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Datasheet for the decision of 12 March 2015

Case Number: T 0102/12 - 3.3.07

Application Number: 05014234.8

Publication Number: 1586294

IPC: A61K6/083

Language of the proceedings: EN

Title of invention:
Nano-sized silica particles in a dry powder form

Patent Proprietor:
3M Innovative Properties Company

Opponent:
Evonik Nanoresins GmbH

Headword:
Nano-sized silica particles in a dry powder form/3M Innovative Properties Company

Relevant legal provisions:
RPBA Art. 12(4)
EPC Art. 123(2), 54, 56
EPC R. 80

Keyword:
Main request - admission into the proceedings (no)
Auxiliary request 1 - added subject-matter (yes)
Auxiliary request 2 -
amendments occasioned by a ground of opposition (yes)
Auxiliary request 2 - novelty (yes)
Auxiliary request 2 - inventive step (yes)

Decisions cited:
G 0002/10

Catchword:

Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 0102/12 - 3.3.07

D E C I S I O N
of Technical Board of Appeal 3.3.07
of 12 March 2015

Appellant: (Patent Proprietor)	3M Innovative Properties Company 3M Center P.O.Box 33427 St. Paul, MN 55133-3427 (US)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB Siebertstrasse 3 81675 München (DE)
Appellant: (Opponent)	Evonik Nanoresins GmbH Charlottenburger Strasse 9 21502 Geesthacht (DE)
Representative:	von Renesse, Dorothea König-Szynka-Tilmann-von Renesse Patentanwälte Partnerschaft mbB Postfach 11 09 46 40509 Düsseldorf (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 9 November 2011 concerning maintenance of the European Patent No. 1586294 in amended form.**

Composition of the Board:

Chairman	J. Riolo
Members:	D. Boulois
	P. Schmitz

Summary of Facts and Submissions

I. European patent No. 1 586 294 B1 based on application No. 05 014 234.8 was granted on the basis of a set of 25 claims.

Independent claim 1 as granted read as follows:
"1. Silica particles in a dry powder form wherein said silica particles have been treated with a silane surface treatment agent capable of polymerizing with a resin, are capable of being in a non-aggregated and non-agglomerated condition once they have been dispersed in a hardenable resin and have an average diameter of less than about 200nm, wherein the silica particles are not fumed and wherein the silica particles are obtainable by a method comprising the steps of:
(i) providing surface modified silica particles by mixing an inorganic sol with a silane surface treatment agent capable of polymerizing with a resin; and
(ii) drying the mixture of said inorganic sol and said silane surface treatment agent."

II. The patent was opposed under Article 100(a), (b) and (c) EPC, on the grounds that its subject-matter lacked novelty and inventive step, the patent was not sufficiently disclosed and its subject-matter extended beyond the content of the application as filed.

III. The documents cited during the opposition and appeal proceedings included the following:
(1): EP 0 982 268 A1
(2): US 2 801 185
(3): Ullmann's Encyclopedia of Industrial Chemistry, p. 49-50, Vol. A24, 5th Edition (1993)

(4): Ullmann's Encyclopedia of Industrial Chemistry, p. 639-640, Vol. A24, 5th Edition (1993)
(6): US 5 936 006
(7): EP 0 530 926 A1
(10): Technical report concerning TEM recording (by Opponent)
(11): Technical report concerning rheological investigations (by Opponent)
(12): Technical report by Patentee
(13): Craig, "Restorative Dental Materials", Chapter 10

IV. The appeal lies from the decision of the opposition division to maintain the patent in an amended form (Article 101(3)(a) EPC). The decision was based on 2 sets of claims filed with letter of 3 January 2011 as main request and auxiliary request 1 filed during oral proceedings held on 6 October 2011.

The subject-matter of independent claim 1 of the main request and of auxiliary request 1 differed from the one of claim 1 as granted by the specification of the resin as follows, the difference(s) compared with claim 1 as granted shown in bold:

a) Main request

"1. Silica particles in a dry powder form wherein said silica particles have been treated with a silane surface treatment agent capable of polymerizing with a resin, **wherein the silane surface treatment has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization and wherein the silica particles** are capable of being in a non-aggregated and non-agglomerated condition once they have been dispersed in a hardenable resin and have an average diameter of less

than about 200nm, wherein the silica particles are not fumed and wherein the silica particles are obtainable by a method comprising the steps of:
(i) providing surface modified silica particles by mixing an inorganic sol with **said** silane surface treatment agent capable of polymerizing with a resin; and
(ii) drying the mixture of said inorganic sol and said silane surface treatment agent."

b) Auxiliary request 1

"1. Silica particles in a dry powder form wherein said silica particles have been treated with a silane surface treatment agent capable of polymerizing with a resin, **wherein the silane surface treatment is γ-methacryloxylpropyltrimethoxysilane or γ-glycidoxypropyltrimethoxysilane and wherein the silica particles** are capable of being in a non-aggregated and non-agglomerated condition once they have been dispersed in a hardenable resin and have an average diameter of less than about 200nm, wherein the silica particles are not fumed and wherein the silica particles are obtainable by a method comprising the steps of:
(i) providing surface modified silica particles by mixing an inorganic sol with **said** silane surface treatment agent capable of polymerizing with a resin; and
(ii) drying the mixture of said inorganic sol and said silane surface treatment agent."

V. According to the decision under appeal, the subject-matter of claim 1 of the main request did not meet the requirements of Article 100(c) and 76(1) EPC, because the selection of the silane surface treatment agents,

namely through the term "*wherein the silane surface treatment agent has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization*", was not disclosed in the parent application as filed.
According to the opposition division, the disclaimer "*wherein the silica particles are not fumed silica*" in claim 1 of the main request was allowable under the criteria set out by decision G 02/10.

As regards the subject-matter of auxiliary request 1, none of the cited document was novelty-destroying:

- Documents (1) and (2) did not disclose the use of a silane surface treatment agent selected from ɣ-methacryloxylpropyltrimethoxysilane or ɣ-glycidoxypropyltrimethoxysilane.
- Document (7) did not disclose silica particles in dry form surface treated with ɣ- methacryloxypropyl trimmethoxysilane and having an average diameter of less than 200 nm.

As regards inventive step of auxiliary request 1 document (6) was the closest prior art.
The subject-matter of claim 1 of auxiliary request 1 differed from the closest prior art in that the surface-modified silica particles are present in dry powder form, whereas in document (6) they were in sol-form. Document (12) demonstrated that the production of a dental material starting with surface modified silica particles in powder form is faster than starting from surface modified particles in a sol, because no extra solvent removal step is required. In document (12), it was tried to remove water/solvent for 3 hours, after which still some solvent was left.

The problem to be solved was regarded as the provision of surface modified silica particles which allowed a faster production of dental materials.
There was no incentive to replace the sol process in document (6) by a process yielding powdered surface treated silica particles.
The subject-matter of claim 1 of auxiliary request 1 was not obvious in view of the teaching of document (6).

VI. The patentee (appellant-proprietor) and the opponent (appellant-opponent) filed an appeal against the decision of the opposition division.

VII. With a letter dated 19 March 2012, the appellant-proprietor filed a main request and auxiliary requests 1-5.

VIII. With a letter dated 12 February 2015, the appellant-proprietor filed a main request and auxiliary requests 1 and 2, and a new document:
(14): Technical Report.

The subject-matter of claims 1-25 of the main request was identical to the granted claims, with an exception on a clerical correction.
The subject-matter of claims 1-25 of auxiliary request 1 was identical to the claims of the main request which was discussed before the opposition division.
The subject-matter of claims 1-25 of auxiliary request 2 was identical to the claims of auxiliary request 1 maintained by the opposition division.

IX. A Board's communication dated 12 February 2015 was sent to the parties. It stated in particular that the main request did not appear to be admissible into the appeal

proceedings (Article 12(4) RPBA). Moreover, the subject-matter of claim 1 of auxiliary request 1 appeared to extend over the content of the earlier application.

X. With a letter dated 5 March 2015, the appellant-opponent informed the Board and the other party that it would not take part in the oral proceedings.

XI. Oral proceedings took place on 12 March 2015, in presence of the appellant-proprietor.

XII. The arguments of the appellant-opponent in its written submissions may be summarized as follows:
The appellant-opponent considered that the main request and auxiliary requests 3-5 should not be admitted into the proceedings.
As regards the main request, this request corresponded to the claims as granted. This set of claims had never been discussed or defended by the patentee in the opposition proceedings, since it filed another main request.
The reason not to admit this request were the following:
- The patentee was not adversely affected with regard to this new main request, since it had never been discussed.
- The admission of this request would adversely affect the opponent for the same reason.
- The new main request had been filed late and should not be accepted under Article 12(4) RPBA.
- The main request did not meet the requirements of Rule 80 EPC, in view of a change made in dependent claim 14.

As regards auxiliary request 1, the subject-matter of claim 1 did not meet the requirements of Article 123(2) EPC. The feature "*wherein the silane surface treatment has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization and wherein the silica particles*" was disclosed in the original description of the application WO 01/30307 on page 8 lines 18 and following. The cited passage refers however to a combination, which is absent from the claim.
The introduction of the disclaimer "*wherein the silica particles are not fumed silica*" also did not find a basis in the original application and infringes Article 123(2) EPC.

As regards auxiliary request 2, this request should not be admitted in view of Rule 80 EPC, and an amendment made in dependent claim 14. Moreover, document (7) was relevant for novelty. This document disclosed particles of silica in the form of a powder, treated with γ-methacryloxylpropyltrimethoxy silane (see page 6, lines 8-11). The silica particles of document (7) might have a diameter of less than 200 nm, as shown in Table IV, wherein a particle size of between 80 and 180 nm was disclosed.
Document (1) was also relevant for novelty. This document disclosed a process for making non-aggregated colloidal silica particles, having a diameter of from 4 to 150 nm. The particles were further coated with vinyl derivates (see par. [0014].
Document (2) was also relevant for novelty, since this document disclosed silica particles coated with hydrophobic substances.

As regards inventive step, document (6) was considered to be the closest prior art and disclosed a sol of non-

agglomerated silica particles having a size comprised between 10 and 100 nm.
The subject-matter of claim 1 differed in that the surface modified silica particles were in dry form and not in a sol form.
The advantage of the powder was that more dental material could be used as filling material. The objective problem was thus to provide silica particles which enabled the use of a greater amount as filling material. The dental material had therewith good mechanical properties and was strong and translucent.
The solution was obvious in view of the disclosure of documents (7) or (13).
Document (7) taught the use of powders as dental material and mentioned the improvement of mechanical properties of said powders.
Document (13) was a common general knowledge document which mentioned the possibility of making dental material in sol or powder form. In Chapter 10 of this document, it was disclosed that the size of the dispersed inorganic phase of silica particles could be used, especially with a size of 40 to 200 nm.
The claimed subject did not involve an inventive step for these reasons.

XIII. The arguments of the appellant-proprietor may be summarized as follows:
The main request filed in appeal proceedings had to be admitted into the proceedings.
In the present case, the patentee had filed amended claims as a main request in the opposition proceedings in response to the notice of opposition. In the preliminary opinion of the opposition division, the opposition division stated explicitly that the main request met the requirements of Article 123(2) EPC.

An objection under Article 123(2) and 76(1) EPC was raised against the main request for the first time at a very late stage of the proceedings, after the issue of the preliminary opinion and summons of the opposition division. The patentee was then taken by surprise by the decision of the opposition division at the oral proceedings, which considered the main request to contravene Article 123(2) EPC and Article 76(1) EPC because the selection of the silane surface treatment was considered not to be disclosed in the parent application and the divisional application.
This specific feature was then removed from the claim, so that the pending main request during oral proceedings was a bona fide attempt to overcome the objection raised.

The main request pending in present appeal proceedings was filed at the first opportunity after the patentee had become aware of the issue. Because the claims of the pending main request were identical to the claims as granted, the opponent had already commented on it, so that no new issues were raised. In any case, the main request was filed with the substantiation of appeal, so that the opponent had three years to consider it.

It was also well established by the jurisprudence, such as decisions T840/93 or T933/04 that the patentee could revert to the claims as granted even if a more restricted main request was filed in the first instance proceedings.

As regards the amendments made in claim 1 of auxiliary request 1, the feature according to which the silica particles are not fumed silica is clearly supported by the application as filed.

Moreover, the feature "*wherein the silane surface treatment has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization and wherein the silica particles*" in claim 1 found a basis on page 8, lines 10 to 29.

As regards novelty, documents (7), (1) or (2) could not be seen as relevant for any request.
Document (7) did not disclose a method in which a silane surface treatment agent was mixed with the inorganic sol to provide the surface treatment. The instant particle in document (7) had a different structure than those obtained by the process of the present invention.
Document (1) did not teach that a dry powder form was obtained, and thus was not relevant.
Document (2) did not disclose a silane surface treatment capable of polymerizing with a resin.

As regards inventive step, the technical reports (11) and (14) showed that a dental composition which used the silica particles in dry powder form, instead of the sol form of document (6), had significant improved rheological properties compared to a dental composition prepared using a sol. For this reason, inventive step should be accepted.

XIV. Requests

The appellant (patent proprietor) had requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request or auxiliary requests 1 or 2 filed with letter dated 12

February 2015 or auxiliary requests 3-5 filed with letter dated 14 May 2012.

The appellant (opponent) had requested that the decision under appeal be set aside and that the patent be revoked. It also requested that the main request and auxiliary requests 3-5 not be admitted into the proceedings and the case be remitted to the first instance if the main request or auxiliary requests 3-5 were admitted into the proceedings.

Reasons for the Decision

1. Admission of the main request into the proceedings

1.1 Claims 1-25 of the main request correspond to the claims as granted with a minor clerical correction in dependent claim 14.

The claims as granted were objected to during the opposition proceedings in the notice of opposition under lack of novelty. In reaction to these objections, the proprietor filed a modified main request with letter dated 3 January 2011. The subject-matter of claim 1 of the modified main request was more restricted than the subject-matter of claim 1 as granted, namely by the specification of the silane surface treatment agent. This modified main request was objected to by the opponent under Article 123(2) EPC with letter dated 2 September 2011, however after the issue of the preliminary opinion of the opposition division which was positive on this point, and was further discussed during the opposition proceedings held on 6 October 2011. During the oral proceedings before the opposition division, the opposition division reversed its preliminary opinion as regards the

allowability of the amendments made to the main request under Article 123(2) EPC. The proprietor reacted by filing during the oral proceedings a new main request with a restriction to specific silane surface treating agents.

1.2 The claims as granted have thus never been discussed during the opposition proceedings. Under Article 12(4) RPBA, the Board has a discretion not to admit a request into the appeal proceedings if it could have been presented in the first instance proceedings.

In the present case, the main request corresponds to a request which was withdrawn during the opposition proceedings. Hence, it was a deliberate choice of the proprietor not to defend the claims as granted and to file in response to the notice of opposition a new main request.
Moreover, the proprietor would have had the opportunity to file a new request, and thus to return to the claims as granted by deleting the feature which was found not to meet the requirements of Article 123(2) EPC. This opportunity was not taken, and the proprietor decided instead to file a more restricted auxiliary request.
Finally, the claims as granted have not been discussed during the opposition proceedings, and a discussion thereon, especially on the novelty of their subject-matter, would constitute a substantial new case. As a matter of fact, if it admitted the request, the Board would have to decide on this request for the first time, which is not in line with its role as a reviewing body, or to remit the case, which would considerably delay the proceedings and increase the costs incurred by the adverse party. The admission of the main request that has only been filed during the appeal proceedings

appears thus to contravene the principle of procedural economy.

1.3 As to the arguments of the appellant-proprietor regarding the fact that it was taken by surprise during the oral proceedings before the opposition regarding the allowability of the modified main request under Article 123(2) EPC, it could not be followed by the Board.
When a set of amended claims is filed, examination of these claims for compliance with Article 123(2) EPC, as well as for other formal issues such as compliance with Articles 123(3) and 84 EPC, is generally required and to be expected. The appellant should therefore have anticipated a possible objection under Article 123(2) EPC by the appellant-opponent, even if the preliminary opinion of the opposition division was positive on this point and even if this objection had been raised by a letter written after the issue of the preliminary opinion of the opposition division. The appellant-proprietor cannot reasonably claim to have been taken by surprise by such a development during the oral proceedings before the opposition division.

As to the preliminary opinion of the opposition division, this opinion could quite clearly only be provisional and not binding.

1.4 The Board exerts its discretionary power and does not admit the main request into the proceedings (Article 12(4) RPBA).

2. Auxiliary request 1

This request corresponds to the main request filed during the opposition proceedings.

2.1 Article 123(2) EPC

The subject-matter of claim 1 has been objected to by the appellant-opponent on the basis of the feature "*wherein the silane surface treatment agent has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization*" and the disclaimer "*wherein the silica particles are not fumed silica*".

2.1.1 As to the feature "*wherein the silica particles are not fumed silica*", it does not find a literal basis in the earlier application, but it is implicitly, directly and unambiguously disclosed in the application as originally filed.

It is indeed possible to deduct from paragraph [0006] of the original application EP 1 586 294 A1, that the use of fumed silica is not preferred. This paragraph mentions explicitly that the conventionally used silica particles are often in the form of fumed silica, and that such "*conventional materials ... result in undesirably dilatant materials*".

Paragraph [0035] of the original application EP 1 586 294 A1 discloses furthermore that "*optionally, fumed silica can be included in the materials of the invention in addition to the nano-sized silica particles described above*", meaning explicitly that fumed silica is only an optional compound of the composition and are not part of the composition. This preference towards non-fumed silica is emphasized by the subject of example 1 which appears to compare a dental material made from fumed silica to another one made from (non-fumed) nano-sized silica particles, to

illustrate the better shear thinning behavior linked with the use of (non-fumed) nano-sized silica particles. Said nano-sized silica particles are further present in all examples of the description.

It is thus possible to implicitly derive from the original application that fumed silica was excluded from the nano-sized silica of the invention, and consequently also that the subject-matter remaining in the claim after the introduction of the disclaimer was implicitly, directly and unambiguously disclosed to the skilled person using common general knowledge, in the application as filed (cf. G 02/10).

2.1.2 As to the feature "*wherein the silane surface treatment agent has a polymerizing group selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization*", it originates from the description on paragraph [0038] of the original application EP 1 586 294 A1.
Said paragraph [0038] follows the listing of the preferred silane treatment agents disclosed in paragraph [0037] and refers specifically to an alternative surface treatment of the silica particles in the terms that "*alternatively a combination of surface modifying agents can be useful, wherein at least one of the agents has a functional group co-polymerizable with a hardenable resin*".
The mentioned paragraph discloses further that "*for example, the polymerizing group can be ethylenically unsaturated or a cyclic function subject to ring opening polymerization. An ethylenically unsaturated polymerizing group can be, for example, an acrylate or methacrylate, or vinyl group*".
The choice of a surface modifying agent "*wherein the silane surface treatment agent has a polymerizing group*

selected from a (meth)acrylate group and a cyclic functional group subject to ring opening polymerization" is therefore disclosed uniquely within the frame of a combination of surface modifying agents and this isolated feature is not derivable explicitly or implicitly, directly and unambiguously from the application as filed.

2.1.3 The subject-matter of claim 1 of the auxiliary request 1 extends therefore over the content of the earlier application and this request does not meet the requirements of Article 123(2) EPC.

3. Auxiliary request 2

This request corresponds to auxiliary request 1 as maintained by the opposition division.

3.1 Rule 80 EPC

The unique amendment made to the claims of this request in comparison to the granted claims is the specification in claim 1 of the type of silane surface treatment agent, namely "*wherein the silane surface treatment is γ-methacryloxylpropyltrimethoxysilane or γ-glycidoxypropyltrimethoxysilane*".
Since this amendment attempts to respond to the objections raised by the appellant-opponent in particular under Article 123(2) EPC, the requirements of Rule 80 EPC are met.

3.2 Novelty

Documents (1), (2) and (7) have been cited by the appellant-opponent as regards novelty.

3.2.1 Document (1) discloses a method for making hydrophobic non-aggregated colloidal silica by reaction with an organosiloxane (see par. [0008] and [0018]).
Document (2) relates to a powder of silica particles coated, in particular by a layer of a compound having trimethylsilyl groups.
Hence, neither document (1) nor document (2) show a treatment of silica particles with the particular silanes claimed in claim 1 of auxiliary request 2, namely γ-methacryloxylpropyl trimethoxysilane or γ-glycidoxypropyl trimethoxysilane.

3.2.2 Document (7) relates to a dental filling composition with as essential component an inorganic filler, which comprises:
(A) 20 to 80 % by weight of spherical inorganic oxide particles with an average particle size of from 1.0 to 5.0 µm, and
(B) 80 to 20 % by weight of spherical inorganic oxide particles which has a particle size range of at least 0.05 µm and less than 1.0 µm and at least 5 % by weight of which has a particle size range of from 0.05 to 0.2 µm (see page 3, lines 6-15; page 5, lines 5-21).
When the inorganic filler is silica, the preferred surface-treating agents include organic silicon compound surface-treating agents, such as γ-methacryloxypropyl trimethoxysilane (see page 6, lines 5-11). .
Examples 1-7 of document (7) show compositions of silica particles comprising particles (A) with an average size comprised between 1.4 and 3.5 µm and particles (B) with a size range between 0.05 and 0.5 µm. Said particles (B) may comprise up to 67% of particles of size 0.05 to 0.2 µm and may constitute at the most 54% of the weight ratio between particles (A) and (B) (see Table II, example 5). However none of the

examples specify the average size of the total silica particles (A) and (B) together and, in view of the weight ratios between particles (A) and (B) in the examples, the skilled person would expect that the particles disclosed in the examples cannot show an average particle size of less than 200 nm.

Document (7) thus does not disclose directly and unambiguously silane treated silica particles particles having in particular an average particle size of less than 200 nm.

3.2.3 The subject-matter of claim 1 of auxiliary request 2 is thus novel and auxiliary request 2 meets the requirements of Article 54 EPC.

3.3 Inventive step

3.3.1 The invention relates to dental materials containing nano-sized particles dispersed in a hardenable resin. These materials can be used as restoratives, adhesives, cements, orthodontic devices, mill blanks and prostheses. More specifically, the invention relates to dental materials containing discrete, nano-sized silica particles that impart high strength and high translucency to the dental materials (see par. [0001]). Dental materials containing specified amounts of nano-sized silica particles of the present invention have especially desirable handling (rheological) properties in an unhardened state and exceptionally high strength in a hardened state coupled with good aesthetic characteristics (see par. [0021]).

3.3.2 Both appellants considered document (6) as the closest state of the art.

Document (6) relates to a filled and polymerizable dental material which can be used in particular in the form of filling composites, fixing cements or adhesives and shows a lower viscosity, improved mechanical properties and a reduced polymerization shrinkage (see col. 1, lines 5-7; col. 2, l. 26-32). The dental material according to document (6) is characterized in that it contains a sol of amorphous SiO2 particles in a liquid, organic dispersion agent, the SiO2 particles being organically surface modified, having an average size of 10 to 100 nm and being non-agglomerated.
The SiO2 sol can be obtained from commercial colloidal solutions of amorphous silica in water by first modifying the surface of the SiO2 particles by reaction, e.g. with 3-(meth)acryloyloxypropyl trialkoxy silane (see col. 3, lines 8-34).
Document (6) does therefore relate to a sol composition of silica particles and not to a dry powder composition.

3.3.3 According to the appellant, the technical problem is the provision of a composition having improved shear thinning properties and thus improved rheological handling properties.

3.3.4 As a solution to this alleged problem, claim 1 of the main request proposes silica particles in a dry powder form.

3.3.5 It has to be investigated whether there is sufficient evidence supporting the alleged effect.

In order to prove the existence of a beneficial effect over the closest state of the art, the appellant-proprietor provided the technical report (14) during the appeal proceedings.

The technical report (14) compared two separate resins filled with 67 wt% of silica particles treated with γ-methacryloxylpropyl trimethoxysilane. The first filled resin is prepared by blending the resin with a paste prepared by using the silica sol method as shown in document (6). The second filled resin is prepared by blending the resin with a paste prepared using the dry powder method according to the invention. The viscosity measurement at different shear rates shows a thicker initial viscosity and a superior shear thinning with the composition prepared using the dry powder method. The dental material prepared using silica in dry powder form exhibits indeed a higher viscosity when subjected to low stress and a lower viscosity when subjected to high stress, so that when sheared it will be "runnier" than the dental material prepared using the silica sol.

This particular rheological properties offer improved handling properties to practitioners, translating to time savings. The low viscosity under high stress allows a practitioner to feather the material over a tooth surface and carve the dental material. When shear is no longer applied, the viscosity increases more significantly in the dental material using the silica in dry powder form, and this high viscosity allows the material to maintain its shape after manipulation, without any slumping (see par. [0033]-[0037]).

Document (14) provides thus sufficient evidence to support the alleged advantages to which the appellant-proprietor refers.
The Board is thus convinced that the claimed composition presents an improvement in the rheological properties over the closest prior-art compositions, so that the problem is credibly solved.

3.3.6 It remains to determine whether the solution was obvious to the person skilled in the art.

Documents (7) and (13) were mentioned by the appellant-opponent to show that silica particles in dry powder form were known and that the solution was obvious.

Document (7) discloses dental filling composition comprising a polymerizable monomer and an inorganic filler, which upon curing, has excellent surface gloss, smoothness, mechanical strength and transparency (see page 2, lines 3-6). The teaching of document (7) directs to the use of silica particles coated with γ-methacryloxypropyl trimethoxysilane (see page 6, lines 5-11) and comprising:
(A) 20 to 80 % by weight of spherical silica particles with an average particle size of from 1.0 to 5.0 µm, and
(B) 80 to 20 % by weight of spherical silica particles which has a particle size range of at least 0.05 µm and less than 1.0 µm and at least 5 % by weight of which has a particle size range of from 0.05 to 0.2 µm (see page 3, lines 6-15; page 5, lines 5-21).
Document (7) therefore not only lacks to teach to use silane treated silica particles size having the claimed average particle size of less than 200 nm, but also lacks to teach the use of such silica particles in dry powder form to improve the rheological properties of the obtained dental material.

Document (13) is a general text book describing restorative materials, which discusses that various fillers, including silica particles, having various particle sizes, ranging from the macro-size to the micro-size, can be used, and that γ-methacryloxypropyl

trimethoxysilane might be used as a surface treatment agent of the particles (see pages 256-257 and Table 10.1; page 274). This document does however not disclose directly and unambiguously the use of silane treated silica particles with an average particle size of less than 200 nm and does not mention any change in the rheological properties of dental material when prepared with particles in dry powder form. There is therefore no incitation for the skilled person to regard the teaching of document (13) to arrive to the claimed solution.

The solution according to the subject-matter of claim 1 is therefore not obvious. The same applies to the dependent claims and to independent claims 3, 8, 21-24 which all refer directly or indirectly to claim 1.

3.3.7 Thus the subject-matter of claim 1 of auxiliary request 2 is inventive. Accordingly the patent is to be maintained in the form as decided by the opposition division.

3.4 At the end of the oral proceedings, the appellant-proprietor explained that there was still a request with respect to the amendment of the description. This was contained on page 10 of the letter of 19 March 2012.

The Board had not identified this passage to be a request, the requests being contained on page 1 of said letter of 19 March 2012. Moreover, also at the beginning of the oral proceedings when the appellant was asked to confirm the requests, no reference was made to the description and no amended description had been filed. Since the decision had already been pronounced when the appellant-proprietor pointed to

this issue, this request could no longer be considered by the Board.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairman:

L. Malécot-Grob J. Riolo

Decision electronically authenticated