Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 10 March 2017

Case Number: T 2311/14 - 3.3.06

Application Number: 05733042.5

Publication Number: 1762299

IPC: B01J29/42, C10G11/05

Language of the proceedings: EN

Title of invention:

A CATALYST CONTAINING ZEOLITE FOR HYDROCARBON CONVERTING AND PREPARATION THEREOF, AND A HYDROCARBON OIL CONVERTING METHOD USING SAID CATALYST

Applicants:

1) China Petroleum & Chemical Corporation
2) RESEARCH INSTITUTE OF PETROLEUM PROCESSING, SINOPEC

Headword:

Zeolite-containing hydrocarbon-converting catalyst/China Petroleum & Chemical Corporation

Relevant legal provisions:

EPC Art. 52(1), 54, 84, 111(1), 123(2)
RPBA Art. 12(4), 13

Keyword:
Late-filed request - admitted (yes)
Amendments - added subject-matter (no)
Claims - clarity (yes)
Novelty - (yes)
Remittal to the department of first instance - (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2311/14 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 10 March 2017

Appellant I: (Applicant 1)	China Petroleum & Chemical Corporation 6A, Huixin Dong Street, Chaoyang District Beijing 100029 (CN)
Appellant II: (Applicant 2)	RESEARCH INSTITUTE OF PETROLEUM PROCESSING, SINOPEC 18, Xue Yuan Road, Haidian District Beijng 100083 (CN)
Representative:	Algemeen Octrooi- en Merkenbureau B.V. P.O. Box 645 5600 AP Eindhoven (NL)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 21 July 2014 refusing European patent application No. 05733042.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	P. Ammendola
Members:	G. Santavicca
	C. Heath

Summary of Facts and Submissions

I. The appeal lies from the decision of the Examining Division to refuse European patent application n° 05733042.5.

II. In the decision under appeal, the Examining Division *inter alia* came to the conclusion that the prior art pursuant to Article 54(2) EPC disclosed in D1 (EP 1 179 581 A1) and D2 (EP 0 903 178 A1) was novelty-destroying for Claim 1 according to the then pending Main Request, because

- this latter defined a zeolite-containing catalyst in which an "*assistant catalytic component*" existed "*either as an oxide or salt of the aforesaid metals, or as a complicated compound formed by reaction with a thermotolerant inorganic oxide and/or clay; and said assistant catalytic component is dispersed in a thermotolerant inorganic oxide, or in a clay, or in a mixture of oxide and clay*" and, thus, did not require a separate and independent assistant catalytic component (in particular, from the zeolite), and
- the alumina and zeolite used in the catalysts of D1 and D2 could both also be regarded as the other ingredient of the claimed catalyst defined as "*thermotolerant inorganic oxide*".

Also, as none of the other then pending claim requests were allowable, the application was refused.

III. With its statement setting out the grounds of appeal (dated 28 November 2014), the Appellants (Applicants) maintained the Main Request and First to Third Auxiliary Requests dealt with in the decision under appeal but submitted two sets of amended claims as, respectively, its Fourth and Fifth Auxiliary Requests.

IV. In a communication dated 6 February 2017, issued in preparation for the oral proceedings, the Board summarised the case history up to this point in time and gave its provisional opinion on the salient issues of the case. This communication contained new objections and observations of the Board also in view of the Appellant's reasoning in the statement of grounds of appeal and in respect to the sets of claims filed with said statement.

V. With letter dated 8 March 2017, the Appellants submitted a new Main Request, replacing the Main Request filed with the statement setting out the grounds of appeal.

VI. Oral proceedings were held on 10 March 2017. The Appellants filed a new Main Request to overcome the objections raised by the Board in respect of admissibility of the Main Request filed with letter of 8 March 2017, formal allowability of the amended claims thereof and novelty over D1 and D2.

VII. Claims 1 and 10 according to this Main Request respectively read as follows:

"*1. A zeolite-containing catalyst for converting hydrocarbons, which catalyst contains based on the weight of the catalyst 1-60% by weight of a zeolite, 5-98% by weight of a thermotolerant inorganic oxide, and 0-70% by weight of a clay in terms of the oxide, said thermotolerant inorganic oxide is one or more selected from the group consisting of alumina, silica and amorphous silica-alumina,*

wherein said zeolite is a MFI-structured zeolite containing phosphor and transition metal(s) or a mixture of said MFI-structured zeolite containing phosphor and transition metal(s) with a macroporous zeolite, which comprises, based on the weight of te mixture, 75-100% by weight of said MFI-structured zeolite containing phosphor and transition metal(s) and 0-25% by weight of the macroporous zeolite;

wherein in the terms of the mass of the oxide, said MFI-structured zeolite containing phosphor and transition metal(s) has the following anhydrous chemical formula:

$$(0\text{-}0.3)Na_2O \cdot (0.3\text{-}5.5)Al_2O_3 \cdot (1.0\text{-}10)P_2O_5 \cdot (0.7\text{-}15)M1_xO_y \cdot (0.01\text{-}5)M2_mO_n \cdot (0\text{-}10)RE_2O_3 \cdot (70\text{-}97)SiO_2 \quad I$$

or

$$(0\text{-}0.3)Na_2O \cdot (0.3\text{-}5)Al_2O_3 \cdot (1.0\text{-}10)P_2O_5 \cdot (0.7\text{-}15)M_pO_q \cdot (0\text{-}10)RE_2O_3 \cdot (70\text{-}98)SiO_2 \quad II$$

wherein M1 is a transition metal selected from Fe, Co, and Ni, M2 is a transition metal selected from Zn, Mn, Ga, and Sn, M is a transition metal selected from Fe, Co or Ni, and RE represents a rare earth metal; x is 1 or 2, when x is 1, the value of y is a half of the valence of the transition metal M1, and when x is 2, the value of y is the valence of the transition Metal M1; m is 1 or 2, when m is 1, the value of n is a half of the valence of the transition metal M2, and when m is 2, the value of n is the valence of the transition metal M2; p is 1 or 2, when p is 1, the value of q is a half of the valence of the transition metal M, and when p is 2, the value of q is the valence of the transition metal M;

characterized in that the catalyst also contains 0.1-10% by weight of an assistant catalytic component, in terms of oxide, which is one or more selected from the group consisting of barium, calcium, magnesium, zirconium, titanium, lanthanum, cerium, iron, cobalt and nickel,

wherein said assistant catalytic component exists either as an oxide or salt of the aforesaid metals, or as a complicated compound formed by reaction with said thermotolerant inorganic oxide and/or clay; and said assistant catalytic component is dispersed in said thermotolerant inorganic oxide, or in a clay, or in a mixture of oxide and clay."

"*10. A process for preparing the catalyst of claim 1, which process comprises mixing and slurrying all or partial thermotolerant inorganic oxide and/or its precursor, water, and optionally a clay, adding a zeolite, and drying the obtained slurry, said thermotolerant inorganic oxide is one or more selected from the group consisting of alumina, silica, and amorphous silica-alumina,*

characterized in that an assistant catalytic compound is also added before adding the zeolite and before or after adding the clay, adding an acid to bring the pH value of the slurry to 1-5, aging at 30-90 deg. C for 0.1-10 h, and adding the remaining thermotolerant inorganic oxide and/or its precursor after aging; said zeolite is a MFI-structured zeolite containing phosphor and transition metal(s) or a mixture of said MFI-structured zeolite containing phosphor and transition metal(s) with a macroporous zeolite, which comprises, based on the weight of te mixture, 75-100% by weight of said MFI-structured zeolite containing phosphor and

transition metal(s) and 0-25% by weight of the macroporous zeolite; wherein in the terms of the mass of the oxide, said MFI-structured zeolite containing phosphor and transition metal(s) has the following anhydrous chemical formula:

$$(0\text{-}0.3)Na_2O \cdot (0.3\text{-}5.5)Al_2O_3 \cdot (1.0\text{-}10)P_2O_5 \cdot (0.7\text{-}15)M1_xO_y \cdot (0.01\text{-}5)M2_mO_n \cdot (0\text{-}10)RE_2O_3 \cdot (70\text{-}97)SiO_2 \quad I$$

or

$$(0\text{-}0.3)Na_2O \cdot (0.3\text{-}5)Al_2O_3 \cdot (1.0\text{-}10)P_2O_5 \cdot (0.7\text{-}15)M_pO_q \cdot (0\text{-}10)RE_2O_3 \cdot (70\text{-}98)SiO_2 \quad II$$

wherein M1 is a transition metal selected from Fe, Co, and Ni, M2 is a transition metal selected from Zn, Mn, Ga, and Sn, M is a transition metal selected from Fe, Co or Ni, and RE represents a rare earth metal; x is 1 or 2, when x is 1, the value of y is a half of the valence of the transition metal M1, and when x is 2, the value of y is the valence of the transition Metal M1; m is 1 or 2, when m is 1, the value of n is a half of the valence of the transition metal M2, and when m is 2, the value of n is the valence of the transition metal M2; p is 1 or 2, when p is 1, the value of q is a half of the valence of the transition metal M, and when p is 2, the value of q is the valence of the transition metal M; the amounts of the components make the final catalyst contain, based on the weight of the catalyst, 1-60% by weight of a zeolite, 0.1-10% by weight of an assistant catalytic component, in terms of oxide, 5-98% by weight of a thermotolerant inorganic oxide, and 0-70% by weight of a clay in terms of the oxide;

said assistant catalytic component is one or more selected from the group consisting of barium, calcium, magnesium, zirconium, titanium, lanthanum, cerium, iron, cobalt and nickel,

wherein said assistant catalytic component exists either as an oxide or salt of the aforesaid metals, or as a complicated compound formed by reaction with said thermotolerant inorganic oxide and/or clay; and said assistant catalytic component is dispersed in said thermotolerant inorganic oxide, or in a clay, or in a mixture of oxide and clay."

Dependent Claims 2-9 concern specific embodiments of the catalyst according to Claim 1, whilst dependent Claims 11 to 17 concern specific embodiments of the process according to Claim 10.

VIII. The Appellants (Applicants) requested that the decision under appeal be set aside and that the case be remitted to the Examining Division for further prosecution on the basis of the Main Request filed during oral proceedings at 10:35, or on the basis of any of the First to Third Auxiliary Requests as already pending before the Examining Division, or on the Fourth or Fifth Auxiliary Request as filed with the statement of grounds of appeal.

IX. The arguments of the Appellants of relevance for the present decision can be summarised as follows:

The Main Request was admissible, as it had been filed in reaction to the objections raised by the Board, and addressed and overcame all of the objections raised.

The claimed catalyst comprised four essential components: zeolite, thermotolerant inorganic oxide, possibly clay, and assistant catalytic compound.

The purpose of the new Main Request was to make clear (in its claims) that each of the assistant catalyst

compound, zeolite and thermotolerant inorganic oxide was a separate, different, compound, hence that the thermotolerant inorganic oxide was not the zeolite.

The amendments were clearly based on the application as filed, in particular on page 10, lines 5-11.

The term "complicated", objected to by the Board under Clarity, was an inaccuracy of translation (from the Chinese) , which however should read "complex" in the given context.
The Appellants accepted to request a rectification of the term "complicated", into "complex" before the Examining Division on the basis of the procedure established by Article 14(2) (second sentence) EPC,.

As apparent from the (whole) application as filed, there was only one thermotolerant inorganic oxide, which was now more specifically defined in Claim 1.

As regards the expression "*or in a mixture of oxide and clay*", it had to be construed in the context of the application as filed concerning the general definition of the final catalyst, in which it only meant a mixture of the aforesaid thermotolerant inorganic oxide and the said clay. No other interpretation was possible.

As to novelty, Claim 1 required the MFI-structured zeolite to contain a metal M1 (Fe, Co, Ni) and a metal M2 (Zn, Mn, Ga, Sn) (Formula I), or only a metal M (Fe, Co, Ni) (Formula II). Claim 1 also required that the assistant catalytic component be dispersed in the thermotolerant inorganic oxide and/or clay, the inorganic oxide being different from the zeolite.

D2, instead, disclosed, in its Example 2, a zeolite ZSM-B containing, insolubly fixed within the zeolite structure (as disclosed in the last sentence of paragraph [0016]), the catalytic components phosphor anhydride (P_2O_5), magnesium oxide (MgO) and nickel oxide (NiO). Since none of the zeolite according to Formulae I or II accommodated the presence of magnesium oxide, the claimed zeolite was different from that disclosed by D2. Also, still according to D2 (Example 8), no assistant catalytic component was dispersed, thus present, in the kaolin and alumina used as support and binder. Thus, the claimed zeolite-containing composition was novel over that of D2.

As to D1 (Examples 15 and 18), the zeolite used in the catalyst composition did not contain phosphor, and no assistant catalytic component was dispersed within the alumina and clay materials illustrated in Example 18 for making the zeolite-containing composition. Hence, D1 was not novelty destroying either.

Consequently, as the Main Request complied with the requirements of Articles 84 and 123(2) EPC, and was novel over D1 or D2, the case should be remitted to the Examining Division for further prosecution.

Reasons for the Decision

Admissibility of the Main Request

1. The Main Request filed at the oral proceedings was not dealt with in the decision under appeal. Its admissibility is thus at stake.

However, this Main Request has been filed in reaction to the new objections raised in the Board's communication of 6 February 2017 and during the hearing. It addresses and overcomes these objections, without raising further issues.

Therefore, the Board decided to admit the Main Request into the proceedings despite its late filing (Articles 12(4) and 13 RPBA).

Amendments

2. The claims according to the Main Request at issue comprise substantial amendments, compared to the respective claims of the application as filed.

2.1 Compared to Claim 1 as originally filed, claim 1 according to the Main Request comprises the following amendments, having a basis in the application as filed as indicated:

2.1.1 "***said thermotolerant inorganic oxide is one or more selected from the group consisting of alumina, silica, and amorphous silica-alumina***". This additional feature is disclosed *verbatim* in Claim 11 as filed, which depends on Claim 1 as originally filed. Also, it is disclosed *verbatim* in the first and most general definition of the "*thermotolerant inorganic oxide*" in the application a filed (page 10, lines 17-19). Hence, this additional feature merely reflects the originally filed, most general concretization of the feature "*thermotolerant inorganic oxide*" which is applicable to all of the embodiments of the claimed invention.

2.1.2 "*M is a transition metal selected from Fe, Co* ***or*** *Ni~~, Cu, Zn, Mo or Mn~~*, ". This amended feature is disclosed

verbatim in original Claim 7, which depends on Claim 1 as originally filed. It is also disclosed verbatim as the first, most general preference for M disclosed originally on page 10, line 2, of the application as filed.

2.1.3 The following limitations have been included in the definition of the assistant catalytic component given in original Claim 1, the limitations finding their respective basis as follows:

(a) "***in terms of oxide***", to define on what basis the amount of 0.1-10% by weight of assistant catalyst component is calculated. Although not being disclosed generally in the application as filed, nor defined in the original claims, the feature is mentioned *verbatim* in all of the catalyst compositions illustrated in the examples (Tables 1 and 2). This is the only indication in the application as filed for the basis of the percentage of the assistant catalytic component present in the catalyst. Hence, the limitation in Claim 1 at issue is the concretization of what has been consistently illustrated in the application as filed;

(b) "***which is one or more selected from the group consisting of barium, calcium, magnesium, zirconium, titanium, lanthanum, cerium, iron, cobalt and nickel***", to define the nature of the assistant catalytic component, is disclosed *verbatim* in original Claim 8, which depends on Claim 1 as originally filed. This list of metals from which the assistant catalytic component is made, is the whole group of individualized metals identified as preferred in the description (see

page 10, lines 5-7) and, thus, represents the most general concretization of the definition of the chemical composition of the "*assistant catalytic component*" which is applicable to all of the embodiments of the claimed invention;

and

(c) "***wherein said assistant catalytic component exists either as an oxide or salt of the aforesaid metals, or as a complicated compound formed by reaction with a thermotolerant inorganic oxide and /or clay. said assistant catalytic component may be dispersed in a thermotolerant inorganic oxide, or in clay, or in a mixture of oxide and clay.***", to define the physical state of the assistant catalytic component in the catalyst, is not defined in any of the original claims but is mentioned *verbatim* in the application as filed, in the context of the most general concretization of the definition of the assistant catalytic component (page 10, lines 5-11), including the list of metals from which the assistant catalytic component is made (see page 10, lines 5-7), which, as already discussed above, is identical to that defined in original Claim 8. Hence, this amendment is disclosed in the passages of the most general description (page 10, lines 5-11) of the assistant catalytic component, which is thus applicable to all of the embodiments of the claimed zeolite-containing catalyst composition.

2.2 Moreover, for the combination of features now defined in Claim 1 according to the Main Request there are also other pointers in the application as filed:

According to the application as filed (e.g. page 10, lines 2 and 5-7; examples), only Fe, Co and Ni are preferred elements of Group VIII for metal M, and Ba, Ca, Zr, Ti, La, Ce, Fe, Co and Ni are the only metals disclosed in the most general concretization of the assistant catalytic component. The mention within the context of the most general embodiment disclosed originally of the metals for M and for the assistant catalytic component implies their use in combination.

Still according to the application as filed (page 10, lines 7-11), the defined assistant catalytic component (last feature of Claim 1 according to the Main Request "*wherein aid assistant catalytic component .. or in a mixture of oxide and clay*") is only disclosed in combination with all the specifically mentioned (page 10, lines 5-7) elements now defined in Claim 1 at issue.
All of the examples of the present application concern a MFI-structured zeolite containing any one of Ni, Co or Fe, and an assistant catalytic component, such as Ba, La, Fe+La, Ce, Zr, Ba+La (Tables 1 and 2), which is dispersed in the thermotolerant inorganic oxide and/or clay, or in a mixture of oxide and clay.

2.3 The same amendments contained in Claim 1 at issue are also contained in Claim 10 at issue.

2.4 Dependent Claims 2-9 and 11-17 are identical, respectively, to original dependent Claims 2-6, 9-10, 12 and 14-20.

2.5 As to the clarity of Claims 1 and 10, in particular in regard of the problematic expressions "*complicated compound*" and "*thermotolerant inorganic oxide*" (Article 84 EPC), or "*wherein aid assistant catalytic*

component .. or in a mixture of oxide and clay", the Board is satisfied that:

2.5.1 The term "*complicated*", as convincingly argued by the Appellant, is a translation error from the original Chinese language. The Appellant has pledged to request rectification of this term, according to the procedure established by Article 14 (second sentence) EPC, before the Examining Division. In any case, this term, still according to the Appellant, could only be construed to mean "complex" by the skilled person. Thus, the term "complicated" plausibly concerns the complex oxides possibly formed by reaction between the assistant catalytic component and any of thermotolerant inorganic oxide and/or clay.

2.5.2 The "*thermotolerant inorganic oxide*", whereby *thermotolerant* does not limit in any way the well known expression "*inorganic oxide*", has now been clarified in line with the statement in the application as filed (page 10, lines 17-20), which is of general application ("*said thermotolerant inorganic oxide is selected ..*"). Hence, it applies to any previously mentioned (from page 9, line 34, to page 10, line 16) thermotolerant inorganic oxide present in the claimed catalyst, as also apparent from Claim 11 as originally filed.

2.5.3 As to the feature "*wherein aid assistant catalytic component .. or in a mixture of oxide and clay*", which happens in the context of the definition of the finished catalyst, this can only mean "*or in a mixture of (thermotolerant inorganic)oxide and clay*". In other words, even if precursors of the inorganic oxide were used in the preparation of the catalyst, they would be present as thermotolerant inorganic oxides of the listed elements in the finished catalyst in the end.

2.6 Consequently, the claims of the Main Request fulfil the requirements of Articles 84 and 123(2) EPC.

2.7 Thus, the Main Request is formally allowable.

Novelty

3. In the decision under appeal, D1 and D2 were held to be novelty-destroying prior art pursuant to Article 54(2) EPC. In particular, the ground of refusal was based on the argument that the features of Claim 1 "*wherein said assistant catalytic component exists either as an oxide or salt of the aforesaid metals, or as a complicated compound formed by reaction with a thermotolerant inorganic oxide and/or clay; and said assistant catalytic component is dispersed in a thermotolerant inorganic oxide, or in a clay, or in a mixture of oxide and clay*" did not require a separate and independent assistant catalytic component (in particular from the zeolite), whereby the alumina and zeolite used in D1 and D2 were both also thermotolerant inorganic oxides (as defined at page 10, lines 17-20, of the application as filed).

3.1 After the limitation of the expression "*thermotolerant inorganic oxide*" to the specific materials defined in Claim 1, it is now clear that the assistant catalytic component is present in the inorganic oxide and/or clay, which are different from the zeolite material.

3.1.1 Hence, now, when considering the feature of Claim 1 at issue "*wherein said assistant catalytic component*

exists ... as a complicated compound formed by reaction with a thermotolerant inorganic oxide", the complicated compound mentioned in that passage cannot possibly be a complex compound obtained (only) by reaction with the zeolite material.

3.1.2 This consideration is particularly relevant to the disclosure of Examples 2 and 8 of D2.

3.2 D2 (Claim 1) concerns a pentasil-type molecular sieve containing composition which comprises from 85 to 98%wt pentasil-type zeolite which has a SiO_2/Al_2O_3 molar ratio from 15 to 60; from 1 to 10%wt phosphorous (based on P_2O_5); from 0.3 to 5%wt alkaline earth metal (based on its oxide); and from 0.3 to 5%wt transition metal (based on its oxide).

3.2.1 The pentasil-type zeolite of D2 is a molecular sieve having a structure type of ZSM-5 (Claim 4), i.e. a MFI-structure.

3.2.2 The alkaline-earth metal can be magnesium or calcium (Claim 6), whilst the transition metal can be selected from Cr, Mn, Fe, Co, Ni, Cu and Zn (Claim 8).

3.2.3 According to D2 (Claim 10), the composition defined in Claim 1 of D2 is prepared by firstly adding a pentasil-type zeolite to an aqueous solution which contains a phosphorous-containing compound, and alkaline earth metal compound and a transition metal compound, homogeneously mixing and impregnating for above 0.5 hour,
drying, and
calcining at 450-650°C for 1 to 4 hours.

Hence, D2 discloses the introduction into the zeolite of the modifying elements phosphor, earth alkaline and transition metals.
According to D2 (paragraph [0016], last sentence), "thereby the phosphorus, alkaline earth metal and transition metal are solidly fixed onto the molecular sieve".

3.2.4 Example 2 of D2 illustrates the preparation of a molecular sieve denoted ZEP-11, comprising a ZSM-5B molecular sieve containing phosphor (4.9%wt as P2O5), magnesium (1.4%wt as MgO) and nickel (0.86%wt as NiO).

3.2.5 Example 8 illustrates the preparation of a catalytic composition comprising 15%wt of said modified zeolite ZEP-11, according to Example 2, 15%wt alumina, 70%wt of kaolin, by ordinary spray-drying method, wherein ZEP-11 was not aged as an active component.

3.2.6 Thus, the MFI-structured zeolite ZEP-11, although comprising phosphor and nickel oxides in the proportion of formula II of Claim 1 at issue, does not satisfy said formula II, as magnesium is not a metal M2 according to Claim 1 at issue.

3.2.7 Also, more importantly, Example 8 does not disclose that the akaline-earth metal magnesium (which as such falls under the list of the assistant catalytic component defined in Claim 1 at issue), instead of being introduced into the zeolite, is dispersed in the alumina and/or clay in order to form an oxide or salt.

3.2.8 Therefore, D2 is not novelty destroying.

3.3 D1 (Claim 1) concerns a catalytic promotor for the catalytic cracking of hydrocarbons, comprising a HZSM-5

zeolite in an amount of 5-65 wt% based on the total weight of the catalytic promoter, said zeolite being modified with Zn and at least one element selected from the group consisting of P, Ga, Al, Ni and rare earth elements, the combined amount of said modifying elements being 0.01-10.37 wt% based on the total weight of said modified HZSM-5 zeolite.

3.3.1 For this catalytic promotor, the preferred modifying elements in said HZSM-5 zeolite are Zn and Ga or Ce (Claims 5 and 7).

3.3.2 The catalytic promotor of D1 (Claim 8) can further comprise

(a) at least one support selected from the group consisting of SiO_2, Al_2O_3, Zr_2O_3, P_2O_5, clay, diatomaceous earth or sepiolite or mixtures thereof in an amount of 15-60 wt%; and,

(b) at least one binder selected from the group consisting of alumina sol, alumina-silica sol, aluminum phosphate sol or mixtures thereof in an amount of 10-40 wt%, based on the total weight of said catalytic promotor.

3.3.3 Examples 1 to 16 of D1 concern the preparation of the modified zeolite by impregnation of a HZSM-5 high Si/Al zeolite (a zeolite indisputably having the Framework MFI) with salts of the modifying elements disclosed in D1 (defined in Claim 1, supra). None of the so modified zeolites contain phosphor and a transition metal, let alone Fe, Co and Ni. The only modified zeolite comprising Nickel and the mandatory Zn is illustrated in Example 16, not dealt with in the decision under appeal. This modified zeolite is not composited with clay and aluminum phosphate in Examples 18-22, dealing with the preparation of the final composited catalyst.

3.3.4 The catalyst of Example 18, mentioned in the decision under appeal as being novelty destroying, is based on a modified zeolite PMZSM-5 prepared according to Example 15. However, this modified zeolite does not comprise phosphor, nor any transition metals such as Fe, Co or Ni. Instead it comprises Zn and Ce. However, as Zn is M2 according to Claim 1 at issue, metal M1 is missing (zeolite according to Formula I of Claim 1), and M is now missing too (zeolite according to Formula II of Claim 1). Also, zeolite PMZSM-5 only comprises 0.173% of Zn, in terms of the mass of the metal present in the corresponding oxide, ZnO. As the weight % of Zn in ZnO is 80.34, the illustrated zeolite thus only contains an amount of 0.215 % by weigth of ZnO. Hence, zeolite PMZSM-5, at least at the beginning of its preparation, would not even fulfil the requirements given in Formula II of Claim 1 for the oxide of the transition metal M, i.e. a minimum of 0.7 % by weight, even if M still comprised Zn.

Moreover, the fact that zeolite PMZSM-5 contains 0.18%wt of Ce no longer permits to consider it as an assistant catalytic component existing as a (complicated) complex compound formed by reaction with a thermotolerant inorganic oxide, as a zeolite is now excluded from the definition of the thermotolerant inorganic oxide. Finally, the content of phosphor mentioned in Example 18 appears to concern the binder of the catalyst rather than the modified zeolite. Even if part of this phosphor lands on the zeolite too, D1 does not become more relevant.

3.3.5 Most importantly, Example 18 of D1 teaches to mix the modified zeolite PMZSM-5 with pseudoboehmite, clay and aluminum phosphate, but does not disclose to disperse

an assistant catalytic component as claimed into the thermotolerant inorganic oxide and/or clay.

3.3.6 Hence, D1 is not novelty-destroying.

3.3.7 Consequently, the Board comes to the conclusion that the zeolite-containing catalyst composition of Claim 1 according to the Main Request is indeed novel over the catalysts disclosed in D2 or D1.

Remittal

4. In the decision under appeal, only novelty over D1 and D2 was dealt with. Outstanding issues such as inventive step were thus not dealt with.

4.1 The present Main Request is admissible, compliant with the requirements of Articles 84 and 123(2) EPC, and its claimed subject-matter is novel over D2 or D1.

4.2 The primary purpose of the appeal proceedings is to review the decision under appeal. This has been done.

4.3 Therefore, the Board decides to remit the case to the Examining Division (pursuant to Article 111(1) EPC) for further prosecution, i.e. the examination of any other outstanding patentability issues not dealt with in the decision under appeal.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution on the basis of the Main Request filed during oral proceedings at 10:35.

The Registrar: The Chairman:

D. Magliano P. Ammendola

Decision electronically authenticated