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Datasheet for the decision of 26 October 2017

Case Number: T 0796/12 - 3.4.03

Application Number: 03743613.6

Publication Number: 1482521

IPC: H01L39/14, H01L39/24

Language of the proceedings: EN

Title of invention:
SUPERCONDUCTIVE LAYER AND METHOD FOR PREPARATION THEREOF

Patent Proprietor:
Kabushiki Kaisha Toshiba

Opponent:
Zenergy Power GmbH

Headword:

Relevant legal provisions:
EPC 1973 Art. 54(1), 56, 83
EPC Art. 123(2), 101(3)(a)

Keyword:
Admissibility of appeal - (yes)
Amendments - extension beyond the content of the application as filed (no)
Sufficiency of disclosure - (yes)
Late-filed document - admitted (yes)
Novelty - (yes)
Inventive step - (yes)

Decisions cited:
G 0001/13, G 0002/04, T 0960/08

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0796/12 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 26 October 2017

Appellant: (Opponent)	Zenergy Power GmbH Heisenbergstrasse 16 53359 Rheinbach (DE)
Representative:	BASF IP Association BASF SE G-FLP-C006 67056 Ludwigshafen (DE)
Respondent: (Patent Proprietor)	Kabushiki Kaisha Toshiba 1-1, Shibaura 1-chome Minato-ku Tokyo 105-8001 (JP)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 16 January 2012 concerning maintenance of the European Patent No. 1482521 in amended form.**

Composition of the Board:

Chairman	G. Eliasson
Members:	M. Papastefanou
	C. Heath

Summary of Facts and Submissions

I. The appeal by the Opponent is against the interlocutory decision of the Opposition Division that, account being taken of the amendments made during the opposition proceedings, European patent No EP 1 482 521 B1 (Application No 03743613.6) and the invention to which it related met the requirements of the EPC on the basis of the Second Auxiliary request before it.

The patent had been opposed in its entirety on the grounds of lack of novelty, lack of inventive step (Articles 100(a), 52(1), 54(1) and 56 EPC) and insufficient disclosure of the invention (Articles 100(b) and 83 EPC).

II. Among the documents cited during the first instance proceedings, the following are relevant for this decision:

D2: Araki et al, Cryogenics 41 (2001) 675-681;
D4: Araki et al, Supercond. Sci. Technol. 14(2001) L21-L24;
D7: Wu et al, J. Mater. Res. Vol. 16, No 10, October 2001, 2869-2884;
D8: Ueno et al, J of Crystal Growth 222 (2001) 697-700

III. The Appellant - Opponent submitted with the grounds of appeal several new prior art documents; the following are relevant for the present decision:

D16: Erklärungen zur Herstellung der Probe zur CuOx-Kontrolle: N430183 (with Annexes)
D17: Gutachten über TEM Untersuchungen einer Beschichtigung von Yttriumbariumcuprat $YBa_2Cu_3O_{7-\delta}$,auf Lanthanaluminat $LaAlO_3$

IV. At the end of the oral proceedings held before the Board, the parties' requests were:

The Appellant - Opponent (hereafter "Opponent") requested that the patent be revoked in its entirety.

The Respondent - Patent Proprietor (hereafter "Proprietor") requested that the appeal be held as inadmissible or, of it were to be found admissible, be dismissed. As an auxiliary measure, it requested that the patent be maintained according to one of Auxiliary requests 1-7. Auxiliary requests 1-3 were filed with the Proprietor's letter dated 27 March 2013. Auxiliary requests 4-7 were referred to in the same letter but no claims were filed.

V. Claim 1 as maintained by the Opposition Division (Main request) is worded as follows:

A superconductor layer formed on a main surface of a substrate, comprising an oxide superconductor containing

(i) at least one metal selected from yttrium and lanthanoids,

(ii) barium,

(iii) copper, and

(iv) oxygen

characterized in that the amount of CuO particles distributed in the oxide semiconductor is such that the area covered by CuO particles is 1% or less of the superconductor layer, determined on a cross section of the superconductor layer parallel to main surface at a distance from the main surface of 50 nm to 70% of the thickness of the superconductor layer.

VI. Independent claim 5 of the Main request is worded as follows:

A method of manufacturing the superconductor layer of any of claims 1-4, comprising the steps of

(i) preparing a coating solution by dissolving trifluoroacetates of (i) at least one metal selected from yttrium and lanthanoids, (ii) barium, and (iii) copper, and which trifluoroacetates contain 6 wt. -%. impurities or less, in a solvent;

(ii) form a coating film by coating a main surface of a substrate with the coating solution;

(iii) calcining the coating film in an atmosphere containing oxygen; and

(iv) firing the calcined coating film in an atmosphere containing water vapor at a temperature higher than that at the calcining process,

characterised in that step (iii) includes elevating the temperature of the coating film in an atmosphere of atmospheric pressure containing water vapor to a maximum temperature of 400°C or more, such that during the temperature elevation the period of time at which

the temperature of the coating film is 200-250°C is 6h 15min to 16h 30min.

VII. The wording of the claims of the Auxiliary requests is not relevant for this decision.

VIII. The arguments of the parties insofar they are relevant for the decision can be summarized as follows:

(a) On the admissibility of the appeal

The Proprietor, for the first time in a letter of 25 October 2017 that reached the Board at 16.30 hours on the day before the oral proceedings, raised the objection that the company Zenergy Power GmbH, which was registered as the Appellant, had been dissolved as a result of a bankruptcy procedure before the appeal was filed. Hence, the Opponent had ceased to exist as a legal person before the filing of the appeal and could not file the appeal or be the appealing party in the opposition-appeal proceedings. This was further argued during the oral proceedings. Further, the Proprietor based on information available on the internet alleged that the relevant department of the opponent that dealt superconductors had been taken over by the BASF New Business GmbH and would thus not be entitled to further pursue these proceedings.

The Opponent stated that it had become aware of these issues on the day of the oral proceedings and was not in a position to respond.

(b) On extension of subject matter (Article 123(2) EPC)

The Opponent argued that there was no basis in the originally filed application of a combination of a manufacturing method, in which during the calcination process the temperature rose from 200°C to 250°C in 6h 15 min - 16h 30 min, and the superconductor layer produced having an area covered by CuO particles that is 1% or less, determined in cross section of the layer parallel to the man surface of at a distance from the main surface of 50nm to 70% of the thickness of the superconductor layer. In addition, there was no disclosure that a superconductor layer according to claim 1 could be obtained throughout the whole claimed time range (6h 15 min - 16h 30 min) in claim 5. Furthermore, the produced superconductor layer comprised further features which were omitted in claim 1, thereby resulting in an unallowable intermediate generalisation. Finally, the method for manufacturing the claimed superconductor layer comprised further steps, which were omitted in the method of claim 5, introducing, thus, a further unallowable intermediate generalisation.

The Proprietor argued that the skilled person, by reading the application as a whole (with particular reference to paragraph [0001]), would understand, directly and unambiguously, that the claimed superconductor layer was produced by the manufacturing method of the invention.

(c) On sufficiency of disclosure (Article 83 EPC)

The Opponent argued that the skilled person would not be able to produce the superconductor layer according to claim 1 for the whole range of values for the area covered by CuO particles (1% or less)

using the method described in the patent. There was no disclosure in the patent of values of the area covered by the CuO particles lower than 0,05% - 0,04% (Figure 10) and, especially for values near 0%, it would not be possible for the skilled person to produce the claimed superconductor layer.

The Proprietor argued that the fact that there was no specific mention of values for the area covered by the CuO particles lower than 0,04% in Figure 10 did not mean that it was not possible to produce superconductor layers with a smaller area covered by CuO particles. Moreover, the skilled person would know that it was not possible to obtain a superconductor with no CuO particles at all. The examples covered 95% of the claimed range (1% or less) and it was not necessary to show that the invention could be carried out for the 100% of the claimed range in order to comply with Article 83 EPC.

(d) On Novelty (Article 54(1) EPC

The Opponent argued that claim 1 was not new in view of either document D7 or D8. Moreover, D2 disclosed a method which corresponded to the method steps of claim 5 and, therefore, the resulting product had to be the same as the one in claim 1, destroying, thus, the novelty of claim 5.

The Proprietor argued that neither D7 nor D8 contained any concrete disclosure regarding the quantity of CuO particles in the superconductor layer. The same applied to D2, which, moreover, did not disclose all the method steps of claim 5, since

there was no mention of any content of impurities.

(e) On Inventive step (Article 56 EPC)

The Opponent argued that the obvious combination of D2 and D4 would result in the method of claim 5. As demonstrated by documents D16 and D17, the superconductor produced from this combined method contained no measurable amount of CuO particles in the cross section defined in claim 1. Hence, claim 5 was obvious to the skilled person.

The Proprietor contested the admission of documents D16 and D17 into the procedure. It argued further that the combination of D2 with D4 was possible only with knowledge of the claimed invention and that, in any case, the combination of the two teachings did not yield the same method as the invention. Regarding, documents D16 and D17, they showed an arbitrary selection of parameters for the method carried out, which was possible only with knowledge of the invention.

Reasons for the Decision

1. Admissibility of the appeal

The inadmissibility of the appeal as argued by the patentee in its last submission dated 25 October has two prongs: either because the opponent was no longer registered at the date the appeal was filed, or because the opponent was subsequently taken over by a different entity without this change having been notified.

Whether an opponent to an ongoing opposition/appeal case can validly be regarded as a legal entity and act in these proceedings is a matter of national law of the state where the company is incorporated, see decision **G 1/13** (OJ EPO 2015, A42) at point 6 of the reasons:

"The Enlarged Board considers that the starting point should be the clearly established principle under the EPC that national law should be referred to in order to determine whether a legal entity exists or has ceased to exist, and has capacity to act."

In the case at issue, that state is Germany. Under German law, even a company extinguished from the company register can validly perform procedural acts such as file a lawsuit in case where such dispute is related to any form of economic interest (Münchener Kommentar zur ZPO, 5. Auflage 2016, § 50 margin note 15; also German Federal Supreme Court, decision of 8 October 2013, II ZR 281/12). This was recognised by the Enlarged Board of Appeal in the above-mentioned decision **G 1/13**, point 2.3.4 of the reasons:

"Thus the Enlarged Board understands that if a company established under German law is removed from the register it only ceases to exist if also it is without assets ("vermögenslos"), these two conditions being known as "Doppeltatbestand". If this latter condition is not satisfied, a later restoration of the company to the register where a further need to wind up the company or its affairs becomes apparent does not have retroactive effect but rather is of a declaratory nature as to the continuing existence of the company: the company is deemed to have always continued in existence. See the submissions of the President, point 2.4. The Enlarged Board understands also that the

status of opponent which a company enjoys in opposition proceedings before the EPO before being removed from the register would be considered as an asset for these purposes or as part of its affairs which would be considered as not having been wound up ("Auswirkungen auf laufenden Prozesse"): see Hachenburg/Ulmer GmbHG, 8. Aufl., § 74, Rdn 27. Further, although a company which has not ceased to exist but which has been struck off the register is incapable of acting, an authorization given to a representative while the company was still capable of acting remains valid (see again the submissions of the President, point 2.4)."

The existence of a patent, as well as its possible revocation, are of economic interest both to the patentee, as well as to potential competitors. For this reason, raising an appeal with the request to have a patent revoked is of economic interest to both parties involved in such dispute. The Board thus holds that the opponent could file a valid appeal even after its extinguishment from the company register. The appeal was filed by the representative who had acted on behalf of the opponent during the opposition, and there is no allegation that the representative in filing the appeal acted without proper mandate.

Also the allegation that the relevant department of the opponent dealing with superconductors had meanwhile been transferred and that the appeal should therefore be continued by the acquiring company has not been properly substantiated. In view of the fact that the position of an opponent cannot be freely transferred (decision **G 2/04**, OJ EPO 2005, 549, headnote), any transfer has to be proven by proper evidence, see decision **T 960/08** of 1 December 2011, reasons 2.2:

"It follows from this procedural principle that the procedural validity of a transfer of opponent status is dependent on the submission of a duly substantiated request and on production of documents providing evidence of legal succession within the proceedings ...Until evidence of the transfer has been provided, the original party to the proceedings continues to have the relevant rights and obligations."

In the case at issue, it would thus have been expedient to file appropriate references from the company register, or a contract of purchase. In the absence thereof, the Board must assume that the party that filed the opposition remains entitled to continue such proceedings.

In the absence of any evidence to the contrary, the Board therefore holds that the Appellant-Opponent keeps being a party to these proceedings, and the appeal is thus admissible.

2. The invention

The invention relates to a superconductor layer containing an oxide superconductor and its manufacture. The superconductor of the invention is produced by metal organic deposition (MOD) using trifluoroacetates (TFA-MOD method). The critical current density of the produced semiconductor is influenced by impurities in the starting products (the trifluoroacetates) and by the quantity of CuO particles in the end product. The invention aims to produce a superconductor with low content of CuO particles (claim 1) in order to achieve high critical current density. A method to produce such a semiconductor is also part of the invention (claim 5).

3. Extension of subject matter (Article 123(2) EPC)

3.1 The Opponent pointed to claim 5, which the reference to claim 1 *("A method of manufacturing the superconductor layer of any of claims 1-4 comprising..."*) rendered new and inventive according to the Opposition Division, and argued that there was no disclosure in the originally filed application that the product of claim 1 was obtainable by the method according to claim 5 throughout the whole claimed scope. It made reference to paragraph [0055] of the originally filed (published) application and noted that, according the described measurements, after keeping the superconductor layer between 200°C and 250°C for 16 hours 40 minutes the ratio of CuO particles in the produced superconductor was outside the range of claim 1 (1/80 instead of 1/100 or less). Although 16 hours 40 minutes were outside the time range of claim 5 (6 hours 15 minutes - 16 hours 30 minutes) it was close enough for it to raise doubts about whether after 16 hours and 30 minutes the ratio would indeed be 1/100 (1%) or less. In addition, in Figure 10 there were also measured values outside the claimed range.

Regarding the reference to paragraph [0001] used by the Proprietor as basis for claim 5, the Opponent argued that this paragraph was referring to the originally filed claims where there was no reference to claim 1 in claim 5 and that it was a general statement which could not be used as basis for the amendment. Therefore, there was no support in the originally filed application for the claim that all the products of the method according to claim 5 were falling within the scope of claim 1.

3.2 The Board does not agree. The reference to claim 1 in claim 5 is not to be understood as a definition of the superconductor of claim 1 being the only, mandatory, product of the method of claim 5 throughout the claimed scope. The Board rather sees the reference to the superconductor of claim 1 as a limitation of claim 5, i. e. the scope of the method claim 5 is limited only to the method that produces the superconductor of claim 1. Whether there are other possible products of the method of claim 5 is irrelevant for the assessment of this amendment. In other words, the question to be answered should be whether the skilled person would derive, directly and unambiguously, from the originally filed application that the superconductor of claim 1 can be obtained by the method of claim 5.

The Board is convinced that this question can be answered in the affirmative. In the general part of the description, especially in paragraphs [0032], [0033] and [0038] of the published application, it is clearly explained that the superconductor with the features of claim 1 is the product of the method according to claim 5. Moreover, in the examples there are measurements that fall within the ranges of claims 1 and 5 (paragraph [0055] of the published application) which confirm that the superconductor of claim 1 can indeed be obtained by the method of claim 5.

3.3 In a second line of argument submitted during the written procedure, the Opponent made reference to paragraph [0039] of the published application and argued that the produced superconductor layer comprised further features which were omitted in claim 1, thereby resulting in an unallowable intermediate generalisation. In addition, with reference to paragraphs [0013]-[0017] and [0042]-[0047], the method

for manufacturing the claimed superconductor layer comprised further steps, which were omitted in the method of claim 5, introducing, thus, a further unallowable intermediate generalisation.

3.4 Regarding the former point, the Board notes that in paragraph [0039] of the published application the features omitted from claim 1 (*the superconductor layer containing a trace of fluorine and the oxide semiconductor is present in an amount of at least 50% by volume in a region which surrounds the CuO particles and whose outer surface is a away from a surface of the CuO by 0,1µm)* are described as being the result of the use of the TFA-MOD method for the production of the superconductor layer. Hence, these features are inherent features of superconductor layers that are produced with the TFA-MOD method of the invention and as such they are within the skilled person's common general knowledge and do not need to be explicitly defined in the claim.

A similar consideration is valid also for the latter point regarding the features of the TFA-MOD method not included in the claims. The Board notes that the TFA-MOD method is a known method (see also paragraphs [0003]-[0005] of the published application) and, hence, the skilled person would be aware of it and how it is to be carried out in general. The claimed invention concerns the use of specific values for a specific parameter (time the layer is left between 200°C and 250°C during he calcining step) in order to achieve a certain content of CuO particles in the end product (1% or less). The skilled person knows from his common general knowledge which are the necessary steps to carry out this method and there is no need for these

steps to be explicitly defined in the claims, either.

3.5 The Board is, hence, satisfied that claim 5 as amended meets the requirements of Article 123(2) EPC.

4. Sufficiency of disclosure (Article 83 EPC 1973)

4.1 The Opponent argued that the skilled person would not be able to produce the superconductor layer according to claim 1 for the whole range of values for the area covered by CuO particles (1% or less) using the method described in the patent. Making reference to paragraph [0031] of the patent, the Opponent argued that this paragraph contained the essential teaching of the invention, i. e. that by keeping the superconductor layer between 200°C and 250°C for a time ranging from 6 hours and 15 minutes to 16 hours 30 minutes during the calcining process, the CuO particles were sufficiently suppressed. From paragraph [0054] it could be understood that the best result that could be achieved was a ratio of CuO particles of 0,1%. In Figure 10, there were measurements of the critical current density corresponding to ratio values as low as 0,05% - 0,04%. There was no indication of any values lower than these and, hence, it had to be concluded that it would not be possible for the skilled person to produce the claimed superconductor layer with the claimed method, in particular for ratio values near 0%.

4.2 An objection for lack of disclosure of the claimed invention has to be based on substantiated allegations that the claimed product (in this case) cannot be obtained throughout the scope of the claim. The Opponent did not provide any such substantiated allegation, however. The Board notes that in the patent, there is a detailed description of the

manufacturing method of the superconductor layer of the claims. The correlation between different parameters of the process (temperature, humidity, time etc.) and their effect to the final product are well explained and there is no indication that the production method would not be suitable for any part of the claimed range. The skilled person, therefore, would be in a position to carry out the production method based on the information provided in the patent and his common general knowledge.

The examples show only specific measurements made at specific points in the production process, and depend on selected values for the various parameters. The examples cannot be regarded, thus, as general teaching of the invention. Therefore, it is not necessary for the examples to show measurements covering the whole of the claimed range and the fact that they do not show such values cannot be considered as an indication that values beyond these examples are not possible to obtain.

The conclusion of the Board is that the patent as amended during opposition meets the requirements of Article 83 EPC 1973.

5. Novelty (Articles 52(1) EPC and 54(1) EPC 1973)

5.1 The Opponent argued that claim 1 was not new in view of either D7 or D8. D7 described a method of production of a superconductor layer made of the same materials as in claim 1 (Yttrium, Barium, Copper and Oxygen - see Abstract). Making reference to page 2875, the Opponent pointed out that in the superconductor of D7, the CuO particles (grains in D7) contained in the superconductor layer tended to migrate towards the

surface during the heat treatment. According to the Opponent, this was an implicit disclosure that there were no CuO particles at all in the bulk of the layer and especially in the cross section defined in the claim (50 nm from the surface to 70% of the thickness of the layer). D7 disclosed, thus, all features of claim 1. Regarding D8, it described a different method of obtaining a superconductor layer made of the same materials as in claim 1 (see Abstract). There was no disclosure of any CuO particles in D8, hence the produced superconductor layer had none and this was within the claimed scope (1% or less). D8 disclosed, thus, all features of claim 1.

5.2 The Board is not convinced by the Opponent's argument. According to Article 54(1) EPC 1973, for a prior art document to be novelty destroying, it must disclose all the features of the objected claim, either explicitly or implicitly. Regarding D7, the mere statement that the CuO particles *tend to migrate towards the surface* (page 2875, right column, second sentence) cannot be held to mean that there are no CuO particles in the remaining of the layer and especially in the cross section according to claim 1. There is no indication of any content of CuO particles in any part of the layer, and therefore this passage cannot support a lack of novelty objection against claim 1.

In the same way, the fact that there is no mention of CuO particles in D8 does not necessarily mean that there were not any. It merely indicates that in the process of D8 different aspects of the manufacturing method were of interest and the presence - or absence - of the CuO particles was not monitored. Hence, the disclosure of D8 cannot be held to disclose all the features of claim 1, either.

The Board concludes, thus, that claim 1 is new over D7 and D8.

5.3 The Opponent argued also that claim 5 was not new with respect to document D2. D2 disclosed steps (ii), (iii) and (iv) of the method in claim 5 (Figures 1, 2 and 3 of D2) as well as the specific time range of the characterising part (Figure 2). This had not been contested by the Proprietor nor by the Opposition Division. Regarding the impurities mentioned in step (i), the Opponent pointed to Figure 1 of D2, which explained the preparation of the coating solution. Using Figure 1 of D4 to explain Figure 1 of D2 in detail, the Opponent pointed out that the steps of the production of the coating solution were the same in both cases. The same starting materials were used and the same materials were added during the production of the coating solution. Looking into Figure 1 of D4, it could be seen that the impurity content of the coating solution before the refining under compression takes place was about 5 wt%. This was the point the preparation of coating solution according to Figure 1 of D2 ended, and hence, it was to be concluded that the coating solution in D2 had an impurity content of about 5 wt%, which was within the range of step (i) in claim 5 (6 wt% or less). Since the method steps in D2 were the same with claim 5, the product obtained had to be the same, i. e. the product according to claim 1 and therefore claim 5 would not be new over D2.

5.4 The Board notes that the impurity content of 6 wt% or less in step (i) of claim 5 refers to impurities contained in the trifluoroacetates, i. e. the starting products used to prepare the coating solution, and not to the coating solution itself as it is the case in D2.

Hence, this feature is not disclosed in D2. Only for this reason, claim 5 is new with respect to D2.

5.5 The conclusion is that the subject matter of claims 1 and 5 is new within the meaning of Article 54(1) and (2) EPC 1973.

6. Inventive step (Articles 52(1) EPC and 56 EPC 1973)

6.1 Documents D16 and D17

These documents were filed with the grounds of appeal for the first time. The Opponent explained that D16 documented the manufacturing of a superconductor layer using a method which was a combination of the methods described in D2 and D4. D17 was a report of laboratory measurements showing that the superconductor layer produced by this combined method had no CuO particles within the section defined in claim 1. These documents were filed as a reaction to the conclusion of the Opposition Division that the reference to the product of claim 1 rendered claim 5 new and inventive and were aiming to show that the product produced by the method tought by the combination of D2 and D4 was indeed falling within the scope of claim 1. The Opponent requested, therefore, that the documents be admitted in the procedure.

The Proprietor objected to the admission of these documents arguing that they were late filed and not prima facie relevant, because the combination of D2 with D4 was possible only with knowledge of the invention, and these documents were also based on analysis based on hindsight.

The Board notes that D16 and D17 refer to the

combination of D2 with D4, which was discussed during the opposition procedure and in the appealed decision. In the decision, the Opposition Division found that claim 5 was obvious with respect to the combination of D2 and D4 and that the reference to claim 1 rendered it new and inventive. Hence, the attempt of the Opponent to show that the product of the combined method of D2 and D4 would fall within the scope of claim 1 is considered a legitimate reaction to this part of the decision. The Board therefore admits these documents into the procedure.

6.2 The Opponent argued that D2 was a document of the same technical field as the invention and described the production of superconductor layers of the same materials with the same method (TFA-MOD) as in the patent (see section titled "1. Introduction" on first page of D2). The aim was also to obtain superconductor layers of the highest possible critical current density. Comparing the disclosure of D2 to claim 5 (see paragraph 4.2 above), the main difference was that there was no mention of any content of CuO particles in the obtained superconductor layer. The problem the skilled person was faced with was how to improve (increase) the critical current density of the obtained superconductor layer.

D4 was also a document of the same technical field, describing the production of superconductor layers of the same materials using the TFA-MOD method (see page L21 of D4). In D4, the critical current density of the produced superconductor layer was increased by purifying the coating solution used as precursor (see Figure 1 and the paragraph bridging the two columns on page L22). The skilled person would, thus, combine the teachings of D2 and D4 and use the TFA-MOD method of D2

with a purified coating solution as suggested in D4. As shown by D16 and D17, the end product of this combined method had no measurable CuO particles in the cross section of the layer defined in claim 1 (paragraph 4 on page 3 of D17). Hence claim 5 would be obvious to the skilled person.

6.3 The Board is not convinced by the argument of the Opponent. As already explained in the context of novelty (see paragraph 5.4 above), the impurity content in D4 refers to the impurities in the produced coating solution used as precursor for the superconductor layer, while in claim 5 the impurity content refers to the trifluoroacetates used as starting products for the preparation of the solution. The combination of D2 and D4, thus, does not result in the method according to claim 5, irrespective of the reference to claim 1. In addition, there is no statement about the level of impurities in the starting products or the coating solution in the experiment described in D16 nor in D17.

6.4 A second point which the Board made in its preliminary opinion, annexed to the summons to oral proceedings, was the selection of the concentration of oxygen (O_2) for the firing process. According to D16 (second page, 3rd and 4th lines), a concentration of O_2 of 273 ppm was selected. This value falls within the range mentioned in D4 (page L22: 125 - 1000 ppm). However, as explained in the first page of D16 (last three lines of penultimate paragraph), all temperature profiles and humidity values used in the experiment corresponded to those of D2. In D2 a concentration of 1000 ppm of O_2 is called for (page 677, left column).

In response to the question why the skilled person would select a value for the O_2 concentration according

to D4 for a firing process according to D2 when a different value is defined in D2, the Opponent explained that this was the maximum value of O_2 concentration the apparatus used for the experiment could provide. According to the Opponent the precise value of the O_2 concentration did not influence the obtained product as it was shown by the rather broad range (125-1000 ppm) in D4.

The Board, however, notes that in D4 the firing process is not the same as in D2. In D4 the firing was done at 800°C for 5 hours with 4,2% humidified Ar mixed with 0,1% O_2 (first two lines of right column on page L22). In D2, the firing was done with 0-12.2% humidified Ar gas mixed with 1000 ppm O_2 according to the temperature profile of Figure 3 (page 676, last lines of first paragraph of left column). Since the firing processes are different, it is inconclusive to modify the firing process of D2 based on information of D4.

The Board concludes, therefore, that the product examined according to D17 was not the result of a straightforward combination of the methods described in D2 and D4 as the Opponent argued, but of a combined method based on steps and choices that are beyond what could be considered as obvious steps for the skilled person. Hence, besides the fact that the combination of the methods of D2 and D4 does not lead to the method of claim 5 (see paragraph 6.3 above), the product which was alleged to anticipate the product of claim 1 was not produced by an obvious combination of the two methods.

6.5 The conclusion is that the subject matter of claim 5 involves an inventive step within the meaning of

Article 56 EPC 1973.

7. Since the patent as amended during the opposition meets the requirements of the EPC, the appeal must fail (Article 101(3)(a) EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Sánchez Chiquero G. Eliasson

Decision electronically authenticated