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D E C I S I O N
of 18 July 1997

Case Number: T 0444/91 - 3.3.2

Application Number: 84305453.7

Publication Number: 0151335

IPC: C04B 35/48

Language of the proceedings: EN

Title of invention:

Zirconia porcelain and method of manufacturing the same

Patentee:

NGK INSULATORS, LTD.

Opponent:

Stora Publication Paper AG Patentabteilung

Headword:

Zirconia porcelain/NGK INSULATORS

Relevant legal provisions:

EPC Art. 123(2), (3), 83, 56, 54

Keyword:

"Inventive step - yes - no reason to select particular points
in a phase diagram of a ternary system"

Decisions cited:

T 0014/83

Catchword:

-



Case Number: T 0444/91 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 18 July 1997

Appellant: Stora Publication Paper AG
(Opponent) Patentabteilung
Postfach 10 04 63
D-41704 Viersen (DE)

Representative: -

Respondent: NGK INSULATORS, LTD.
(Proprietor of the patent) 2-56, Suda-cho, Mizuho-ku
Nagoya-shi, Aichi 467 (JP)

Representative: Paget, Hugh Charles Edward
MEWBURN ELLIS
York House
23 Kingsway
London WC2B 6HP (GB)

Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 9 April 1991
concerning maintenance of European patent
No. 0 151 335 in amended form.

Composition of the Board:

Chairman: P. A. M. Lançon
Members: U. Oswald
C. Holtz

Summary of Facts and Submissions

- I. European patent No. 0 151 335 was granted on the basis of ten claims contained in European patent application No. 84 305 453.7.
- II. Opposition was filed against the granted patent by the Appellant. According to the grounds of opposition the patent was opposed under Article 100(a) for lack of novelty and lack of inventive step and under Article 100(b) EPC for insufficiency of disclosure. Of the documents cited during the opposition the following remain relevant to the present decision:
- (1) C. Pascual et al., Journal of Materials Science 18 (1983) 1315-1322;
 - (2) Chemical Abstracts 76(26):158930g, 1969;
 - (3) English translation of "Izvestiya Akademii Nauk SSSR, Neorganicheskie Materialy, Vol. 11, No. 8, pages 1427 to 1429, August 1975" in Plenum Publishing Corporation 1976, pages 1218 to 1220;
 - (4) Artikel "Oxidkeramik" by "Dr. A. Reckziegel et al. from "Handbuch der Keramik Copyright 1979 by Verlag Schmid GmbH, Freiburg i.Brg. Germany, Gruppe **II** K 1", pages 1 to 3;
 - (5) Materials Research Bulletin, vol. 4, 1969, pages 727 to 740, Pergamon Press, Inc. Printed;
 - (6) EP-A-0 036 786;

(7) C. Pascual et al., Journal of Materials Science 17 (1982), pages 3431 to 3436;

(8) US-A-4 316 964.

Document (8) mentioned in the European search report was cited by the Appellant for the first time in the oral proceedings before the Opposition Division. This document was not introduced into the proceedings by the Opposition Division.

III. The Opposition Division maintained the patent in amended form on the basis of a set of six claims. Claim 1 reads as follows:

"1. A zirconia porcelain containing yttrium oxide and cerium oxide, characterized in that the amount of yttrium oxide is 2-3 mol% and the amount of cerium oxide is 2-4 mol%, and that the average particle size of the zirconia crystals is not larger than 10 μm , and wherein the sum of the content of tetragonal zirconium oxide and the content of cubic zirconium oxide is not less than 3 times in terms of volume fraction the content of monoclinic zirconium oxide."

In the view of the Opposition Division the closest prior art was document (6), which described in accordance with the patent in suit a partially stabilised zirconia porcelain in a non-equilibrium state containing obligatorily a tetragonal crystal phase.

It was particularly pointed out that

- (i) this prior art related to a material containing a maximum amount of 1.3 mol% of an oxide of a rare earth element, a value below the minimum amount of 2 mol% of CeO₂, according to the patent in suit and that
- (ii) document (6) was restricted to zirconia crystal sizes below 2 µm, whereas the product according to the patent in suit comprised zirconia crystal sizes between 2 µm and 10 µm without impairing the stability of the material and that
- (iii) as a consequence of this extension of the crystal grain size it was possible to work with coarser powder grain size in the starting mixture.

Therefore, the subject-matter of the patent in suit in the amended form could not be derived in an obvious manner from the teaching of this document. The other documents cited during the proceedings either related to a zirconia porcelain containing a different amount of components as set out in the amended claim 1 of the patent in suit, or related to an equilibrium state material and therefore could not give any suggestions as to the stabilisation of crystal phases including the non-equilibrium state tetragonal phase.

IV. The Appellant lodged an appeal against this decision.

Although the objection under Article 54 EPC for lack of novelty was not explicitly withdrawn, it is to be noted that the Appellant's submissions before the Board of Appeal essentially related to the lack of inventive step of the zirconia porcelain according to claim 1 in comparison with the ceramic material described in the closest prior art known from document (6).

More particularly, it was pointed out that document (6) described sintering conditions, contents of the tetragonal, cubic and monoclinic crystal phases which could not be discriminated from those described in the patent in suit. This document clearly taught to adjust the content of the tetragonal phase to as high a level as possible. Furthermore, document (6) disclosed a particle size of the zirconia crystals of up to 2 μm . Consequently, the average particle size of the zirconia crystals of not larger than 10 μm according to the patent in suit could not be regarded as a feature distinguishing the porcelain now claimed from the material disclosed in the prior art. Since document (6) suggested that up to 30 mol% of the yttria stabiliser could be replaced by another rare earth oxide component the zirconia bodies of the patent in suit differed from those described in document (6) only in the presence of at least 2 mol% instead of 1.3 mol% of a rare earth oxide stabiliser. However, it was within the customary practice followed by a person skilled in the art to use ceria as a rare earth oxide stabiliser. It was argued that the now claimed subject-matter was not exclusively restricted to a porcelain consisting of zirconium oxide and stabilising rare earth oxides, but could also relate to other components such as aluminium oxide, the latter being expressly mentioned in amounts of up to 10% in the description of the patent in suit. Therefore document (8), which related to a zirconia ceramic material containing alumina, was relevant for the assessment of inventive step. This document proposed

the use of ceria as a stabiliser for the preparation of a zirconia ceramic with a particle size of the zirconia crystals of less than 2 μm and clearly taught to increase the amount of the tetragonal phase and to reduce the formation of the cubic phase by the addition of suitable amounts of stabiliser oxides. The zirconia material of document (8) comprised only minor amounts of alumina as dope additive. Accordingly, the skilled person obviously would choose ceria as a suitable rare earth oxide stabiliser in order to substitute 30 mol% yttria as proposed in document (6).

This point of view could not be changed by the fact that document (8) comprised a separate crystal phase of alumina and that the alumina component according to the patent in suit was deemed to be a sintering aid. According to a generally applicable principle in science, the use of the same composition in the preparation method resulted in the preparation of the same ceramic body. Moreover, documents (6) and (8), as well as the patent in suit, related to the same industrial use of the ceramic material, namely the use as a cutting tool and combustion engine parts.

Taking into account the fact that the worked examples according to the patent in suit did not show any special advantage of the use of ceria at the now-claimed range of 2 to 4 mol%, it was a matter of routine for a person skilled in the art to optimise the product parameters known from document (6) and thus to arrive at the zirconia porcelain according to the patent in suit without the exercise of inventive skill.

Moreover, it was to be noted that the production of ceramic bodies with a crystal size between 2 μm and 10 μm according to the patent in suit was outside the scope of the teaching of document (6). However, the worked examples of the patent in suit showed that the

production of such bodies was accompanied by certain drawbacks. Most of the said worked examples showed that the now-claimed zirconia porcelain, in particular the material with a particle size of the zirconia crystals above 2 μm , did not solve the problem underlying the patent in suit, namely to provide a material having a high strength and an excellent thermal stability without impairing properties such as a low dimensional change and durability in long-term use.

With respect to inventive step, the Appellant furthermore made reference to documents (1), (2), (3), (4), (5) and (7) and argued that each of these documents either expressly mentioned the use of ceria and yttria in zirconia materials or contained a clear hint to use a combination of ceria and yttria as a stabiliser in ceramic materials as presently claimed.

Documents (1) and (5) contained phase diagrams of the system $\text{ZrO}_2/\text{Y}_2\text{O}_3/\text{CeO}_2$. Document (1) additionally contained a photographic picture showing the microstructure of a zirconia composition with an average particle size very close to the upper limit of 10 μm according to the patent in suit. Since it was well-known to a person skilled in the art how to adjust the relationship between the tetragonal, cubic and monoclinic crystal phases of a ceramic material by using different amounts of stabilising rare earth oxides, and since documents (1) and (5) disclosed phase diagrams of comprising compositions and phase relationships which came very close to those of the patent in suit, there was strong evidence that the subject-matter of the patent in suit could be derived in an obvious manner from the teaching of the cited prior art.

In a facsimile dated 1 February 1996 the Appellant indicated that he was withdrawing his request for oral proceedings filed with his letter dated 27 May 1991 and that he would not attend oral proceedings if such were to take place.

In a letter dated 19 November 1996, the Appellant indicated that he did not intend to reply to the communication of the Board of Appeal dated 11 November 1996 in which the Board, by reference to the Respondent's argumentation in his letter of 19 June 1996, indicated that it appeared that the patent in suit could be maintained on the basis of the "sole Auxiliary Request" referred to in the letter dated 15 December 1994.

- V. The Respondent argued that all the Appellant's arguments were based on hindsight. Even working on the assumption that the contents of the crystalline phases of the sintered bodies according to the closest prior art document (6) could not be discriminated from those of the sintered bodies of the patent in suit, and further assuming that document (6) suggested that up to 30 mol% of yttria could be replaced by ceria as the rare earth oxide, this did not lead the expert to use ceria and yttria in the specific amounts of claim 1 and still less did it predict the particular benefits obtained up to a grain size of 10 μm .

Although example 6 came close to the material of document (6), none of these examples could be regarded as forming part of the prior art. Moreover, it was clear from a comparison of Figure 4 of the patent in suit with Figure 1 of document (6) that the addition of ceria decreases the influence of the particle size on the thermal stability. Said Figure 4 provided evidence that the benefit of the present invention was obtained up to a grain size of the zirconia crystals of 10 μm .

Document (8) concerned a zirconia ceramic containing a separate crystalline alumina phase, whereas, according to the patent in suit, alumina was only used as a component in a glassy phase of a sintering aid which promotes densification during sintering. Furthermore, it was to be noted that document (8) did not propose the use of the specific combination of yttria and ceria.

Other cited documents suggested the use of ceria, but none of them contained technical information on how to obtain the results which could be achieved by the addition of ceria within the claimed range.

In a letter dated 19 March 1997, the Respondent withdrew his previous main request and indicated that he did not request oral proceedings if the patent was maintained "on the basis of the sole remaining Request (attached)..." (this request was identical to the previous sole auxiliary request of 15 December 1994). Claim 1 according to this request reads as follows:

"1. A zirconia porcelain containing yttrium oxide and cerium oxide, characterized in that the amount of yttrium oxide is 2-3 mol% and the amount of cerium oxide is 2-4 mol%, and that the average particle size of the zirconia crystals is not larger than 10 μm , and wherein the sum of the content of tetragonal zirconium oxide and the content of cubic zirconium oxide is not less than 3 times in terms of volume fraction the content of monoclinic zirconium oxide, **and the content of cubic zirconium oxide is less than the sum of the content of tetragonal zirconium oxide and the content of monoclinic zirconium oxide in terms of the volume fraction.**" (Emphasis added.)

- VI. The Appellant requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of the set of claims 1 to 5 according to the sole remaining request filed with letter dated 19 March 1997.

Reasons for the Decision

1. The appeal is admissible.
2. The Board notes that during the appeal proceedings all the documents quoted under point II above were discussed by each of the parties. Accordingly, the Board considers each of them to have been introduced into the proceedings.
3. Claim 1, relating to a zirconia porcelain, is a combination of claims 1, 2, 3, 5 and 6 as originally filed, corresponding to claims 1, 2, 3, 5 and 6 as granted. Dependent claim 2 corresponds to claim 4 both as granted and as originally filed. Claim 3, relating to a method of producing a zirconia porcelain, is based on claim 7 both as granted and as originally filed and contains each of the features of the zirconia porcelain according to present claim 1. Dependent Claims 4 and 5 correspond to claims 9 and 10 both as granted and as originally filed. The scope of the new claims is narrower than that of the claims as granted, and the Board considers that the requirements of Articles 123(2) and (3) EPC are satisfied.

4. In the grounds of opposition the Appellant made reference to the content of the monoclinic phase of the zirconia porcelain according to claims 5 and 6 as granted and argued that document (1) would disclose a diagram of the zirconium oxide, yttrium oxide and cerium oxide system which diagram did not allow the presence of a monoclinic phase having regard to the stabiliser composition claimed in the patent in suit and therefore, in the light of the teaching of said claims 5 and 6, the skilled person could not carry out the invention.

This objection under Article 83 EPC was not further substantiated.

It is established Board of Appeal case law that the question of sufficient disclosure is not to be judged merely on the basis of the claims (see e.g. T 14/83, OJ EPO 1984, 105). There cannot be any doubt that the examples of the patent in suit show how a zirconia porcelain as defined in claim 1 (now comprising the features of claims 5 and 6 as granted) can be obtained. Thus, the requirements of Article 83 EPC are also met.

5. The patent in suit relates to a porcelain material containing tetragonal, cubic and monoclinic zirconium oxide having, according to the description, a high strength, excellent thermal stability, suffering little or not at all from deterioration phenomena such as shape change, reduction in strength and the like even in long-term use and exhibiting excellent durability (see page 2, lines 23 to 25). The Board agrees with the Opposition Division's view that for such a zirconia porcelain in a so-called "non-equilibrium state" document (6) represents the closest prior art. This was not disputed by the parties at the appeal stage.

5.1 Document (6) discloses a zirconia ceramic comprising ZrO_2 and Y_2O_3 in a molar ratio of Y_2O_3/ZrO_2 of 2/98-7/93 and consisting of crystal grains having a mixed phase comprising a tetragonal phase and a cubic phase or having a phase comprising a tetragonal phase, the average size of the crystal grains being not larger than $2 \mu m$ (see page 3, lines 16 to 24). According to page 8, lines 10 to 25, the said mixed crystal phase of the ceramic material may consist only of a tetragonal phase and a cubic phase or may comprise a tetragonal phase, a cubic phase and not more than about 20% by volume of monoclinic phase based on the total crystal phase. The zirconia ceramic may also comprise the tetragonal phase and at least one of a monoclinic phase and a cubic phase in an amount of not more than 20% by volume of the content of the said at least one of monoclinic phase and cubic phase (see page 8, line 25 up to page 9, line 3).

Yttria is mainly used as a stabiliser for zirconia. Not more than about 30 mol% of the yttria may be replaced by oxides of rare earth elements such as Yb_2O_3 , Sc_2O_3 , Nb_2O_3 , and Sm_2O_3 , or by CaO or MgO. The zirconia ceramics of document (6) may also contain not more than 30% by weight, based on the total amount of the ceramics, of sintering aids such as SiO_2 , Al_2O_3 , and clay (see page 9, lines 4 to 13). In the method of producing the zirconia ceramics, the mixture of the suitable starting material is converted into a moulded article and is fired in air at a temperature within a range of $1000 \text{ }^\circ C$ - $1550 \text{ }^\circ C$. It is indicated that the zirconium oxide to be molded into the article has to be zirconium oxide having a crystallite size of not larger than 1000 Angstrom in order to stably maintain the crystal phase of the resulting zirconia ceramic to be the mixed phase comprising the tetragonal phase (see pages 10, lines 21 to 34 and page 12, lines 6 to 10).

It is furthermore indicated on page 6, lines 7 to 15, with reference to curve B of Figure 1, of document (6) that after a durability test during which the ceramic is maintained for 1500 hours within a specifically limited temperature range of 200°C to 300 °C , when the average crystal grain size in the final ceramic material becomes larger than 2 µm, the strength of the ceramic is noticeably decreased due to the formation of excess monoclinic phase.

Said Figure 1 shows a steep decline of said curve B for a zirconia ceramic material produced with an average crystal grain size larger than 2 µm.

As regards the formation of the monoclinic phase, it is then explained on page 6, lines 25 to 35, that the transformation from a tetragonal phase to a monoclinic phase hardly occurs in the case where the crystal grain size is small and that, when crystal grains have a very fine size, the tetragonal phase is more stable than the monoclinic phase owing to the surface free energy of the grains.

Subsequently, it is stated that the tetragonal phase greatly contributes to the good mechanical properties of zirconia ceramics.

- 5.2 The Board notes that the patent in suit does not comprise any worked example showing in a **direct comparison** an overall improvement of mechanical properties of the zirconia porcelain according to claim 1 over that known from the closest prior art according to document (6), namely **when the average particle size of the zirconia crystals is below 2 µm.**

Accordingly, in relation to document (6), the problem to be solved can only be seen in providing a zirconia porcelain keeping a high amount of the tetragonal phase under broader production conditions.

- 5.3 The solution lies in a composition with the technical features of claim 1, comprising 2 to 3 mol% of yttrium oxide stabiliser and 2 to 4 mol% of cerium oxide as rare earth element stabiliser component.

Having regard to Figure 4 of the patent in suit showing that from about 0 up to a particle size of 10 μm the flexural strength and the dimensional change of the material is not sharply dependent on the crystal grain size, the Board finds that it is credibly demonstrated that cerium oxide within the claimed range relatively decreases the influence of the particle size of zirconia crystals on the mechanical properties of the porcelain material and thus optimises the composition known from document (6) such that a porcelain material under broader production conditions may be produced by maintaining a tetragonal phase.

The Appellant did not file any counterevidence that the materials having a crystal size within the claimed range either do not contain the required tetragonal phase or show such drawbacks that the occurrence of less good mechanical properties outweighs the advantage of the possibility of having broader production conditions.

The Board notes that the Appellant did not reply to the Respondent's submission dated 19 June 1996, including explanations regarding the outcome of said Figure 4 of the patent in suit and Figure 1 according to document (6).

The provision of the possibility of broader production conditions of a zirconia porcelain attainable by the composition of the patent in suit was already discussed before the Opposition Division (see minutes of oral proceedings held on 26 September 1990, point 3).

Accordingly, the Board sees no reason to doubt that the problem has indeed been solved.

5. After examination of the cited prior art, the Board has reached the conclusion that the zirconia porcelain of claim 1 is not disclosed therein and that the claimed subject matter is therefore novel.
6. The remaining issue in this case is inventive step.
 - 6.1 Document (6) itself does not mention the use of ceria as an oxide of a rare earth element suitable to replace certain amounts of the yttria component as a stabiliser. This document is wholly silent about any reasons for substituting certain amounts of the yttria stabilizer and comprises no other teaching than to control the fine structure of the final ceramic material so as to obtain small crystal grain sizes well below 2 μm and this prior art therefore teaches only to ensure under restricted production conditions that the critical limit for crystal size in the final product of 2 μm is not exceeded.
 - 6.1.1 However, if confronted with the problem as stated above, the skilled person inevitably would turn to other prior art relating to zirconia porcelain material comprising a tetragonal crystal phase and first of all take into account documents particularly containing technical information with respect to a stabilisation or a retention of the tetragonal phase.

6.1.2 Document (8) describes such a ceramic material in the form of a two-phase ceramic composite, one of the phases is ZrO_2 with a rare earth oxide such as Y_2O_3 , CeO_2 , La_2O_3 and/or Er_2O_3 dissolved therein to maintain at least some of the phase in the tetragonal structure, the second phase being aluminium oxide. In a first preferred embodiment the rare earth oxide is Y_2O_3 in the range of 0.5 to 5.5 mole% of Y_2O_3 to Y_2O_3 plus ZrO_2 . In a second preferred embodiment the rare earth oxide is CeO_2 in the range of 0.5 to 10 mole% of CeO_2 to CeO_2 plus ZrO_2 (see column 2, lines 16 to 40). As regards the size of the zirconia crystals, document (8) contains a reference to theoretical calculations showing that a critical size exists, below which a particle of tetragonal zirconium oxide can be constrained in its transformation by an elastic matrix. It is then concluded that if yttrium oxide is held in solution in the zirconium oxide, it increases the critical grain size below which tetragonal zirconium oxide can be retained in an Al_2O_3/ZrO_2 matrix and that consequently the tetragonal zirconium oxide can be obtained in Al_2O_3/ZrO_2 composites with grain sizes up to about 2 μm (see column 5, lines 22 to 50). It is furthermore concluded in column 6, lines 30 to 58, with reference to phase diagrams compiled by the "National Bureau of Standards" that the addition of CeO_2 , La_2O_3 or Er_2O_3 to an Al_2O_3/ZrO_2 composite would also favour the retention of tetragonal zirconium oxide **in a manner analogous to the yttrium oxide addition** and that mixtures of Y_2O_3 , CeO_2 , La_2O_3 and Er_2O_3 could be added in various portions within the above ranges to promote the tetragonal zirconium oxide.

Even if the Board were to accept the Appellant's argument that a person skilled in the art would not distinguish between the use of an aluminium oxide component as a sintering aid in a glassy phase

according to the patent in suit and the use of aluminium oxide in a crystalline phase forming a separate phase of a composite material according to document (8), the Board is unable to see on which basis the skilled person, faced with the problem defined above, in a first step would select the specific combination of Y_2O_3 / CeO_2 and then, in a second step, would modify the parameters known from document (6) outside the critical grain size taught therein.

6.1.3 Document (4) represents a review article relating in general to oxide ceramics. The Board agrees with the Appellant that in sub-section 3.3.2 document (4) describes zirconium ceramic materials comprising a mixture of cubic, monoclinic and tetragonal zirconium oxide phases partially stabilised with rare-earth element components such as yttrium oxide and having an excellent thermal stability. However, in the absence of any data relating to production conditions of the material with respect to the grain size of the crystallites and without any hint that a specific combination of stabilisers should be used, document (4), even in combination with documents (8) and (6), could not lead a person skilled in the art to the claimed solution.

6.2 None of the other cited prior art documents is concerned with the stabilisation or retention of a tetragonal zirconium oxide material and thus provide any incentive at all to broaden the production conditions of a zirconia porcelain obligatorily comprising such a metastable phase.

6.2.1 The Appellant is right in arguing that documents (1), (2), (3) and (5) as well as document (7) make express reference to phase diagrams of the ZrO_2/Y_2O_3 / CeO_2 system and that in particular document (1) (page 1317, Figure 2) and document (5) (page 732, Figure 2)

disclose ternary compositions lying slightly outside or even on the cubic phase boundary line and that document (5) expressly mentions a mixed crystal phase region of the phase diagram possibly comprising monoclinic, cubic and tetragonal zirconium oxide structures (page 733, first to third full paragraph).

However, apart from the fact that

- (i) document (1) only discloses a material with a particle size around 10 μm containing 7 mol% cerium oxide and 7 mol% yttrium oxide (page 1318, Figure 4 c and page 1319, right column, last paragraph), a composition far removed from the porcelain according to claim 1, and that
- (ii) document (2) only expressly describes a composition with 6 mol% yttrium oxide and 2 mol% cerium oxide and mentions neither a crystal size nor a tetragonal phase, and that
- (iii) document (3) does not mention the tetragonal phase and describes a material with 12 mol% cerium oxide and 3 mol% yttrium oxide with a crystal size well below 1 μm not showing a tetragonal phase (page 1218, second paragraph, composition "I" and page 1219, seventh and last paragraph) a composition also far removed from the porcelain according to claim 1, and that
- (iv) document (5) only mentions lattice parameters and is totally silent as to a particle size of the zirconium oxide crystals, and that
- (v) document (7), cited by the Respondent, describes kinetics of a material with 5 mol% yttrium oxide and 7 mol% cerium oxide, also far removed from the porcelain according to claim 1,

there is not the slightest hint in any of these documents as to a selection of compositions in regions of the ternary $ZrO_2/Y_2O_3/CeO_2$ system outside the cubic region in order to achieve any technical effect correlative with the problem underlying the patent in suit.

Under these circumstances the Board can only conclude that the Appellant has by way of hindsight with knowledge of the invention, chosen compositions in ternary phase diagrams known from the prior art, but has not provided evidence as to why a person skilled in the art faced with the problem underlying the patent in suit would have done so.

7. It is accordingly the Boards view that the subject-matter of product claim 1 and dependent claim 2, as well as claim 3 relating to a method of producing a zirconia porcelain comprising each of the product features of claim 1 and dependent claims 4 and 5, would not have been obvious from either citation taken singly or in combination. Thus, the required inventive step is not lacking and the said claims satisfy the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

1. The appeal is dismissed.
2. The decision under appeal is set aside.
3. The case is remitted to the first instance with the order to maintain the patent on the basis of claims 1 to 5 filed with the letter of 19 March 1997 and a description to be adapted.

The Registrar:

The Chairman:

E. Görgmaier

P. A. M. Lançon