Commissioner's Decision #1367
Décision du commissaire # 1367

TOPIC: B20, B21, B22, C00
SUJET : B20, B21, B22, C00

Application No.: 2,519,188
Demande n^{o} : 2,519,188

Commissioner's Decision Summary

The purpose of this review is to determine, among other things, whether and under what circumstances it is acceptable to claim a composition defined by known elements and a desired physical property.

The subject application was rejected in a Final Action since certain claims were considered as: being directed to an "obviously desired result"; omitting an essential feature; and claiming more than what had been invented.

The Panel found that the central question to be answered in order to address the issues raised by the Examiner is whether the claims are enabled across their full scope. The decision relates therefore to this central question.

Enablement of claims 1-37 across their full scope

Decision: Claims 1-37 are refused on the ground that they are not enabled across their full scope.

The specification does not provide an enabling disclosure across the full scope of these claims. Furthermore, a person skilled in the art would not be able to achieve the claimed result (obtain all of the catalytic compositions as defined and which have the physical properties recited in the claims) based only on the specification and his or her common general knowledge. As a result, these claims are not considered to be enabled across their full scope.

For claims 1-37 to be allowable, independent claims 1, 11 and 23, as well as dependent claims 19-21 and 32-34, must be amended so as to define embodiments in which the claimed properties correspond to those of the compositions actually obtained or which a person skilled in the art could obtain based on the specification and his or her common general knowledge. Since the above amendments introduce defects (lack of clarity or antecedence) in claims 14, 22, 27 and 35; these claims must also be amended as recommended by the Panel.

The following decision with respect to the desired result flows from the above decision:

- Rejection of claims 23-37 on this ground is affirmed.

For the same reasons as above, we have concluded that these claims, which include, among other elements, a statement of desired result, are not enabled across their full scope. Accordingly, they are not directed to an achieved result but only a desired result.

However, if the claims are amended as recommended by the Panel, they will be considered as allowable.

CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application No. 2,519,188, having been rejected pursuant to subsection 30(3) of the *Patent Rules*, has been reviewed in compliance with paragraph 30(6)(c) of the *Patent Rules* by the Patent Appeal Board and the Commissioner of Patents. The findings of the Board and the ruling of the Commissioner are as follows:

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INTRODUCTION

[1] Pursuant to paragraph 30(6)(c) of the *Patent Rules*, this decision deals with a review of rejected patent application No. 2,519,188.

[2] It will be noted that the companion patent application, No. 2,519,192 (the '192 application), which also belongs to the Applicant, was reviewed at the same time as the instant case due to similarity in the facts and the issues in dispute raised in each one. Accordingly, to avoid duplications we will refer to certain passages in the decision relating to the '192 application (CD1359, rendered February 26, 2014) when required. Furthermore, for issues covering elements common to both applications, we will consider the comments and arguments provided by the Applicant with respect to one of the applications as being applicable for the other.

[3] The Applicant is Rhodia Electronics and Catalysis and the invention is entitled "Reduced Maximum Reducibility Temperature Zirconium Oxide and Cerium Oxide Based Composition, Method for the Production and Use Thereof as a Catalyst". The inventors are Olivier Larcher and Emmanuel Rohart.

HISTORY OF THE APPLICATION

[4] The subject application was filed on March 17, 2004, and the Examiner in charge of the application issued a Final Action on December 1, 2010 in which claims 23-36 were considered defective under the provisions of section 84 of the *Patent Rules*: 1) for being directed solely to an "obviously desired" result, such that they are merely a restatement of the problem faced by the inventors; 2) for omitting an essential feature; and 3) for claiming more than what has been invented. Claim 1 was further considered defective under the provisions of subsection 27(4) of the *Patent Act* because the expression "aforementioned element" is vague since no "element" was previously recited in claim 1.

[5] On May 30, 2011, the Applicant replied to the Final Action and submitted new claims. The submission of the new claims resulted in the cancellation of claims 1-36 and their replacement with new claims 1-37. The Applicant maintained that the application now on file is in allowable form.

[6] While the Examiner found that the defects under subsection 27(4) had been overcome, as indicated in the Summary of Reasons, he found that the defects under section 84 of the *Patent Rules* had not been overcome. Accordingly, the rejection was referred to the Patent Appeal Board, and a panel was tasked to review the application. The Applicant requested a hearing, which was held on October 23, 2013.

[7] Prior to the hearing, on October 15, 2013, the Applicant submitted a letter to the Board accompanied by further submissions relating to the outstanding issues. These submissions will be taken into account in our analysis.

[8] At the hearing, the Applicant was represented by Nathalie Jodoin, Laurence Bourget-Merle and Jason Moscovici of the firm Robic and by Philippe Dubruc and Julien Hernandez from Rhodia. Pierre Cuerrier, the Examiner in charge of the application, also attended the hearing.

[9] During the hearing, the Examiner presented his arguments and made some comments to which the Applicant was not fully prepared to respond at that time. Owing to the impact the Applicant's response could have on the outcome of the review, it was agreed that the Examiner would provide his comments in writing and that the Applicant would reply in writing. Submissions received by the Board on October 30, 2013, in response to the Examiner's comments, will also be taken into account in our analysis.

[10] Following the hearing, the Panel invited the Applicant to provide clarifications that would help it address the issue with respect to enablement of claims 1-37 across their full scope. Specifically, a letter was sent to the Applicant on February 4, 2014 regarding the claimed embodiments in which the composition is binary, and another letter was sent on April 1, 2014 inviting the Applicant to provide additional information concerning the maximum reducibility temperature (T_{max}) of the embodiments in which the proportion of cerium oxide falls within the claimed range. A response to the first letter, accompanied by Appendix 1, indicating the physical properties of a binary composition, was received on March 4, 2014. A response to the second letter, accompanied by an Appendix indicating the T_{max} for a series of compositions in which the proportion of cerium oxide varies between 10% and 45%, was received on April 28, 2014. Each of these responses will be taken into account during our analysis.

BACKGROUND TO THE INVENTION

[11] Before addressing the issues raised in the Final Action, it is important to understand the nature and the purpose of the invention.

[12] The “three-way” catalysts based on zirconium oxide and cerium oxide were well known before the filing date of this application. Specifically, this type of catalyst had useful properties in the treatment of internal combustion engine exhaust gases.

[13] To be effective, these catalysts must have a high specific surface area, even at an elevated temperature. They must also have the capacity to be reduced in a reducing atmosphere and to be re-oxidized in an oxidizing atmosphere. This capacity, called reducibility, is a maximum at a given temperature (maximum reducibility temperature), which is around 600°C for known catalysts. The problem facing the inventors was to obtain catalysts having a higher performance, i.e. having both the lowest possible maximum reducibility temperature and a high specific surface area at an elevated temperature.

[14] In this case, the Applicant developed a new process for preparing zirconium- and cerium-based catalysts having a higher performance in that they have a lower maximum reducibility temperature than that of known catalysts while having a high specific surface area at a given elevated temperature.

[15] The Examiner does not dispute that the Applicant had solved the problem by developing a new and inventive process to make new catalytic compositions having the desired properties, but rather he questioned the appropriateness of claiming these compositions independently of their process.

[16] As will be shown below, this review focuses the issues raised by the Examiner by determining whether the claims are enabled across their full scope and are, as a result, in compliance with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

The claims in dispute

[17] In our analysis, we will consider all of the claims on file. Claims 1-22, which were not initially at issue, were added following the letters sent by the Panel to the Applicant dated February 4 and April 1, 2014. The Panel considers that the central issue relates to enablement across the full scope of each of claims 1-37.

[18] For ease of reading, we have decided to present claims 1-37 in detail in the analysis. All of these claims encompass catalytic compositions defined by known chemical elements and structure and by their physical properties, i.e. maximum reducibility temperature (T_{max}) and specific surface area at a given elevated temperature. Claims 1-37 are presented briefly as follows:

- Claims 1-10 are directed to a process for preparing catalytic compositions;
- Claims 11-22 are directed to catalytic compositions obtained using the process of any one of claims 1-10;
- Claims 23-35 are directed to catalytic compositions per se; and
- Claims 36-37 are directed to a catalytic system and a process for treating internal combustion engine exhaust gases, respectively, and encompass the catalytic compositions of any one of claims 11-35.

ISSUES RAISED BY THE EXAMINER

[19] The Examiner raised the following three issues:

- Are claims 23-37 directed to an "obviously desired" result and therefore are not compliant with the provisions of section 84 of the *Patent Rules*?
- Do claims 23-37 omit an essential feature of the alleged invention and therefore fail to comply with the provisions of section 84 of the *Patent Rules*?
- Do claims 23, 32, 33 and 34 claim more than what has been invented and, therefore, fail to comply with the provisions of section 84 of the *Patent Rules*?

REFRAMING THE ISSUES RAISED BY THE EXAMINER

[20] As expressed in our letters of February 4 and April 1, 2014, the Panel considers that the central question to be answered in order to address the issues raised by the Examiner is whether claims 1-37 are enabled across their full scope.

PURPOSIVE CONSTRUCTION OF THE CLAIMS

[21] The purposive construction of claims 1-37 is based on the case law mentioned in the companion decision CD1359.

[22] It should be noted that we construed all the claims purposively at the outset. However, for ease of reading, the construction of the claims will be presented in detail during the analysis.

ISSUE RELATING TO THE ALLOWABILITY OF CLAIMS INCLUDING A STATEMENT OF DESIRED RESULT

Positions of the Examiner and the Applicant

[23] The position of the Examiner was expressed in the Final Action, in the Summary of Reasons and during the hearing. The Applicant expressed its position in its response to the Final Action and in the submissions made during and after the hearing. Since the positions of the Examiner and the Applicant are almost the same as those presented in related decision CD1359, it is not necessary to present them again. We will mention only new points that were not addressed in the related decision.

Legal principles

[24] Our analysis is based on the same legal principles as those mentioned in related decision CD1359. These principles have led us to conclude that a claim that includes a statement of desired result will be acceptable (assuming all other criteria of patentability are met) so long as the specification provides a person skilled in the art with the means of achieving the desired result across the full scope of the claim. If trials and experiments are required in order to accomplish the desired result, the test of sufficiency of the specification is met if these trials and experiments are not themselves inventions and if the specification gives sufficient directions to the person skilled in the art to enable him or her to identify what trials or experiments he or she may have to perform and how to conduct them. If the specification contains gaps with respect to this required information, it can nonetheless be considered sufficient provided the gaps are filled by the common general knowledge.

[25] Moreover, the Applicant is aware, and even acknowledges, that claims including a statement of desired result are not allowable if they are not enabled across their full scope.

In its response dated October 15, 2013, the Applicant stated on page 10:

[TRANSLATION]

> [The] inclusion, in the claims, of functional limitations that use the desired result can be allowable or even necessary, in order to provide a context for the invention. This "result/function" type of restriction is allowable provided that a person skilled in the art can obtain the desired and identified result without having to demonstrate inordinate ingenuity. Furthermore, it is permissible for a person skilled in the art to use, in addition to the information described in the description of the application, his common general knowledge, as well as regular techniques in the field, if necessary, in order to obtain the desired result.

[26] To the above we would like to add a few comments concerning the recent decision from the Federal Court in *AbbVie Corp v Janssen Inc,* 2014 FC 55 [*AbbVie*]. Of particular interest are paragraphs 141-178 of the reasons for judgment, dealing with the issue of "breadth and form of claiming". We are struck by the similarity between the manner in which this issue was framed by the parties in that case and by the Examiner and the Applicant in the instant case. In that case, the issue was framed in terms of whether the claims were covetous, whether it was permissible to draft them in the form of functional claims, whether they were broader than the invention disclosed, whether they were directed solely to a desired result, whether they were missing an essential feature and whether they met the requirements of utility and sound prediction. The claims at issue in *AbbVie* were directed to the use of a human antibody that binds to human IL-12 and possesses certain minimum levels of stickiness and potency to be an effective treatment for psoriasis. Although the facts in that case differ from those of the current case, the approach for addressing the issues above is of particular interest.

[27] After providing a summary of the Canadian case law on the issues of claims overbreadth, sufficiency of the specification, utility and sound prediction, Justice Hughes applied the relevant principles to the facts in the case. He found that: the claims at issue were readily understandable by a person skilled in the art; the skilled person would know what the parameters were; there was no evidence to indicate that antibodies falling within these parameters would not work to bind to IL-12 so as to treat psoriasis; and there was no evidence that the skilled person, given the patent, could not have created an antibody meeting the parameters of the claims. Accordingly, the claims were held not to be invalid for overbreadth.

Analysis

[28] In accordance with the above, and as stated by the Panel in its letters to the Applicant dated February 4 and April 1, 2014, the question for determination with respect to all of the claims (1-37) is whether the specification provides an enabling disclosure across the full scope of the claimed invention.

[29] In the following section, we will purposively construe each of the claims before determining whether the specification is sufficient and the claims are enabled across their full scope.

Claims directed to a process for preparing a composition (claims 1-10)

[30] Claims 1-10 are directed to a preparation process for a catalytic composition defined by known chemical and structural elements and by a maximum reducibility temperature of between 350°C and 500°C and a specific surface area of between 40 m^2/g and 89 m^2/g after calcination for 6 hours at 500°C.

[31] Claim 1 is written as follows (the terms that require clarification are underlined):

[TRANSLATION]

1. A process for preparing a composition comprising zirconium oxide, cerium oxide and optionally at least one other element selected from lanthanides other than cerium, in a proportion of zirconium oxide of at least 50% by weight, characterized in that it has a maximum reducibility temperature of between 350°C and 500°C and a specific surface area of between 40 m^2/g and 89 m^2/g, after calcination for 6 hours at 500°C, and in that it is in the form of a tetragonal phase, said process being characterized in that it comprises the following steps:

   (a) forming a mixture comprising compounds of cerium, zirconium and optionally at least one of the aforementioned element;
   (b) mixing said mixture with a basic compound to obtain a precipitate;
   (c) heating said precipitate in an aqueous medium; then
   (d) either firstly adding an additive, selected from anionic surfactants, non-ionic surfactants, polyethylene glycols and carboxylic acids and their salts and surfactants of the carboxymethyl fatty alcohol ethoxylate-type to the medium resulting from the previous step, and, then, optionally separating said precipitate; or

(d') firstly separating said precipitate, and then adding said additive to the precipitate;

(e) Subjecting to a milling operation the precipitate obtained in the previous step; and

(f) calcining the precipitate thus obtained.

"composition comprising zirconium oxide, cerium oxide and optionally at least one other element selected from lanthanides other than cerium"

[32] The expression "composition comprising zirconium oxide, cerium oxide and optionally at least one other element selected from lanthanides other than cerium" would be understood by a person skilled in the art as encompassing, in a first embodiment, a binary catalytic composition, i.e. comprising zirconium oxide and cerium oxide, and, in a second embodiment, a composition comprising, in addition to zirconium oxide and cerium oxide, at least one oxide of an element selected from lanthanides other than cerium. The "lanthanides" are defined in the description as being the elements of the group comprised of the elements in the periodic table with an atomic number of between 57 and 71. The "lanthanides" other than cerium include lanthanum, neodymium and praseodymium.

"*maximum reducibility temperature of between 350°C and 500°C"*

[33] "[R]educibility" in the context of the expression "maximum reducibility temperature of between 350°C and 500°C" is defined on pages 1, 3 and 4 of the description as being the capacity of the catalyst to be reduced in a reducing atmosphere and to be re-oxidized in an oxidizing atmosphere. The reducibility of the catalyst is due to the cerium, which has the capacity to be reduced or re-oxidized and it can be measured by the capacity to capture hydrogen as a function of temperature. Maximum reducibility temperature would be understood by a person skilled in the art as being the temperature at which the capture of hydrogen is at a maximum and where, in other words, the reduction of cerium IV into cerium III is at a maximum. The way of measuring the "reducibility" is described on page 18, lines 12-22 of the description. In particular, the measuring is carried out on a 200-mg specimen that has been calcined beforehand for 10 hours at 1000°C.

"*specific surface area of between 40 m^2/g and 89 m^2/g*"

[34] The specific surface area is defined, on page 2 of the originally filed description, as being the B.E.T. surface area. This surface area is established using the **B**runauer–**E**mmett–

Teller method, known and used for over 70 years. In general, a person skilled in the art would know that the specific surface area of a material is its surface area per unit of mass - for example, it can be expressed in m^2/g. Moreover, the larger the specific surface area of a porous material, the finer the pores.

[35] Accordingly, the expression: "composition...characterized in that it has a specific surface area of between 40 m^2/g and 89 m^2/g, after calcination for 6 hours at 500°C", would be interpreted by a person skilled in the art as relating to a composition that had been calcined for 6 hours at 500°C and whose specific surface area is at least 40 m^2/g but no greater than 89 m^2/g.

"*calcination for 6 hours at 500°C"*

[36] "[C]alcination for 6 hours at 500°C" indicates that the catalytic composition obtained is calcined [heated] at high temperature, in air (as mentioned, for example, on page 4 of the description) for 6 hours at the elevated temperature of 500°C.

"*composition....in the form of a tetragonal phase"*

[37] The expression "composition....in the form of a tetragonal phase" is defined in the last two paragraphs of page 2 of the description as originally filed. It indicates that the tetragonal phase of the composition is predominant, i.e. the intensity of the diffraction peak corresponding to the crystal plane (111) of the tetragonal phase of the mixed oxide of the composition is at least equal to 1 times and more specifically 4 times the intensity of the main line of any other phase present. This structure is determined by XR diffraction analysis on a product that has undergone calcination at a temperature of at least 900°C for 6 hours.

"*compounds of cerium, zirconium and… at least one of the aforementioned elements"*

[38] "[C]ompounds of cerium, zirconium and… at least one of the aforementioned element" are defined on page 5 of the description as originally filed and would be understood by a person skilled in the art as being ceric ammonium nitrates, sulfates, acetates or chlorides of cerium and zirconium and at least one lanthanide other than cerium.

"*additive, selected from anionic surfactants, non-ionic surfactants, polyethylene glycols and carboxylic acids and their salts and surfactants of the carboxymethylated fatty alcohol ethoxylate-type*"

[39] The term "additive" in the expression: "an additive selected from anionic surfactants, non-ionic surfactants, polyethylene glycols, carboxylic acids and their salts, and surfactants of the carboxymethylated fatty alcohol ethoxylate-type" would be understood by a person skilled in the art as being a compound that can be chosen from among a very large number of possible compounds, i.e. anionic surfactants, non-ionic surfactants, polyethylene glycols, carboxylic acids and their salts, and surfactants of the carboxymethylated fatty alcohol ethoxylate type, listed on pages 8-9 of the description.

"calcining the precipitate"

[40] The expression "calcining the precipitate" is defined on page 10 of the description as originally filed and would be understood by a person skilled in the art as calcining the precipitate at a temperature of between 300°C and 1000°C, in an oxidizing atmosphere (air) for at least 30 minutes, or under a stream of inert gas (nitrogen), initially (at a temperature of between 800°C and 1000°C) for at least one hour then secondly (at a temperature of between 300°C and 700°C) in an oxidizing atmosphere for at least 30 minutes. This calcination allows the crystallinity of the product formed to be increased, and may be adjusted depending on the temperature at which the composition is used subsequently, taking into account the fact that the specific surface area of the product decreases as the calcination temperature employed increases.

[41] Since many of the terms and elements above are the same as or similar to those in claims 2-37, it will not be necessary to interpret them again.

[42] We consider that the terms and expressions used in claim 1 would be understood by a person skilled in the art. Collectively, they define the limits of the claim in such a way that a person skilled in the art would be able to understand whether or not a given catalytic composition would fall within the scope of the claim. In other words, the claim distinctly and in explicit terms defines the invention, as required by subsection 27(4) of the *Patent Act*.

[43] As indicated in paragraph [24], in order to assess the allowability of this claim, we must determine whether the specification includes an enabling disclosure across the full scope of

this claim. In this case, we must determine whether:

1) by following the steps of the process described, any binary composition in which the proportion of zirconium oxide is between 50% and 99%, and that of cerium oxide is between approximately 1% and 50% (assuming these limits reflect the entire claimed range) will have a T_{max} and a specific surface area as defined in claim 1; and

2) by following the steps of the process described, any composition of three or more oxides in which the proportion of zirconium oxide is between 50% and approximately 99%, that of cerium oxide is between approximately 1% and 49% and that of the lanthanide(s) other than cerium is between approximately 1% and 49% (assuming these limits reflect the entire claimed range) will have a T_{max} and a specific surface area as defined in claim 1.

[44] For ease of reading, we will consider the data in the specification concerning the physical properties (T_{max} and specific surface area) of the binary compositions and of the compositions of three or more oxides separately; next; we will determine whether the specification contains any gaps with respect to the values of T_{max} and the specific surface area claimed and, if there are gaps, whether they are filled by the common general knowledge of the skilled person.

1) Data for binary compositions:

[45] As presented, claim 1 includes binary compositions (comprising solely zirconium oxide and cerium oxide). However, there are no examples of this type of composition in the description. In its letter of February 4, 2014, the Panel indicated that to be allowable, claims 1-37 would have to be enabled across their scope and, accordingly, the specification must include an enabling disclosure across the full scope of the claims. In particular, the Panel observed that there is no data relating to a binary composition. In its response dated March 4, 2014, the Applicant provided an affidavit, signed by Isabella Ferri, which describes the preparation of a binary composition comprising 80% zirconium oxide and 20% cerium oxide, in accordance with the process of claim 1. The composition was prepared according to the same process as that of example 1 of the application. This composition has the properties (T_{max}, specific surface area and structure) shown in the table below:

	Specific surface area after calcination for 6 hours at:	**T_{max}**	**Structure**

	500°C	-----	-----		
Example Binary catalyst	94 m^2/g	-----	-----	431°C	tetragonal phase at 100%

[46] We note that this new experimental data was submitted after the filing date of this application and therefore cannot be made part of the specification since it would constitute new matter and it is not permitted to amend the specification by adding a new matter. Nonetheless, by taking into account the Office's practice shown in decisions such as *Re Farbwerke Hoechst Aktiengesellschaft* (1976), CD 322, (PAB and Pat. Comm), regarding patent application No. 1,011,738, and *Re Immunex Corp* (2010), 89 CPR (4th) 34 (PAB and Pat. Comm), CD 1302, regarding patent application No. 593,988, we consider it permissible to consider such experimental data as documentary evidence confirming that the specification includes an enabling disclosure covering the full scope of a claim. Therefore, in this case, we will consider this documentary evidence during our analysis.

2) Data for compositions comprising three or more oxides:

[47] As presented, claim 1 also includes compositions of three or more oxides. The specification discloses two examples (examples 1 and 2) describing a process for preparing a four-oxide composition, i.e. ZrO2 (72%): CeO2 (21%): LaO2 (2%): NdO2 (5%), which has the properties (T_{max}, specific surface area and structure) shown in the table below:

	Specific surface area after calcination for 6 hours at:			**T_{max}**	**Structure**
	500°C	900°C	1000°C		
Example 1 Four-oxide catalyst	83 m^2/g	50 m^2/g	38 m^2/g	475°C	tetragonal phase at 100%
Example 2 Four-oxide catalyst	84 m^2/g	46 m^2/g	37 m^2/g	375°C	

3) Additional information on file:

[48] As indicated in paragraphs [45] and [47], the affidavit includes an example of a binary

composition (comprising ZrO2 (80%) and CeO2 (20%)) and the specification includes two examples of a four-oxide composition (comprising: ZrO2 (72%), CeO2 (21%), LaO2 (2%) and NdO2 (5%)) having certain physical properties (T_{max} and specific surface area). As originally filed, the specification provides no information regarding the relationship between the various proportions of the constituent elements in the compositions and their physical properties (T_{max} and specific surface area). However, as indicated in paragraph [24], it is possible to fill these gaps by the common general knowledge of a person skilled in the art or, alternatively, as indicated in paragraph [46], by submitting documentary evidence to confirm enablement across the full scope of the claims.

a) Relationship between the proportion of the constituent elements of the compositions and $T_{max:}$

[49] In the absence of information in the specification regarding the relationship between the proportions of the constituent elements in the compositions and T_{max}, the Panel invited the Applicant, by a letter dated April 1, 2014, to indicate how the general knowledge of the person skilled in the art would enable the latter to extrapolate the T_{max} of the compositions claimed based on the T_{max} of the compositions obtained in examples 1 and 2, in which the proportion of cerium oxide is 21%. The Panel indicated that, alternatively, it would consider data regarding T_{max} for compositions, prepared according to the processes described and claimed, in which the proportion of cerium oxide is close to the limits of the claimed range, i.e. close to 1% and close to 50%.

[50] In its response dated April 28, 2014, the Applicant provided a document, signed by Isabella Ferri, reporting values of T_{max} for compositions of three or more oxides in which the proportion of cerium oxide varied between 10% and 45%. However, the Applicant indicated that these compositions were obtained using a different process than that described and claimed in the specification. It also mentioned that even though the values of T_{max} are outside the claimed range, the results reported inform the person skilled in the art that T_{max} varies very little on the basis of the Zr/Ce ratio (and therefore the proportion of cerium oxide in the composition). We note that the document does not describe the process for preparing these compositions.

[51] The Panel finds that the data provided in the letter of April 28, 2014 cannot be considered as acceptable documentary evidence for deciding the issue of enablement of claim 1 (nor any other claim on file) given that: 1) the data provided comes from an unknown process, different from that described and claimed in the specification and, accordingly, it does not

make it possible to confirm that the claimed values of T_{max} can be obtained by following the processes described; 2) there is nothing to indicate that the information provided (i.e. the data points and conclusions concerning the relationship between T_{max} and the proportions of the constituent elements in the composition) is part of the general knowledge of a person skilled in the art; and 3) the document in question does not indicate how the common general knowledge of a person skilled in the art enables the latter to extrapolate the claimed T_{max} based on the examples. We will therefore continue our analysis without taking into account the data and conclusions received in the April 28, 2014 letter.

[52] In view of the above, we conclude that the description does not include an enabling disclosure across the full scope of claim 1, in particular concerning the claimed values of T_{max}. Accordingly, claim 1 is not enabled across its full scope and therefore does not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[53] However, in this case, we consider that it is possible to remedy this defect by indicating, for a binary composition, a proportion by weight of zirconium oxide with respect to the overall composition that bears some relationship to the proportion used in the example of the affidavit (i.e. 80%) and, for a composition of three or more oxides, proportions by weight of zirconium oxide and cerium oxide with respect to the overall composition that bear some relationship to the proportions used in examples 1 and 2 (i.e. 72% and 21%, respectively). The specification indicates, on page 3 of the description as originally filed, that the proportion of zirconium oxide can be, more particularly, at least 70% and that the content of cerium oxide can be, more particularly, no more than 25%. Based on the specification, we find that if the binary composition in claim 1 is defined such that it includes a limitation on the proportion of zirconium oxide relative to the overall composition of between 75% and 80% (i.e. the proportion of cerium oxide is between 20% and 25%) and if the composition comprising three or more oxides in this claim is defined so as to include a limitation on the proportion of zirconium oxide with relative to the overall composition of at least 70% and of cerium oxide being between 21% and 25%, this claim would be considered allowable.

[54] Assuming that claim 1 is amended as indicated above, by comparing the values of T_{max} of the composition in claim 1 with the T_{max} of the composition obtained in examples 1 and 2, we note that the T_{max} of the composition in claim 1 is between 350°C and 500°C and that the value of each of the upper and lower limits of the claimed range represents a variation

of less than 7% with respect to T_{max} of the composition obtained in examples 1 and 2 (475°C and 375°C, respectively). We also note that T_{max} of the composition in the example of the affidavit (431°C) falls within the claimed range.

[55] In its letter of March 4, 2014, the Applicant indicated that it is well known in the field that measured values can vary on the order of 10% due to uncertainty in the measuring instruments. We find this reasonable and we accept it. For the remainder of our analysis, this variation will be taken into account in considering the claimed values of T_{max} and specific surface area with respect to the values obtained in the examples.

[56] We will continue our analysis of claim 1 (and of all other claims) to determine whether this claim is enabled across its full scope, on the assumption that this claim will be amended to include the limitations indicated above regarding the proportions of zirconium oxide and cerium oxide with respect to the overall composition.

b) Relationship between the proportion of constituent elements in the compositions and specific surface area:

[57] The only data we have available regarding the relationship between the proportions by weight of the constituent elements in the compositions and the specific surface area claimed was provided to us by the Applicant. In its comments and arguments before and during the hearing, the Applicant submitted that it is well known in the art that increasing the content of cerium results in reducing the stability of the specific surface area of the composition. In the absence of any evidence to the contrary, we accept that this is part of the common general knowledge of the person skilled in the art.

[58] We note that the upper limit of the specific surface area of the composition in this claim (89 m^2/g, after calcination for 6 hours at 500°C) corresponds to that of the composition of three or more oxides obtained in examples 1 and 2 (83 m^2/g and 84 m^2/g), in which the proportion of cerium oxide is 21%, and that of the binary composition in the example in the affidavit (94 m^2/g), in which the proportion of cerium oxide is 20%. However, the specification contains gaps as to the lower limit of the specific surface area (40 m^2/g). As indicated in the paragraph above, a person skilled in the art, based on his or her common general knowledge, would expect the specific surface area to decrease as the proportion of cerium oxide increases. In this case, he or she would expect that the specific surface area of the composition in which the proportion of cerium oxide is 25% would be lower than that of a composition in which this proportion is 20% or 21%.

[59] Accordingly, assuming claim 1 to be amended as indicated in paragraph [53], this claim includes a composition that has a specific surface area whose upper limit, after calcination for 6 hours at 500°C, corresponds to that obtained in examples 1 and 2 and in the example in the affidavit (within 6%). Although the description does not disclose examples of a catalytic composition that has a specific surface area equal to or approaching the claimed lower limit, this can be justified by the fact that such a specific surface area is described on page 4 of the description and that, as indicated in paragraphs [57] and [58], the person skilled in the art, by increasing the content of cerium in the composition, could obtain, according to the process described in examples 1 and 2 and the example of the affidavit, a composition having a specific surface area lower than that obtained in these examples.

Conclusion concerning enablement across the full scope of claim 1:

[60] In view of the above, we conclude that claim 1 is not enabled across its full scope and therefore does not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*. However, if this claim is amended as indicated in paragraph [53], it will be considered as allowable.

[61] Dependent claims 2-10 have the same defects as claim 1 and the additional limitations they include do not remedy these defects. Accordingly, and for the same reasons, we conclude that these claims are not enabled across their full scope and do not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

Claims directed to a catalytic composition obtained by its process of preparation (claims 11-22)

[62] Claims 11-22 are directed to a catalytic composition obtained by the process of any one of claims 1-10.

[63] Independent claim 11 is written as follows:

[TRANSLATION]

11. A composition comprising zirconium oxide, cerium oxide and optionally at least one other element selected from the lanthanides other than cerium, in a proportion of zirconium oxide of at least 50% by weight, characterized in that it has a maximum reducibility temperature of between 350 °C and 500°C and a specific surface area of between 40 m^2/g and 89 m^2/g after calcination for 6 hours at 500°C, and in that it is in the

> form of a tetragonal phase, said composition being obtained by the process as defined in any one of claims 1-10.

[64] The composition in this claim is defined in the same manner as the composition in claim 1. In paragraph [60], we concluded that claim 1 is not allowable since it does not limit the proportions of zirconium oxide or cerium oxide. Accordingly, and for the same reasons, this claim is not considered as being enabled across its full scope and does not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[65] However, if the defect in this claim is corrected to include the limitations on the proportions of the constituent elements in the composition, as indicated in paragraph [53] in the case of claim 1, claim 11 will be considered as being in compliance with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[66] Claims 12-18 have the same defects as claim 11, on which they depend, and the further limitations they include do not remedy these defects. Accordingly, these claims are considered as not being enabled across their full scope and do not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[67] Claims 19-21 depend on claim 11 and appear as follows:

> [TRANSLATION]
>
> 19. The composition according to any one of claims 11-18, characterized in that it has a specific surface area of at least 30 m^2/g after calcination for 6 hours at 900°C.
>
> 20. The composition according to claim 19, characterized in that it has a specific surface area of at least 45 m^2/g after calcination for 6 hours at 900°C.
>
> 21. The composition according to any one of claims 11-20, characterized in that it has a specific surface area of at least 25 m^2/g after calcination for 6 hours at 1000°C.

[68] As claims 19-21 depend directly or indirectly on independent claim 11 they thus have the same defects as this claim, and the limitations they include do not remedy the defects. Moreover, since these claims define new data points that are not defined in claim 11, it must be determined whether the specification includes an enabling disclosure across the full scope of these claims. We note that the specification contains gaps regarding the specific surface area of the binary composition after calcination for 6 hours at 900°C and

1000°C. Indeed, there is no data in the specification or in the example provided in the affidavit concerning the specific surface area of the binary composition at these temperatures. In addition, the general knowledge of the person skilled in the art would not fill in these gaps. For this reason, these claims are not enabled across their full scope and do not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[69] As to embodiments in which the compositions comprise three or more oxides, claims 19-21 state that the value of the specific surface area, after calcination for 6 hours at 900°C and 1000°C, falls within a range the lower limit of which is equal or less than that obtained in the examples. This is considered acceptable because the person skilled in the art would expect the specific surface area of the composition to decrease as the calcination temperature increases and that a lower specific surface area can be obtained. However, since the range of specific surface areas at these temperatures has no upper limit, claims 19-21 encompass compositions which, after calcination for 6 hours at 900°C and at 1000°C, have a higher specific surface area than the specific surface area of the composition obtained in the examples. The composition of examples 1 and 2 is the one in which the proportion of cerium oxide is the lowest within the claimed range, and therefore the value of the corresponding specific surface area should be the highest that can be obtained. We conclude, therefore, that these claims are not enabled across their full scope and do not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*. However it is possible to remedy the defects in claims 19-21 mentioned above by defining the composition as being one of three or more oxides and by including an upper limit for specific surface area corresponding to the specific surface area of the compositions obtained in the examples, i.e. 50 m^2/g after calcination at 900°C and 38 m^2/g after calcination at 1000°C. The lower limit can be justified by the fact that it is described on page 4 of the description and that, as indicated in paragraphs [57] and [58], a person skilled in the art could obtain a composition that has such a specific surface area by increasing the content of cerium in the composition.

[70] In summary, we find that claims 19-21 would comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*, if: 1) claim 11 is amended as indicated in paragraph [53]; and 2) claims 19-21 are amended so as to include only compositions comprising three or more oxides and so as to include an upper limit of the range of specific surface areas of 50 m^2/g after calcination at 900°C, and 38 m^2/g after calcination at 1000°C.

[71] Claim 22, which depends upon claims 11-20, appears as follows:

[TRANSLATION]

> 22. The composition according to any one of claims 11 to 21, characterized in that it is in the form of a solid solution of cerium, optionally with the other previously mentioned element, in zirconium oxide.

[72] As claim 22 refers to any one of claims 19-21 it thus has the same defects as these claims, and the further limitations it includes do not remedy the defects. Accordingly, this claim is not enabled across its full scope and does not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

Claims directed to a catalytic composition per se (claims 23-35)

[73] Claims 23-35 are directed to a catalytic composition defined by known chemical and structural elements, and by physical properties, i.e. its specific surface area after calcination for 6 hours at a given elevated temperature and its maximum reducibility temperature.

[74] Claim 23 appears as follows:

[TRANSLATION]

> 23. A composition comprising zirconium oxide, cerium oxide and optionally at least one other element selected from the lanthanides other than cerium, in a proportion of zirconium oxide of at least 50% by weight, characterized in that it has a maximum reducibility temperature of between 350 °C and 500°C and a specific surface area of between 40 m^2/g and 89 m^2/g after calcination for 6 hours at 500°C, and in that it is in a tetragonal phase.

[75] Claim 23 is directed to a catalytic composition as defined in claim 11. Accordingly, and for the same reasons indicated in paragraph [64], this claim is not considered as being enabled across its full scope and does not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[76] However, if the defect above is corrected as in the case of claim 11, i.e. as indicated in paragraph [53], this claim will be considered be compliant with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[77] As claims 24-31 depend upon claim 23 they thus have the same defects as this claim, and the further limitations they include do not remedy these defects. Accordingly, these claims are considered as not being enabled across their full scope and do not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

[78] Claims 32-35 depend upon claim 23 and appear as follows:

> [TRANSLATION]
>
> 32. The composition according to any one of claims 23-31, characterized in that it has a specific surface area of at least 30 m^2/g after calcination for 6 hours at 900°C.
>
> 33. The composition according to claim 32, characterized in that it has a specific surface area of at least 45 m^2/g after calcination for 6 hours at 900°C.
>
> 34. The composition according to any one of claims 23-33, characterized in that it has a specific surface area of at least 25 m^2/g after calcination for 6 hours at 1000°C.
>
> 35. The composition according to any one of claims 23 to 34, characterized in that it is in the form of a solid solution of cerium, optionally with the other aforementioned element, in zirconium oxide.

[79] As claims 32-34 depend directly or indirectly upon independent claim 23 they thus have the same defects as this claim, and the further limitations they include do not remedy the defects. Moreover, since these claims define new data points that are not defined in claim 23, it must be determined whether the specification includes an enabling disclosure covering the full scope of these claims. It should be noted that the composition of these claims is defined in the same manner as in claims 19-21. Accordingly, and for the same reasons, we conclude that these claims are not enabled across their full scope and do not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*. To be allowable, these claims must be amended as indicated in paragraph [70] for claims 19-21.

[80] As claim 35 refers to any one of claims 32-34 it thus has the same defects as these claims, and the further limitations it includes do not remedy the defects. Accordingly, this claim is not enabled across its full scope and does not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

Independent claims 36-37 which refer to claims 11-35

[81] Independent claims 36 and 37 appear as follows:

[TRANSLATION]

36. A catalytic system, characterized in that it comprises a composition according to any one of claims 11-35.

37. An internal combustion engine exhaust gas treatment process characterized in that it uses as a catalyst, a catalytic system according to claim 36 or a composition according to any one of claims 11-35.

[82] As claims 36-37 refer to any one of claims 11-35 they thus have the same defects, and the further limitations they include do not remedy the defects. Accordingly, these claims are not enabled across their full scope and do not comply with section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*.

Recommended amendments

[83] In order to remedy the defects in claims 1-37 currently on file, independent claims 1, 11 and 23 must specify that, for embodiments in which the catalytic composition is binary, the proportion of zirconium oxide is between 75% and 80%, and for embodiments in which the composition comprises three or more oxides, that the proportion of zirconium oxide is at least 70% and that of cerium oxide is between 21% and 25%. Furthermore, independent claims 19-21 and 32-34 must limit the range of the specific surface areas to the values indicated in the table below. Note that the recited upper limit is acceptable since it is described in the specification and that it has actually been obtained (in this case, it corresponds to the specific surface area of the catalytic composition obtained in examples 1 and 2) and the lower limit can be justified by the fact that it is described in the description and that, as indicated in paragraphs [57] and [58], a person skilled in the art could obtain a composition that has such a specific surface area by increasing the concentration of cerium in the composition. Moreover, it should be noted that the lower limit is indicated in the claims on file and the Examiner's search of the prior art failed to reveal any document that discloses or renders obvious the claimed subject matter. Finally, claims 19-21 and 32-34 must be limited to compositions comprising three or more oxides. To do this, the expression "characterized in that it has" in claims 19, 21, 32 and 34, should be replaced by "characterized in that it comprises zirconium oxide, cerium oxide and at least one other element selected from the lanthanides other than cerium, and in that it has".

It is sufficient to remedy the defects in claims 19 and 32 to render claims 20 and 33 allowable.

T°	Claims on file	Specific surface area between
900°C	19, 32	30 m^2/g and 50 m^2/g
	20, 33	45 m^2/g and 50 m^2/g
1000°C	21, 34	25 m^2/g and 38 m^2/g

[84] It must be noted that the amendment to claims 19-21 and 32-34 indicated above would result in a defect in claim 22, which encompasses both a binary composition and a composition comprising three or more oxides, and thus does not include all of the limitations of claims 12-13 and 19-21, to which it refers, since they encompass only a composition comprising three or more oxides. Claim 35 would also have the same defect for the same reasons, since it would not include all of the limitations of claims 25-27 and 32-34, to which it refers, and they encompass only a composition comprising three or more oxides. In order to overcome this defect, claims 22 and 35 must be redrafted so as to delete the term "optionally" in the expression "optionally with the other aforementioned element" when these claims refer to claims that encompass only the composition comprising three or more oxides. Finally, the amendment to claims 1, 11 and 23, to include a limitation on the proportion of zirconium oxide (of at least 70% or between 75% and 80%), renders the scope of dependent claims 14 and 27, which recite a proportion by weight of zirconium oxide of at least 65%, broader than that of the independent claims upon which they depend. Claims 14 and 27 should be deleted and all the claims on file (15-37) should be properly renumbered while ensuring to also properly renumber any claims to which they refer.

Comments concerning the case law cited by the Examiner and the Applicant

[85] The issue relating to overbreadth of the claims that include a statement of desired result has been addressed in the case law, but to our knowledge there is no decision in which the facts are similar to those of the instant case. Specifically, in the decisions dealing with this issue, the claims were not directed to a product distinguished solely from known products by a desired physical property. Nonetheless, we find it useful to provide some comments on the case law cited by the Examiner and the Applicant. These comments can be found in the decision CD 1359.

OTHER ISSUES RAISED BY THE EXAMINER

[86] The Examiner also raised the following issues:

- *Do claims 23-37 omit an essential feature and must they therefore be drafted in the form of product-by-process?*

- *Do claims 23 and 32-34 claim more than what has been invented?*

[87] In this case, we find the test that is determinative of the issues above is the test of enablement across the full scope of the claims.

[88] The question of whether the claims, including the above claims, are enabled across their full scope has already been addressed and it is not necessary to address it again. We have already determined that these claims are not enabled across their full scope.

[89] If these claims are amended as indicated at the end of the analysis they will be considered allowable and will comply with section 84 of the *Patent Rules*.

[90] In the case of a claim that is enabled across its full scope, we see no problem with it being directed to a product *per se*, independently of its process of preparation.

PANEL'S RECOMMENDATIONS

[91] In summary, we recommend that the Commissioner inform the Applicant that:

1) claims 1-37 are not enabled across their full scope and therefore do not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*;

and that the Commissioner inform the Applicant that:

2) the following amendments are necessary to bring the application into conformance with the Act and the Rules:

- in claims 1, 11 and 23, replace [TRANSLATION] "in a proportion of zirconium oxide of at least 50% by weight" with [TRANSLATION] "in a proportion of zirconium oxide of between 75% and 80% by weight, when said at least one other element is absent, and in a proportion of zirconium oxide of at least 70% by weight and a proportion of cerium oxide of between 21% and 25% by weight when said at least one other element is present".

- in claims 19, 21, 32 and 34, which define specific surface areas at a given elevated temperature, ensure that the value of these specific surface areas is that recited in the table appearing in paragraph [83];

- in claims 19, 21, 32 and 34, add a limitation, as mentioned at the end of the analysis, indicating that the composition comprises zirconium oxide, cerium oxide and at least one other element selected from lanthanides other than cerium.

- replace the wording of claim 22 with [TRANSLATION] "composition according to any one of claims 11 and 14-18, characterized in that it is in the form of a solid solution of cerium, optionally with the other aforementioned element, in zirconium oxide, and according to any one of claims 12-13 or 19-21, characterized in that it is in the form of a solid solution of cerium, with the other aforementioned element, in zirconium oxide";

- replace the wording in claim 35 with [TRANSLATION] "composition according to any one of claims 23-24 or 28-31, characterized in that it is in the form of a solid

solution of cerium, optionally with the other aforementioned element, in zirconium oxide, and according to any one of claims 25-27 or 32-34, characterized in that it is in the form of a solid solution of cerium, with the other aforementioned element, in zirconium oxide"; and

- delete claims 14 and 27 and properly renumber claims 15-37 on file and their dependencies while ensuring that they refer to the appropriate claims.

Assia Semra	Mark Couture	Paul Fitzner
Member	Member	Member

COMMISSIONER'S DECISION

[92] I concur with the findings and recommendations of the Patent Appeal Board and inform the Applicant that:

- claims 1-37 are not enabled across their full scope and therefore do not comply with the provisions of section 84 of the *Patent Rules* and subsection 27(3) of the *Patent Act*; and

- In compliance with paragraph 30(6.3) of the *Patent Rules,* I inform the Applicant that:

    1) the amendments indicated in paragraph [91] are necessary to bring the application into compliance with the Act and the Rules; and

    2) the Applicant has three months following the date of this decision to implement the amendments above, failing which I intend to refuse the application. Accordingly, under paragraph 31(b) of the *Patent Rules,* I invite the Applicant to make the above amendments, and only these amendments.

Sylvain Laporte
Commissioner of Patents

Signed in Gatineau (Quebec)
this 9th day of June, 2014