yttrium oxide-zirconia support or rare earth oxide-zirconia support, a second activated alumina support, and a catalytically effective amount of a second platinum catalytic component dispersed on the second alumina support, in which the second coat overlies the first coat".

Fourth auxiliary request:

"1. A catalyst composition comprising a carrier on which is disposed a catalytic material, the catalytic material comprising:

a first coat carried on the carrier and comprising a first activated alumina support, a catalytically effective amount of a first platinum catalytic component dispersed on the first alumina support, and a catalytically effective amount of bulk ceria; and

a second coat carried by the carrier and comprising a metal oxide(s)-zirconia support, wherein the said metal oxide or oxides are selected from the oxides of cerium, neodymium and yttrium and are dispersed substantially throughout the entire matrix of the zirconia, a catalytically effective amount of a first rhodium catalytic component dispersed on the said metal oxide(s)-zirconia support, a second activated alumina support, and a catalytically effective amount of a second platinum catalytic component dispersed on the second alumina support, in which the second coat overlies the first coat".

Two documents illustrating the common general knowledge of the skilled person were handed over to the Appellant at the oral proceedings, namely Römpps Chemie-Lexikon, 8th Edition, 1988, pages 4726-4727, (D4), and

Encyclopedia of Chemical Technology, 3rd Edition, 1984, pages 882-883 (D5).

IV. The Appellant's arguments can be summarised as follows:

Claim 1 of each of the main and first auxiliary requests was novel with respect to D2 since the catalyst member comprising the second coat was not disclosed in D2 as the upstream stage of the catalyst but as the downstream stage. A claim containing both product features and process features was clearly permissible (see decision G 2/88, OJ EPO 1990, 93) and both types of features have to be considered when construing such a claim. The Guidelines did not justify the dismissal, as non-distinctive, of those features relating to the relative disposition of the first and second coats. There was no principle that forbade the claiming of a catalyst composition, as it were "in situ". The terms "exhaust gas line" did imply that exhaust gases were vented from a source through a venting outlet and thus defined a direction of flow which enabled one to ascertain an upstream and downstream direction. The gas flow direction was precisely defined in an automobile exhaust gas line.

Concerning inventive step of the second auxiliary request, no comparative examples were available with respect to the catalysts of D1. However, it was not obvious in view of the teaching of D1 to change, in such sophisticated catalysts, one precious metal of the second coat for another one in order to provide an alternative catalyst. A great number of possible modifications existed for such complicated catalysts. According to the case law, the skilled person was rather unimaginative and considered the concrete and narrow teaching of a document (T 5/81 and T 127/82). The articles cited in the statement of grounds of appeal showed that Pt and Pd were neither equivalent

nor interchangeable in TWC catalysts. Article (2) recommended selecting Pd as the main precious metal in rhodium-free catalyst since it was more resistant to sintering than Pt. In view of this article, the skilled person would have been discouraged from replacing Pd by Pt in the catalyst of D1 because he would have expected the catalyst to be worse as regards sintering and to be more expensive. The skilled person was interested in providing an alternative catalyst which would be technically sound. D1 taught that the Pd was loaded in combination with lanthanum oxide in the layer containing the praseodymium-stabilised zirconia in order to avoid sintering of the Pd. There was no evidence that the lanthanum oxide would help to avoid Pt-sintering in the same manner as for Pd and that the NO_x efficiency would be maintained by replacing Pd by Pt. If the skilled person had considered replacing the Pd by Pt or adding Pt, he would have loaded the additional Pt into the cerium oxide-containing layer in view of the teaching of D1.

Claim 1 of the third auxiliary request met the requirements of Article 123(2) EPC since the statement on page 7 of the description could not be construed as meaning that all the rare earth oxides should be dispersed throughout the zirconia matrix. The Appellant's representative requested remittal of the fourth auxiliary request to the Examining Division and pointed out that the arguments in connection with the new documents D4 and D5 would be more complete if the Appellant had an opportunity to comment on them.

- V. The Appellant requested that the decision under appeal be set aside. As his main request, he requested that a patent be granted with the claims of the main request submitted in the oral proceedings. As his first auxiliary request, he requested that a patent be granted with the claims of any of auxiliary requests 1

to 3 submitted in the oral proceedings, in the order indicated. As a further auxiliary request he requested that the case be remitted to the first instance for consideration of auxiliary requests 4 to 5.

Reasons for the Decision

1. The appeal is admissible.
2. The amendments in claim 1 of each of the main request, first auxiliary request and second auxiliary request meet the requirements of Article 123(2) EPC.

Main request

3. D2 is a European patent application which forms part of the state of the art as defined in Article 54(3) and (4) EPC in respect of all Contracting States designated in the present patent application. It can be taken into consideration only for the novelty issue. D2 discloses a catalytic converter for the conversion of hydrocarbons (HC), CO and NO_x pollutants contained in particular in the exhaust gases from internal combustion engines. The catalyst composition of example 3 comprises an "upstream" catalytic member and a "downstream" catalytic member, as sensed in the direction of exhaust gas flow through the converter, the upstream and downstream members being respectively Catalyst I of example 1 and Catalyst II of example 2. Catalysts I and II have compositions falling within the definition stated in claim 1 for the first and second coat respectively.

According to claim 1 of the main request, the second coat is located on the separate carrier upstream of the first coat as sensed in the direction of gas flow

through the catalyst. The Appellant's arguments that the claimed catalyst is new over the catalyst of D2 because of the reverse disposition of the two coats, cannot be accepted by the Board. The fact that the gases to be treated flow first through the catalyst member supporting the second coat and then through the catalyst member supporting the first coat when the claimed catalyst is being used whereas it is the contrary in D2 (ie the gases flow first through the catalyst member supporting the first coat) does not change in any way the structure, form or composition of the catalyst. The catalyst as defined in claim 1 does not differ from the catalyst of example 3 of D2, only the direction of gas flow through it is changed when the said catalysts are used for treating gases. Therefore, the claimed catalyst cannot be distinguished from the catalyst of example 3 of D2 and the subject-matter of claim 1 is not novel over the disclosure of D2. Thus, claim 1 does not meet the requirements set out in Articles 52(1) and 54(1), (3) and (4) EPC.

First auxiliary request

4. Claim 1 of this request differs in substance from claim 1 of the main request in that it further states that the catalyst composition is located in an exhaust gas line for carrying a gas containing noxious components comprising one or more of carbon monoxide, hydrocarbons and nitrogen oxides. The question arises whether claim 1 is to be construed as relating to (i) the catalyst composition for use in an exhaust gas line or (ii) to the combination of the catalyst composition plus the exhaust gas line in which it is located. However, as both possibilities lead to the same outcome as regards novelty, this question can remain open.

4.1 Concerning the first possibility, the Board holds that a claim directed to a product for a particular use is to be construed as being directed to a product which is **suitable** for the said use. Therefore, the catalyst composition of claim 1 would be novel over the catalyst of example 3 of D2 if the latter were in a form which would render it unsuitable for the use stated in claim 1. However, the catalyst of D2 is suitable for use in an exhaust gas line for converting CO, HC and NO_x. Furthermore, although **in the use** disclosed in example 3 of D2 catalyst II is placed downstream of catalyst I as sensed in the direction of the gases flowing through the exhaust gas line connected to the internal combustion engine, the catalyst made of catalysts I and II is also suitable for use in the reverse position indicated in claim 1. The fact that in the use defined in claim 1 the catalyst member carrying the second coat is placed upstream of the member carrying the first coat does not change the structure, composition or form of the claimed catalyst, and thus does not make it distinguishable from the catalyst of D2. Therefore, this feature cannot render the claimed catalyst novel over the catalyst of D2.

4.2 Concerning the second possible construction of claim 1, the question of what is meant by the expression "exhaust gas line" was discussed at the oral proceedings. If this expression implies an exhaust gas line including the gas inlet which has to be connected to the venting outlet of an automobile engine as the source of gases to be treated, the combination of such an exhaust gas line plus the catalyst might be novel over the product of D2. In that case, as the said gas inlet is usually structurally different from the gas outlet of the exhaust gas line, this structural dissymmetry would enable one to ascertain the direction of gas flow in the exhaust gas line and to distinguish the said combination from that of D2. However, claim 1

of the first auxiliary request does not contain any limitation as to the kind of exhaust gas line in which the catalyst is emplaced, and, in particular, it neither states that the exhaust gas line can be directly connected to the venting outlet of an automobile engine nor does it contain an equivalent statement. Therefore, the exhaust gas line may have a configuration in which the inlet part thereof cannot be distinguished from the outlet part. In this case, two opposite directions of gas flow through the catalyst are possible and the catalyst composition located in an exhaust gas line as defined in claim 1 cannot be distinguished from the catalyst of D2 which can be used in any kind of exhaust gas line comprising at least one of CO, HC and NO_x.

It follows from the above that the catalyst composition as defined in claim 1 of the first auxiliary request lacks novelty over the catalyst known from D2.

Second auxiliary request

5. Claim 1 of this request is limited to a catalyst in which the second coat overlies the first coat. As D2 does not disclose depositing a second coat having the composition stated in claim 1 on a first coat as defined in the said claim, the catalyst composition of claim 1 is new with respect to D2. The claimed catalyst is also novel over the disclosure of D1.
6. D1, which concerns catalysts for the simultaneous treatment of HC, CO and NO_x contained in exhaust gases from internal combustion engines, is considered to represent the closest prior art. The catalysts of examples 1 and 3 of D1 comprise two different layers, the layer comprising lanthanum oxide and a praseodymium-stabilised zirconia (hereinafter second

layer) overlying a first layer deposited on a monolithic support and comprising bulk cerium oxide as an oxygen storage material. It was not contested by the Appellant at the oral proceedings that the catalyst composition according to claim 1 differs from the catalysts of examples 1 or 3 of D1 only in that the second coat comprises Pt instead of Pd as the platinum group metal on the alumina support (see D1, page 2, lines 1-23; page 3, second paragraph; page 4, lines 30-32; examples 1 and 3). The catalysts of D1 avoid oxidation of Rh and prevent rapid sintering resulting from the breakdown of the palladium oxide to the metal at high temperatures, thus improving the NO_x activity. The low-cost Pd is used effectively while maintaining a high catalyst activity (see paragraphs bridging pages 2/3 and pages 23/24).

- 6.1 It is stated in the application as filed that a need still exists for improved stabilisation against thermal degradation of precious metal-containing TWC catalysts. However, as there is no evidence, in particular no comparative tests, in the file showing that the claimed catalyst exhibits an improved stability against thermal degradation, this unproved advantage cannot be taken into account for the determination of the technical problem with respect to D1, all the more so as the catalyst of claim 1 comprises an activated alumina support which is not necessarily stabilised. Stabilisation of the said alumina support is the object of dependent claims 11 and 24 and is, therefore, optional. On the contrary, the activated aluminas used in the first and second layers of the catalysts of D1 are stabilised by cerium oxide and lanthanum oxide respectively (see page 2, first paragraph, and examples 1 and 3 in combination with the sentence bridging pages 3 and 4). In these circumstances, the Board has doubts even that the stability against thermal degradation of the catalysts according to

claim 1 is at least as good as or comparable to that of the catalysts of D1. Furthermore, it was also not shown that the performances of the catalysts with respect to the HC and CO oxidation and the simultaneous NO_x reduction were improved in comparison with the catalyst of D1.

In these circumstances, the Board considers that the technical problem with respect to D1 was the provision of a further catalyst which is suitable for the oxidation of HC and CO and the simultaneous reduction of NO_x in exhaust gases containing these components.

It is proposed that this problem be solved by a catalyst composition having the features indicated in claim 1, which differs from the catalysts of D1 by the presence of Pt as the precious metal dispersed on the activated alumina support of the second coat. The sole catalyst composition exemplified in the description contains not only the essential components indicated in claim 1 but also optional components stated in the dependent claims, ie thermal stabilisers for the activated alumina (claims 10-11 and 23-24), a NiO powder for the suppression of H₂S (claim 3), magnetite for promoting the oxidation of CO (claims 4 and 5) and rhodium dispersed on the activated alumina support of the second coat (claim 7). However, in view of the conversion efficiency reported in Table I for this catalyst, it is credible, in the absence of evidence to the contrary, that a catalyst not containing the said optional components is also suitable for the simultaneous reduction of NO_x and oxidation of HC and CO, ie for use as a TWC catalyst. Thus, it is plausible that the said technical problem has actually been solved by the catalyst of claim 1.

6.2 D3 discloses durability performance studies in which the performances of commercial high technology platinum/rhodium TWC catalysts are compared with those of palladium-only TWC catalysts containing a washcoat specifically designed for Pd (see page 2, left-hand col., 3rd and 4th paragraphs; page 5, right-hand col., 1st paragraph of "results and discussion"). The results of the dynamometer aging experiments and vehicle aging experiments reported in D3 (see pages 6-13) show that the Pt/Rh catalysts are suitable catalysts for the simultaneous conversion of significant amounts of HC, CO and NO_x in automotive exhaust gases. Although the Pd-only catalysts containing a sophisticated washcoat are said to have a superior HC conversion than the Pt/Rh TWC catalysts, the latter exhibit a performance advantage under rich operation conditions for the NO_x and CO conversions (see page 13). Furthermore, it was well-known before the priority date that Pt, Pd and Rh were the three metals of the platinum group conventionally used in TWC catalysts and that Rh was the most effective of these three metals for reducing nitrogen oxides. In these circumstances and in view of the results reported in D3 for the Pt/Rh TWC catalysts, it would have been obvious to the skilled person faced with the problem stated above to replace a part of the Pd by a small amount of Pt on the alumina support present in the second coat of the catalysts of D1, or to add a small amount of Pt thereon. The skilled person would have contemplated performing the said replacement or addition since, on the basis of the common general knowledge in this field and in view of the aging tests in D3, he would have expected this measure to solve the problem of achieving a further catalyst which possibly exhibits a different performance but is still suitable for the simultaneous conversion of HC, CO and NO_x. This conclusion is not based on an abstraction or a generalisation of the specific teaching of a document (D1 or D3), which was held inadmissible in decisions

T 5/81 of 4 March 1982 (item 11) or T 127/82 of 19 May 1983 (item 7) relied upon by the Appellant, so that the finding in these decisions is not relevant in the present case. As pointed out by the Appellant, the skilled person would have had several possible ways of modifying the catalyst of D1, taking into account the number of components present in the catalyst compositions. For example, he might have introduced additional Pt into the first coat or modified the support. However, the fact that a great number of possibilities might be envisageable does not necessarily prove the presence of an inventive step when the objective to be attained is simply to provide a further catalyst which is still suitable for use as a TWC-catalyst but which also might have some disadvantages over the catalyst of D1 under certain conditions of operation. Furthermore, the partial replacement of Pd by Pt or the addition of Pt into the second coat is not considered to require the skilled person to be imaginative taking into account the teaching of D3 and the general knowledge in the field of TWC catalysts. The Board's finding in the present case is thus not in contradiction with the finding in decision T 127/82 (item 5).

6.3 The Appellant's arguments that the teaching of articles 1 and 2 would have been a disincentive for the skilled person to introduce Pt into the second coat of the catalysts of D1 since he would have expected the resulting catalyst to be more expensive and less resistant to sintering, cannot be accepted for the following reasons. It is disclosed on page 47 of article 2, last paragraph, that Pd should be selected as a main component of the Rh-free TWC catalysts since its performance is more similar to that of Rh catalysts. According to page 48, although Pd is less resistant to poisoning than Pt, it is more resistant to sintering than Pt. In article 1, it is stated on

page 295 (see paragraph headed "Supported Catalysts") that Pt sinters readily at 600°C or above even for catalysts of very low Pt concentration. These documents primarily show that Pd, Pt and Rh on an alumina support have different performances for the oxidation of alkanes and for the conversion of NO_x, CO and HC and disclose the advantages and disadvantages of these different metals; however, they do not suggest that Pd should be used instead of Pt in rhodium-containing TWC catalysts. The performances of Pt, Pd and Rh were examined in these articles in laboratory experiments on the basis of relatively simple catalysts in comparison to the more complicated catalysts described in D1 or to the commercial high technology formulations used in D3. On the contrary, in D3 the durability performances of the Pt/Rh TWC catalysts and Pd-only TWC catalysts were tested by subjecting them to dynamometer evaluations and to vehicle evaluations on three types of vehicle chosen to provide a range in temperatures and Air/Fuel control strategies, using three different test procedures. Furthermore, D3 has a later publication date (1989) than article 1 (1980), article 2 (1985) and D1 (1988). Thus, the fact that articles 1 and 2 mention that Pd is more resistant to sintering than Pt would not have deterred the skilled person from using Pt in the second coat of the catalysts of D1 in view of the more recent evaluations reported in D3 which clearly show the suitability of these commercial Pt/Rh TWC catalysts for the simultaneous conversion of CO, HC and NO_x in automobile exhaust gases.

The Appellant's arguments that there was no evidence in D1 that lanthanum oxide would help to avoid Pt-sintering in the same manner that it avoids Pd-sintering and that the NO_x efficiency would be maintained with Pt in the second coat must also fail since the technical problem with respect to the catalysts of D1 was not the provision of a catalyst

having similar NO_x efficiency and resistance to sintering (no evidence was provided that such a problem has been solved: see point 6.1 above). Likewise, the higher cost of Pt relative to Pd would not have been a disincentive for the skilled person to try Pt since the technical problem to be solved with respect to D1 was not to provide a less expensive catalyst but a further catalyst suitable as TWC catalyst. Furthermore, replacing a part of the Pd or all the Pd by a small amount of Pt does not necessarily lead to a more expensive catalyst, if the amount of Pt is relatively low compared to that of Pd. It should be noted in this respect that claim 1 does not state the amount of precious metal used in the claimed catalyst so that the amount of Pt present in the second coat may be very small.

- 6.4 It follows from the above that the subject-matter of claim 1 does not meet the requirements of inventive step set out in Articles 52(1) and 56 EPC.

Third auxiliary request

7. According to amended claim 1 of this request only the oxides of cerium, neodymium and yttrium are substantially dispersed throughout the entire matrix of the zirconia. In other words, a rare earth oxide-zirconia support in which a rare earth oxide other than neodymium oxide and cerium oxide is not dispersed substantially throughout the entire matrix of the zirconia may also be used in the second coat as a support for the rhodium catalytic component. This feature is not disclosed in the application as filed. According to the latter, the second coat of the catalyst composition comprises a **co-formed** rare earth oxide-zirconia support and the rhodium catalytic component is dispersed on the said **co-formed** zirconia support (see in particular the four independent

claims 1, 38, 41 and 48 as originally filed; page 5, "summary of the invention", lines 22-25; page 7, lines 3-13; page 15, second paragraph). The term "co-formed" is explained on page 7 of the description, lines 3-13. According to this passage, the term "co-formed" as used in the description and in the claims "means that the rare earth oxide or oxides are dispersed substantially throughout the entire matrix of the zirconia particles as will occur for example when the rare earth oxide(s) and zirconium oxide, or predecessors thereof, are co-precipitated or co-gelled". On page 15, lines 16-21, it is further stated that the rare earth oxide is to be dispersed throughout substantially the entire matrix of the zirconia particles. It is neither directly and unambiguously derivable from the said explanation on page 7 nor from the whole application as filed that the catalytic rhodium component may also be supported on a rare earth oxide-zirconia support comprising a rare earth oxide or rare earth oxides which are not "co-formed" within the meaning indicated above, ie dispersed substantially throughout the entire matrix of the zirconia. Therefore, claim 1 of this request does not meet the requirements of Article 123(2) EPC.

8. For the reasons given above claim 1 of the main request and of each of the auxiliary requests 1 to 3 is not allowable and, thus, these requests must fail.

Fourth auxiliary request

9. The two independent claims 1 and 39 of the fourth auxiliary request comply with the provisions of Article 123(2) EPC. In particular the selection of the oxides of cerium, neodymium and yttrium and the dispersion of these oxides substantially throughout the entire matrix of the zirconia are disclosed in original claim 16 and on page 7 of the application (see page 7,

lines 3-9, read in combination with claim 16). The relative locations of the first and second coats stated in claims 1 and 39 are supported by the disclosure on page 8, lines 2 to 11, of the application as filed.

10. The catalyst composition and the method as defined in claims 1 and 39 are novel with respect to the disclosure of the cited documents.

11. Concerning the issue of inventive step, the Appellant's representative requested at the oral proceedings that the case be remitted to the Examining Division for consideration of this auxiliary request to enable him to present more complete arguments concerning D4 and D5 after consultation of the Appellant. Taking into account that the inventive step of the product and method according to claims 1 and 39 of this request was not examined by the Examining Division and that the Appellant has had no opportunity to comment on the general knowledge disclosed in D4 and D5, the Board finds it appropriate, in accordance with Article 111(1) EPC, to remit the case to the Examining Division for further prosecution. The Examining Division's attention is drawn to the fact that the Board did not examine whether or not dependent claims 2-38 and 40-50 of the third auxiliary request have been correctly amended after deletion of some dependent claims and, thus, whether or not these claims meet the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The main request and the first, second and third auxiliary requests, submitted during the oral proceedings before the Board, are rejected.
3. The case is remitted to the first instance for further prosecution.

The Registrar:



S. Hue

The Chairman:



R. Spangenberg