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Datasheet for the decision of 28 May 2014

Case Number: T 2186/11 - 3.2.03

Application Number: 05729228.6

Publication Number: 1736261

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Language of the proceedings: EN

Title of invention:
TANTALUM POWDER AND SOLID ELECTROLYTIC CAPACITOR UTILIZING THE SAME

Patent Proprietor:
JFE Mineral Company, Ltd.

Opponent:
H.C. Starck GmbH

Headword:

Relevant legal provisions:
EPC Art. 100(b), 83, 100(a), 54, 56, 114(2)
RPBA Art. 12(4), 13(1)

Keyword:
Sufficiency of disclosure - (yes)
Novelty - (yes)
Inventive step - (yes)
Late submitted material - public prior use admitted (no)

Decisions cited:
G 0007/93, T 0150/82, T 0724/08, T 0229/08, T 0702/99, T 1212/11, T 2375/10, T 0306/09, T 0087/08

Catchword:

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Case Number: T 2186/11 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 28 May 2014

Appellant: (Patent Proprietor)	JFE Mineral Company, Ltd. 1-2, Marunouchi 1-chome, Chiyoda-ku Tokyo 100-0005 (JP)
Representative:	Stebbing, Timothy Charles Haseltine Lake LLP Lincoln House, 5th Floor 300 High Holborn London WC1V 7JH (GB)
Appellant: (Opponent)	H.C. Starck GmbH Im Schleeke 78-91 D-38642 Goslar (DE)
Representative:	Von Kreisler Selting Werner - Partnerschaft von Patentanwälten und Rechtsanwälten mbB Deichmannhaus am Dom Bahnhofsvorplatz 1 50667 Köln (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 8 August 2011 concerning maintenance of the European Patent No. 1736261 in amended form.**

Composition of the Board:

Chairman	G. Ashley
Members:	C. Donnelly
	M. Blasi

Summary of Facts and Submissions

I. The appeal lies from the interlocutory decision of the opposition division dated 8 August 2011 on the amended form in which the European Patent No. EP 1 736 261 could be maintained.

In its decision the opposition division held that the invention defined in claims 3 and 4 as granted had not been disclosed sufficiently (Articles 100(b), 83 EPC), but decided that the patent could be maintained on the basis of the claims of the first auxiliary request.

II. This decision was appealed by both the opponent (Appellant I) and the patent proprietor (Appellant II).

III. In its grounds of appeal, Appellant I referred to the following documents and evidence in support of its case:

D1: WO-A-98/37248
D2: WO-A-00/67936
D3: T. Balaji et al, "Hydriding, powder processing and dehydriding of tantalum for capacitor application", Metals Materials and Processes, Vol. 14, No. 2, pages 155 to 162, 2002.
D4: US-A-6 689 187
D5: S. Ohfuji et al, "Oxidation of hydrogen doped tantalum films on silicon", J. Vac. Sci. Technol., B 4(3), pages 714 to 719, May/June 1986.
D6: US-A-6 679 934

Documents D1 to D6 were referred to in the contested decision; the following documents were cited for the first time in the grounds of appeal:

D7: EP-A-1 502 680
D8: EP-B-0 647 349

A1: Copy of Laboratory Notebook ("Laborjournal") relating to Test Nr. 17/1999, SAP Projekt-Nr. F 00050FE, Working Group: Dr Wolf, Rawohl/Vieregge, dated 1 April 1999 to 26 May 1999.

A2: Inspection Certificate 3.1.B; Tantalum Powder Capacitor Grade; Produkt STA-100 K; Lot. No. WO 39917 AB, dated 23 April 1999.

A3: Inspection Certificate 3.1.B; Tantalum Powder Capacitor Grade; Produkt STA-100 K; Lot. No. WO 39917 CD, dated 26 April 1999.

A4: Copy of Delivery Note No. 557519, dated 27 April 1999.

A5: Copy of Proforma Invoice No. 965058, dated 27 April 1999.

A6: Copy of "Fertigungsauftrag" No. 44734, dated 21 April 1999.

B1: Copy of Laboratory Notebook ("Laborjournal"), pages 91 to 93, Versuchsvorschrift 3.3 zu Versuch-Nr. 46/97, dated 14 October 1997.

B2: Analysis results of Tantalum powder samples, page 7, dated 10 December 1997.

B3: Copy of Laboratory Notebook ("Laborjournal"), pages 36 to 39, dated 29 April 1997 relating to test numbers ("Versuch-Nr.") 17/97 and 18/97

B4: Analysis of Sample WO-03036-8N received on 6 May 1997, dated 14 May 1997.

C1: Test Nr. HA 71028, an Experimental Report concerning Example 3 of WO-A-00/67936 (D2 above).

AD1: Test Nr. Ha 71131, an Experimental Report concerning various tantalum powders.

D9: Affidavit of Dr Uwe Becker, dated 30 October 2011.

D10: Affidavit I of Ms Christine Rawohl, dated 31 October 2011.

D11: Affidavit II of Ms Christine Rawohl, dated 9 November 2011.

E1: Test Nr. Ha 71129U19, an Experimental Report concerning Example 8 of WO-A-98/37248 (D1 above).

F1: Test Nr. Ha 71129MOA, an Experimental Report concerning Example 7 of WO-A-98/37248 (D1 above).

Appellant I filed the following further documents with letter dated 26 September 2012:

D12: Affidavit of Ms Claudia Bartosch, dated 7 September 2012.

D13: Copy of an e-mail from Mr A. Conibear, dated 28 May 1999.

A7: Copy of a printout of a "Belegfluß".
A8: Copy of a printout of a "Materialbelegliste".

P1: Photographs relating to A1

P2: Photographs relating to B1
P3: Photographs relating to B3
P4: Photograph of cover of Christine Rawohl's Laborjournal

By letter of 24 April 2014 Appellant I filed the following further documents:

D14: DE1805372;
D15: Ullmann's Encyclopedia of Industrial Chemistry, Fifth edition, Volume A26, pages 75 to 77, VCH Publishers 1995;
D16: Gmelins Handbuch der anorganischen Chemie ("Handbook of inorganic Chemistry") "Tantal Teil B" ("Tantalum Part B"), pages 1 to 7, publ. 1970;
D17: Graphical representation of the data shown on pages 4 and 5 of reference D16.

IV. In a communication dated 24 February 2014 annexed to the summons to the oral proceedings the board set out its provisional opinion.

V. In conclusion of the presentation of their cases at the oral proceedings held on 28 May 2014, the parties made the following requests:

Appellant I requested that the above decision be set aside and the patent be revoked.

Appellant II requested that the above decision be set aside and that the patent be maintained as granted or, alternatively, on the basis of one of the sets of claims filed with the letter of 25 April 2012 as auxiliary requests I, II and III.

VI. Claims 1 to 4 as granted read:

"1. A hydrogen-containing tantalum powder wherein a value obtained by dividing the hydrogen content (ppm) of the tantalum powder by the specific surface area (m^2/g) of the tantalum powder is in the range of 10 to 100; characterised in that the specific surface area of the tantalum powder is in the range 4 to 10m^2/g.

2. The tantalum powder according to claim 1, further comprising nitrogen wherein a value obtained by dividing the nitrogen content (ppm) of the tantalum powder by the specific surface area (m^2/g) of the tantalum powder is 500 or less.

3. An anode for a solid electrolyte capacitor comprising the tantalum powder according to claim 1 or 2.

4. A solid electrolyte capacitor comprising the anode for a solid electrolyte capacitor according to claim 3."

VII. *Appellant I's (Opponent) submissions concerning Appellant II's main request*

The submissions of Appellant I concerning the main request, as far as relevant for the present decision, can be summarised as follows:

a) Sufficiency of disclosure, Article 100(b), Article 83 EPC,

The patent provides no explanation as to how to make an anode or a capacitor containing a tantalum powder as defined in claims 1 or 2 since, in making these products, the powder is subjected to a sintering

process that changes its properties. On the one hand the skilled person can assume that the anode and the capacitor according to claims 3 and 4 comprise a tantalum powder as defined in claims 1 or 2. However, in this case the contested patent does not offer any teaching as to how the properties of the tantalum powder can be maintained during sintering. On the other hand, if the skilled person is aware that the properties change during sintering, no further specification of the anode or the capacitor exhibiting the changed properties can be found in the patent such that the skilled person does not know whether he is working within the scope of the invention. In both cases the invention is not sufficiently disclosed.

b) Allowability of Product by process claims

It is further pointed out that product-by-process claims are only allowable if it is impossible to define the claimed product other than in terms of manufacture (T 150/82) However, it is quite possible to define an anode and a capacitor according to claims 3 and 4 respectively in other ways than by their process of manufacture. Therefore, in the present case, product-by-process claims should not be admissible anyway.

c) Late filed facts and evidence

Alleged Public Prior Use

Tantalum powders meeting the requirements of claim 1 were made available by Appellant I to the public before the priority date of the disputed patent (27 December 2006).

These powders were manufactured by Ms Christine Rawohl and the samples WO-39917 AB and WO-39917 CD were supplied to the customer AVX Ltd of Paignton, GB, as evidenced by the copies of the order request (A6, dated 21 April 1999), the proforma invoice (A5, dated 27 April 1999) and the delivery note (A4, dated 27 April 1999).

Each of these documents bears the order number of the customer (P991608) and that of the supplier (44734). The proforma invoice (A5) and the delivery note (A4) refer to 2 x 0.5 kg of both WO-39917 AB and WO-39917 CD tantalum metal powders STA-100K.

Further evidence is provided by the affidavits of Ms Rawohl (D10), Ms Bartosch (D12), and Dr Becker (D9), as well as copies of printouts of a "Belegfluß" (A7) and a "Materialbelegliste" (A8).

Ms Rawohl states that she carried out tests on powders WO 39917 AB and WO 39917 CD, which were delivered to AVX Ltd in April 1999. Dr Becker states that the test results (A2 and A3) accompanied the dispatch of 1 kg samples of each of the powders WO 39917 AB and WO 39917 CD to Mr Andy Conibear of AVX Ltd.

A copy of an e-mail from Mr A. Conibear (D13) confirms that the samples were received by AVX Ltd. The e-mail speaks of tests carried out on the powders and gives a brief report of the results for the benefit of the manufacturer (Appellant I).

The submissions and documents relating to this prior use were filed as soon as possible since they only came to light after a further search was carried out following the decision of the opposition division that

the public prior use was not sufficiently supported. The documents were found against all expectations since not only had the mandatory storage time expired, but also the person responsible for the development and sale of these powders, Dr Wolf, passed away on 12 July 2005 leaving a huge gap in corporate knowledge. This problem was exacerbated due to a buy-out of this part of the company's activities.

In addition to the written evidence, Appellant I nominated Ms Christine Rawohl as a witness who could confirm the prior use.

Documents B1 to B4 and D11

Documents B1 to B4 are laboratory notebooks and analytical data; D11 is an affidavit from Ms Rawohl, one of the inventors named in D1. The values given in B1 to B4 are raw data gathered from the laboratory tests carried out during preparation of Examples 13 and 16 of D1. These values were erroneously referred to in the notice of opposition as being the results obtained by reworking the Examples 13 and 16 specified in D1. Although there may have been some confusion as to their status it cannot be denied that the values themselves are not late filed and, given their relevance in providing further information concerning Examples 13 and 16 of D1, should be admitted into the proceedings.

Documents D4 to D8

Documents D4 to D6 were filed during opposition proceedings and the opposition division was wrong not to admit them. D4 shows the correlation between the specific surface area and the capacity of the capacitor. D5 deals with hydrogen doping of tantalum

powders and states that hydrogen content has no effect the leakage current. D6 describes removal of hydrogen from the powder in order to avoid mechanical instability of the later anode.

D7 and D8 were filed with the grounds of appeal and are also very relevant. In particular, D7 teaches that the leakage current of an electrolyte capacitor is reduced and the capacity thereof is improved if a small amount of hydrogen is added to a niobium powder which is a valve metal similar to tantalum.

Documents D14 to D17

These documents provide valuable background information concerning the general knowledge of the skilled person and should be admitted into the proceedings.

Annexes C1, AD1, E1 and F1

Annex C1 relates to a reworking of Example 3 of D2 and demonstrates that Example 3 on page 25 of D2 anticipates the subject-matter of claim 1 as granted. The reworking reproduces the method presented in D2 for making the powder since the use of more modern equipment and slight differences in the reducing and deoxidation steps would have no significant effect on the end product.

Annexes E1 and F1 relate to the reworking of Examples 8 and 7 respectively of D1.

Annex AD1 was filed to show that the alleged technical effect of the hydrogen content does not exist. It lists values of leakage current and capacitance for anodes fabricated from various powders exhibiting different

hydrogen and specific surface area values from which no technical effect is discernible. For this reason the document should be admitted into the proceedings.

d) Novelty

Claim 1 as granted, Document D1

The powder of claim 1 as granted lacks novelty with respect to the powders of Examples 13, 16, 7 and 8 of D1. Experimental data collected during preparation of Examples 13 and 16 of D1 is given in Annexes B1 to B4. The data shows that the powders of Examples 13 and 16 fall within the specification of the powder of claim 1.

Additionally, Examples 7 and 8 of D1 have been reworked and the hydrogen content analysed as shown in Annexes E1 and F1. This data shows that the subject-matter of claim 1 also lacks novelty.

Claim 1 as granted, Document D2

When Example 3 of D2 (see page 25) is reworked as shown in Annex C1 it can be seen that the obtained powder inevitably meets the conditions set out in claim 1 as granted. Thus, the subject-matter of claim 1 is not new with respect to D2.

Claims 3 and 4 as granted

The subject-matter of claims 3 and 4 as granted is not new since if it is acknowledged that the process of sintering the powder of claim 1 changes its composition, then the powder comprised in the anode of claim 3 is not characterised by the H/BET ratio and the specific surface area as specified in claim 1 anymore.

Therefore, the anode of claim 3 is made out of tantalum powder without any special features. Such anodes are disclosed in D1, D3, D4, D6 and D8.

Thus, the requirements of Article 54 EPC are not met.

e) Inventive step

The subject-matter of claim 1 as granted lacks an inventive step:
(i) taking D1, D2 or D4 as the most relevant prior art in combination with the skilled person's general knowledge; or
(ii) in view of a combination of D4 with D5 or D6; or
(iii) in view of D1 or D2 or D4 in combination with D7 and D8.

D1 discloses tantalum powders which demonstrate a high capacity and which show a high specific surface area of up to 10 m^2/g (see page 5, line 15). The solid capacitors obtained from the tantalum powders show an extremely low leak current characteristic (see page 7, lines 20 to 24 and Table 4, page 6). The electrical properties specified in D1 correspond to those of the opposed patent. Thus, D1 solves the same problem as that given in the patent. Since hydrogen content does not have any effect on the electrical properties of the tantalum powder (also see Annex AD1), the alleged invention underlying the contested patent must be considered obvious for the skilled person.

D2 also discloses tantalum powder having a high capacity with a high specific surface area (see claims 1 and 2 and Example 6). Since the hydrogen content does not have any effect on the electrical properties ie there is no technical effect (also see Annex AD1), the

objective technical problem underlying the contested patent can be considered as the provision of an alternative tantalum powder. Since D2 discloses tantalum powders having a certain hydrogen content (see Examples 16 and 17) the subject-matter of the claims lacks an inventive step.

VIII. Appellant II's (Patent Proprietor) submissions

The submissions of Appellant II concerning the main request, as far as relevant for the present decision, can be summarised as follows:

a) Sufficiency of disclosure, Article 100(b), Article 83 EPC

It might be that there is a logical inconsistency between claims 1 and 2 on the one hand and claims 3 and 4 on the other, however, this is a clarity matter falling under Article 84 EPC. Since the patent describes how the anode and the capacitor are made (paragraphs [0043] to [0049] of the specification), the requirements of Article 83 EPC are met.

b) Late filed facts and evidence

Documents D4 to D8, D9, D10, Annexes A1,A2,A3,A4,A5 and A6, D11, and Annexes B1,B2,B3,B4,C1,AD1,E1 and F1 as well as D14 to D17 were all late filed and should not be admitted into the proceedings.

Alleged public prior use

Given the very late submissions of an alleged public prior use, namely only with the grounds of appeal, and bearing in mind that it arises out of the activities solely under the control of Appellant I, these submissions and the relating evidence should not be admitted into the proceedings. Regarding the reasons given by Appellant I for the late reply, the patent proprietor should not be disadvantaged as a consequence of any disorganisation in the opponent's company. Moreover, the submissions concerning the prior use were not relevant, as it was doubtful whether the customer was a member of the public.

Documents B1 to B4, D11

Documents B1 to B4 were only filed with the grounds of appeal. Also the values they refer to, even though they had been mentioned in the notice of opposition, can only be considered as being filed with the grounds of appeal since only at that point did their status become clear.

The experiments described in B1 to B4 and D11 were carried out in the laboratories of Appellant I and it has not been shown that the information obtained was made available to the public. Consequently, the information contained in B1 to B4 and D11 is not only late filed, but also does not form part of the prior art in accordance with Article 54(2) EPC.

Documents D4 to D8, D14 to D17

The opposition division did not consider that documents D4 to D6 were prima facie more relevant than those already on file and did not admit them into the

proceedings. There is no reason to reverse this decision since the opposition division had exercised its discretion correctly.

Documents D7 and D8 were first filed with the grounds of appeal without any reasoning as to their pertinence. These documents are not highly relevant and should not be admitted into the proceedings at this late stage.

Documents D14 to D17 were filed extremely late, barely a month before the oral proceedings and also should not be admitted.

Annexes C1, AD1, E1 and F1

Annex C1 relates to a reworking of Example 3 of D2. The allegation that Example 3 on page 25 of D2 anticipates the subject-matter of claim 1 as granted was made for the first time with the grounds of appeal. In addition to being late filed, the reworking shown does not faithfully reproduce the method presented in D2 for making the powder.

Annexes E1 and F1 relate to the reworking of Examples 8 and 7 respectively of D1. These reworkings could also have been filed earlier.

Annex AD1 is late filed and should not be admitted into the proceedings.

c) Novelty

Claim 1 as granted with respect to D1

The experiments of E1 and F1 which rework Examples 7 and 8 of D1 use equipment available at the time of the reworking in November 2011, rather than equipment available at the time of the tests reported in D1 (1998) or D2 (2000). For the purpose of assessing novelty, it is the disclosure at the time of the publication date of the document that is considered. Since different equipment was used for the reworked tests compared with that used in the original work, the resulting powders might also differ.

D1 makes no reference to the hydrogen content of the powders, hence the opposition division concluded correctly that the defined ratio H2/BET was not disclosed in D1.

Claim 1 as granted with respect to D2

The procedure set out in C1 differs from that of Example 3 in D2, in that:

- the step of reducing tantalum oxide is carried out in D2 at 1000°C for 6 hours (see Example 2 on page 23), whereas in C1 it is at 855°C for 9 hours;

- according to the deoxidation step of Example 3, no separation of reducing agent (Mg) and oxide is necessary following the deoxidation, whereas in C1 excess magnesium is separated by washing in dilute sulphuric acid and filtering (paragraph at the top of the second page).

The experiments of C1 also used equipment available at the time of the reworking in August 2010, rather than equipment available at the time of the tests reported in D1 (1998) or D2 (2000).

d) Inventive step

There is no suggestion in the prior art to adjust the hydrogen content and surface area of the powders of D1 or D2 in the claimed manner. None of the cited documents teaches the combination of high capacitance and low leakage currents achieved by the invention. The subject-matter of claim 1 therefore involves an inventive step.

Reasons for the Decision

1. Sufficiency of disclosure, Articles 83, 100(b) EPC

1.1 The opposition division and Appellant I argued that the requirements of sufficiency of disclosure are not met, since the patent provides no explanation as to how to make an anode or a capacitor (claims 3 and 4 respectively) containing a tantalum powder as defined in claims 1 or 2. This is because, in making these products, the powder is subjected to a sintering process in which the powders particles are fused together, hence the powders having the properties defined in claims 1 or 2 are no longer present in the products of claims 3 and 4. However, it is apparent that it is the tantalum powder of claim 1 that is used to produce a tantalum sintered element, and this is consistently specified throughout the contested patent (in particular see paragraphs [0018] and [0024]; page

4, lines 51 to 52; paragraphs [0045] and [0046]; as well as Example 1).

1.2 A skilled person is well aware that a sintering step changes the properties of a powder. Thus, on a reasonable interpretation of claims 3 and 4, the skilled person would understand that the anode and capacitor must be made from the powder of claims 1 or 2 used as the *starting powder*. The patent specification describes how an anode and capacitor are made, starting from the claimed powder and employing specific pressing and sintering conditions; several examples are given.

1.3 Thus, it is clear how to make the products of claims 3 and 4 and the requirements of Article 83 EPC are met.

2. Late filed facts and evidence

Pursuant to Article 114(2) EPC the EPO may disregard facts and evidence not submitted in due time by the parties. As far as the appeal procedure is concerned, the Rules of Procedure of the Boards of Appeal (RPBA) give the general directions as to the way in which the boards of appeal have to exercise their power to admit or disregard submissions filed at different stages of the appeal proceedings.

Article 12 RPBA delineates the basis of the appeal proceedings, providing that the appeal file should contain one comprehensive submission from each party. The purpose of this provision is that the exchange of the grounds and the reply should effect a defined and controlled initial phase of proceedings providing a moment in time fixed by the rules when a party's case is deemed to be complete, any further material submitted being an amendment to the party's case

admittance of which is assessed in accordance with Article 13 RPBA.

At the same time, Article 12(4) RPBA confirms that the board has the power to hold inadmissible facts, evidence or requests which could have been presented or were not admitted in the first instance proceedings, even if they were duly presented at the beginning of the appeal procedure and would, otherwise, belong to the party's case.

As to amendments to a party's case after the initial phase, ie filed after the filing of the grounds of appeal or the reply, it is in the board's discretion to evaluate their admissibility in the light of several criteria, the most common being listed in Article 13(1) RPBA: the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

2.1 Alleged public prior use

2.1.1 As indicated by Appellant II, the allegation of a public prior use was referred to for the first time in the grounds of appeal, more than 2 years after the expiry of the opposition deadline. It therefore needs to be assessed in accordance with the above principles whether the new facts and evidence relating to the prior use should be considered in the present appeal proceedings.

2.1.2 The alleged public prior use concerns the delivery of two batches of powders, WO 39917 AB and WO 39917 CD to AVX Limited in April 1999. Copies of the inspection certificates for these powders have been submitted as

documents A2 and A3, according to which, the powders have the following characteristics:

A2 (23 April 1999)

WO39917AB:	BET(m^2/g)	4.58
	H ppm	343
	H/BET	74.9

A3 (26 April 1999)

WO39917CD:	BET (m^2/g)	4.14
	H (ppm)	309
	H/BET	74.6

Thus, on the basis of A2 and A3, the composition of the powders seems to fall within the definition given in claim 1 and, hence, the subject-matter of the alleged prior use is prima facie relevant.

2.1.3 The board cannot accept Appellant I's explanation that the submissions and documents relating to the alleged prior use were filed in response to the opposition division's decision since this makes no reference to any public prior use. Appellant I is simply filing facts and evidence of prior art not dealt with by the opposition division. The board thus interprets this argument in the sense that the documents had only been detected in the context of preparing the present appeal. This purely time-related aspect cannot per se be accepted as a justification for the late filing since Article 12(4) RPBA also refers to facts and evidence which *could have been presented* in the first instance proceedings.

2.1.4 In the present case, in light of the explanations provided by Appellant I, the board accepts that the documents relating to the public prior use were only found by Appellant I at the appeal stage and the board sees no reason to assume an abuse of procedure. However, the board also sees no reason as to why the facts and evidence concerning the public prior use could not have been detected in a similar manner when preparing the notice of opposition in 2009. The alleged public prior use was invoked especially against claims 1 and 2 of the first auxiliary request considered allowable by the opposition division. These claims are however identical to claims 1 and 2 of the granted patent. Thus, the situation when preparing the grounds of appeal was similar to the one when the notice of opposition was prepared.

2.1.5 The board also notes that the alleged public prior use was within the sphere of activities of Appellant I, as it was the manufacturer and seller of the tantalum powders. Appellant I should therefore have known about its own prior use. Appellant I's explanation of the huge gap of knowledge caused by the sudden loss of the main inventor and main contact person Mr Wolf in 2005 cannot be used to justify the late submission. The board notes in this respect that other persons, notably those who signed written declarations in 2011, in particular Ms Rawohl, who also was offered as a witness, were apparently involved in the public prior use which allegedly took place in 1999. The board therefore concludes that knowledge of the prior use must have existed within the Appellant I's company even after the passing of Mr Wolf.
Appellant I's argument concerning the difficulties caused by a take-over also cannot be used to justify the late filing, since this would mean Appellant II

bearing the consequences of shortcomings within Appellant I's organisation and management structure.

2.1.6 Although relevance may play a role when a board is exercising its discretion whether or not to consider or admit late filed facts and evidence, it is not the predominant criterion. Otherwise, an opponent could present prima facie (highly) relevant facts and evidence only with the grounds of appeal relying on the fact that they would always be admitted because of their relevance (see also T 724/08, point 3.4 of the reasons). In the present case, for the reasons given in paragraphs 2.1.3 to 2.1.5 above, the board disregards the alleged prior use, regardless of the relevance of its subject-matter.

2.1.7 In summary, the facts and evidence submitted with the grounds of appeal relating to the prior use, ie D9, D10 and Annexes A1, A2, A3, A4, A5 and A6, are held inadmissible under Article 12(4) RPBA since they could have been presented in the first instance proceedings. The same considerations apply to the additional evidence submitted during the appeal proceedings. A fortiori, documents D12, D13, A7, A8 are not admitted to the proceedings in accordance with Article 13(1) RPBA.

2.2 Documents B1 to B4 and D11

2.2.1 In the annex to the summons to the oral proceedings in opposition (see paragraph 4.2.2) the opposition division had specifically indicated that it had doubts that the examples of D1 had been reworked to give the values set out in the notice of opposition since no

documentary evidence, such as test protocols, had been supplied.

2.2.2 Appellant I, then the opponent, is the applicant of D1. During the oral proceedings before the opposition division it transpired that these values did not relate to reworkings of Examples 13 and 16 of D1, but to data obtained during the development work prior to the filing of D1 (see point 3.2 of the minutes of the oral proceedings before the opposition division).

2.2.3 With its grounds of appeal Appellant I filed documents B1 to B4, which are laboratory notebooks and analytical data together with an affidavit (D11) from Ms Rawohl, one of the inventors named in D1. However, in its letter of 24 April 2014 (see page 9, paragraph 2), Appellant I again referred to the values shown in these documents as being obtained by reworking Examples 13 and 16.

2.2.4 During the oral proceedings before the board, Appellant I confirmed that these values were erroneously referred to in the grounds of appeal as being the results obtained by reworking the examples specified in D1 and agreed there may have been some confusion as to their status during the opposition proceedings.

2.2.5 In the board's opinion it should have been apparent to Appellant I that the status of the values referred to in the notice of opposition required clarification, at the latest with the reception of the annex to the summons to the oral proceedings before the opposition division by which the opposition division specifically drew Appellant I's attention to this point by criticising the absence of test protocols,.

2.2.6 The status of the values also had important implications for the preparation of the parties cases, since if the values were not reworkings, but raw data, it is possible that documents B1 to B4 comprise additional information beyond that disclosed in D1. Hence, they might be seen as a separate disclosure and potential prior art, leading to additional topics for discussion. .

2.2.7 Consequently, documents B1 to B4 and D11 are not admitted into the proceedings since they should have been filed during the first instance proceedings (Article 12(4) RPBA).

2.3 Documents D4 to D8

2.3.1 Documents D4 to D6 were filed in opposition proceedings, but after expiry of the opposition period set out in Article 99(1) EPC. The opposition division did not consider these documents to be prima facie more relevant than those already on file and did not admit them into the proceedings, exercising its discretion under Article 114(2) EPC.
A board of appeal should only overrule the way in which a first instance department has exercised its discretion if the board comes to the conclusion that the first instance department in its decision has exercised its discretion according to the wrong principles, or without taking into account the right principles, or in an unreasonable way (G 7/93, OJ EPO 1994, 775, point 2.6 of the reasons, T 229/08, point 3.1 of the reasons).
In the present case, the opposition division mentioned two criteria for not admitting documents D4 to D6 to the proceedings, namely it considered the late filing as an abuse of procedure and considered the documents

prima facie not more relevant than other documents on file, and explained why it came to this conclusion. The aspects taken into account by the opposition division belong to the accepted criteria for deciding on the admissibility of late-filed documents, ie correct principles were applied. In view of the opposition division's explanation, there is also no reason for considering that the opposition division exercised its discretion in an unreasonable way. Therefore, on the basis of the above principles for the limited review of discretionary decisions of the departments of first instance, the board does not consider the opposition division's decision not to admit D4 to D6 to the opposition proceedings to be defective.

2.3.2 In its grounds of appeal, Appellant I again relied on D4 to D6 in the context of its objection on inventive step and, in its letter of 24 April 2014, provided further explanations why it considered the documents to be relevant. The board agrees with the reasons given by the opposition division concerning the prima facie relevance. The additional arguments of Appellant I do not alter this conclusion. Accordingly documents D4 to D6 are not taken into consideration in the appeal proceedings pursuant to Article 12(4) RPBA.

2.3.3 As to documents D7 and D8, Appellant I has not provided any explanation as to why these documents could not have been filed before their eventual submission with the grounds of appeal. In addition, these documents do not seem to be highly relevant. D7 describes the control of hydrogen in niobium powders in order to reduce the leakage current and increase capacitance. Although the characteristics of niobium and tantalum powders might be similar, there is no teaching in D7 of the effect of hydrogen content combined with the

surface area of the powders; the capacitance of the powders is less than 100,000 µFV/g , which is significantly lower than the values obtained by the disputed invention (200,000 µFV/g or more). Similarly, D8 provides no indication of the effect of the hydrogen content and surface area of tantalum powders, and given that the maximum charge achieved is 25,000 µFV/g, it is clear that the document is not highly relevant.

2.3.4 Thus, in accordance with Article 12(4) RPBA, D7 and D8 will also not be taken into consideration in the appeal proceedings.

2.4 Documents D14 to D17

2.4.1 These documents were filed with letter of 24 April 2014 and provided further support for the general knowledge of the skilled person which had already been asserted during the proceedings. On this basis, the board admits these documents into the proceedings.

2.5 Annexes C1, AD1, E1 and F1

2.5.1 The allegation that a reworking of Example 3 on page 25 of D2, as shown in Annex C1, anticipated the subject-matter of claim 1 as granted was made for the first time with the grounds of appeal. During the opposition proceedings, Appellant I (opponent) alleged that reworking Examples 5 and 6 took away the novelty of claim 1 as granted (see letter of 27 August 2010, page 6, first paragraph). In its decision, the opposition division held that these allegations were not substantiated sufficiently since the experimental details of the reworkings had not been presented (see paragraph 3.3 of the contested decision). Even though the filing of the details of the reworking of a

different example can be considered as a different line of attack, C1 is admitted as the board considers it to be closely related to the reasoning taken by the opposition division.

2.5.2 Annexes E1 and F1 relate respectively to the reworkings of Examples 8 and 7 of D1. As with Annex C1, this data was presented for the first time in Appellant I's grounds of appeal. During the opposition proceedings, reference had been limited to the alleged reworking of Examples 13 and 16 of D1. However, at first sight these documents appeared to merit further study and were admitted into the proceedings.

2.5.3 Annex AD1 lists values of leakage current and capacitance for anodes fabricated from various powders exhibiting different hydrogen and specific surface area values. This document may therefore provide some background information and is admitted into the proceedings.

2.6 In conclusion, the state of the art which will be taken into consideration is as follows:

D1: WO-A-98/37248
D2: WO-A-00/67936
D3: T. Balaji et al, "Hydriding, powder processing and dehydriding of tantalum for capacitor application", Metals Materials and Processes, Vol. 14, No. 2, pages 155 to 162, 2002.

C1: Experimental Report concerning Example 3 of WO-A-00/67936 (D2 above);
AD1: Test Nr. Ha 71131, an Experimental Report concerning various tantalum powders.

E1: Experimental Report concerning Example 8 of WO-A-98/37248 (D1 above).
F1: Experimental Report concerning Example 7 of WO-A-98/37248 (D1 above).
D14: DE1805372;
D15: Ullmann's Encyclopedia of Industrial Chemistry, Fifth edition, Volume A26, pages 75 to 77, VCH Publishers 1995;
D16: Gmelins Handbuch der anorganischen Chemie ("Handbook of inorganic Chemistry") "Tantal Teil B" ("Tantalum Part B"), pages 1 to 7, publ. 1970;
D17: Graphical representation of the data shown on pages 4 and 5 of reference D16.

3. Novelty, Claim 1 as granted (Main request)

3.1 With respect to D1 and D2

3.1.1 D1 makes no reference to the hydrogen content of the powders, hence the opposition division concluded correctly that the defined ratio H_2/BET was not disclosed in D1. Appellant I alleges that the powder of claim 1 lacks novelty with respect to the powders of Examples 13, 16, 7 and 8 of D1, since they will inevitably have a hydrogen content that meets the requirements of claim 1. A hydrogen content is specified for Examples 16 and 17 of D2, however, in both cases the specific surface area of the tantalum powder lies outside the range of 4 to 10m^2/g required by claim 1.

3.1.2 Appellant I has submitted raw data concerning Examples 13 and 16 of D1, as shown in Annexes B1 to B4 and D11. However, for the reasons given above, Annexes B1 to B4 and D11 have not been admitted into the proceedings.

Hence, the allegations based on these documents are not considered further.

3.1.3 Appellant I further maintains that the reworking of Examples 8 and 7 of D1 as well as Example 3 of D2, as shown in Annexes E1, F1 and C1 respectively, prove that these powders must also inevitably comprise hydrogen in such quantities that the requirements of claim 1 as granted are met.

3.1.4 As Appellant II has pointed out, all of these reworkings were carried out using more modern equipment than that available at the priority date of D1 which may possibly have influenced the results.

3.1.5 Also, the board would add that in the background explanatory notes ("Hintergrund") of Annexes E1,F1 and C1, the objective is given as one of showing by the reworkings that the tantalum powder obtained ***is*** novelty destroying. This is subtly different from an objective of carrying out testing ***to see if*** the composition of a powder produced from the reworkings is novelty destroying. It is accepted case law of the boards of appeal that any possibility that employees carrying out comparative testing might be influenced by their employer's expectation of the result of their tests is to be avoided (e. g. see T702/99, paragraph 3 of the Reasons).

3.1.6 The data presented in Annexes E1 and F1 is limited to the hydrogen and BET values; a complete analysis of the powders obtained by the reworkings is not given. This means it is not possible for the board to compare the powders produced by the reworkings with the more complete specifications given in D1 for each of the

Examples (see pages 19 to 22). Consequently, the board cannot be certain that the data shown in the reworkings of Annexes E1 and F1 are the result of faithful and exact reproductions of the methods used to produce the powders of Examples 8 and 7 of D1.

3.1.7 The reworking shown in Annex C1 is not reliable since, as pointed out by appellant II, there are manifest differences in the procedures adopted. In particular, the procedure set out in C1 differs from that of Example 3 in D2, in that:

- the step of reducing tantalum oxide is carried out in D2 at 1000°C for 6 hours (see Example 2 on page 23), whereas in C1 it is at 855°C for 9 hours;

- according to the deoxidation step of Example 3, no separation of reducing agent (Mg) and oxide is necessary following the deoxidation, whereas in C1 excess magnesium is separated by washing in dilute sulphuric acid and filtering (paragraph at the top of the second page).

3.1.8 The test for novelty is strict, and in the present case it cannot be said with certainty that a particular hydrogen content will inevitably be achieved for the powders of the cited examples.

3.1.9 Thus, the subject-matter of claim 1 differs from that of D1 in terms of the definition of the hydrogen content and from D2 in terms of the specific surface area.

3.2 Claims 3 and 4 as granted

3.2.1 Appellant I has argued that if it is acknowledged that the process of sintering the powder of claim 1 changes its composition, then the anode of claim 3 must be made out of tantalum powder without the characterising characterising features of claim 1. In its view, such anodes are disclosed in D1, D3, D4, D6 and D8 therefore claims 3 and 4 are not new.

3.2.2 Claims 3 and 4 are considered to be drafted as "product by process" claims. Although it is preferable whenever possible to avoid such a formulation, such claims are not prohibited. As mentioned in the contested patent (see paragraphs [0025] to [0027], the mechanism by which the hydrogen content and specific surface area of the powder effect the properties of the sintered powder is not exactly known, nevertheless an improvement in capacitance and leakage current has been established. In the light of this, contrary to the view held by Appellant I, it seems appropriate to define the products of claims 3 and 4 as being produced by the defined process. However, it is well established that the product per se should be novel and inventive, and is not rendered so merely because it is made by a new and inventive process. For a process feature to have any relevance in a product claim it must result in a discernible physical characteristic in the product, which in this case is the combination of capacitance and leakage current.

3.2.3 As set out above, claims 3 and 4 are to be construed as defining an anode and a capacitor respectively which has been obtained by using the tantalum powders of claims 1 or 2 as the starting material. According to the specification (paragraph [0018]), capacitors having

a capacitance of 200,000 µFV/g or more and a leakage current of 1.0 nA/µFV or less are achieved. It is thus apparent that use of the claimed powders results in an anode and a capacitor having particular physical features which give rise to these properties.

3.2.4 It is therefore necessary to examine if such products can be derived from the prior art cited by Appellant I.

3.2.5 Document D1 discloses a tantalum powder for producing capacitors with a capacity of 120,000 to 180,000 µFV/g with a leakage current of less than 2 nA/µFV (page 7, lines 20 to 24); these values fall outside the ranges of the disputed patent. D3 merely refers to tantalum powders for capacitors with high capacitance and low leakage current without specifying any values.

3.2.6 The properties of the prior art anodes and capacitors thus differ from those cited in the disputed patent. Since an anode and a capacitor having the properties derived from using the claimed tantalum powder as the starting material are not directly and unambiguously derivable from the prior art, the subject-matter of claims 3 and 4 is novel.

4. Inventive Step

4.1 Appellant I's arguments relying on D4, D6, D7 and D8 are not to be considered since these documents have not been admitted into the proceedings by the board.

4.2 As concerns Appellant I's arguments based on D1 and D2, both of these documents concern tantalum powders and hence provide appropriate starting points for the assessment of inventive step.

4.3 As set out above under novelty, the subject-matter of claim 1 differs from the disclosures of D1 or D2 in terms of the definition of the hydrogen content or of the specific surface area.

4.4 Starting from either D1 or D2, the objective problem to be solved is to provide a tantalum powder having a large surface area, which leads to high capacitance, yet a low leakage current when formed into an anode in a capacitor (see paragraph [0012] of the patent).

4.5 The solution proposed by the patent is to provide a powder having a particular specific surface area and to control the hydrogen content to surface area ratio, as defined in claim 1.

4.6 The features of high capacitance and low leakage current relate to a capacitor made from the sintered powder rather than the tantalum starting powder itself. According to the disputed patent (paragraph [0046]), the powder is sintered at 1000 to 1400°C for 0.3 to 1 hour and then subjected to anodic oxidation. On the basis of this, Appellant I argues that the alleged technical effect cannot be attributed to the hydrogen content, since there would be no hydrogen remaining in the sintered powder after such a treatment. Experimental results (Annex AD1) were submitted by Appellant I to demonstrate lack of the alleged technical effect. In particular, the Table in section 4 of Annex AD1 gives the results for eight powders, all of which have a specific surface area as claimed, but only four of which have the required hydrogen content / specific surface area ratio (H/BET). Those samples having the claimed H/BET ratio do not exhibit improved values for capacitance and leakage current over those

with greater H/BET ratios lying outside the upper limit of the claimed range.

4.7 The BET surface area of the powders in Annex AD1 have values between 4.20 and 4.65 m^2/g, ie they lie close to the lower end of the claimed range (4 to 10 m^2/g). The H/BET ratios of the four samples not corresponding to the invention are between 114 and 140, ie they lie just above the claimed range of 10 to 100; there are no samples having a ratio lower than the claimed range.

4.8 Consequently, the four samples said not to correspond to the invention have similar BET and H/BET values, and are insufficient to conclude conclusively that the alleged technical effect does not exist for the claimed ranges.

4.9 As stated on page 6 of the contested decision, the extent of dehydration occurring during sintering of the claimed powder is unknown, and regardless of the degree of removal of hydrogen during the processing of the powders, the results presented in Tables 1 to 3 of the disputed patent show that, by starting with a tantalum powder having the properties of claim 1, the combination of capacitance and leakage is improved. As argued by Appellant II, the exact scientific explanation as to why the hydrogen content of the tantalum starting powder influences the properties of a capacitor made from the powder may not be known, but this does not detract from the fact that experimental results have shown the effect to exist.

4.10 Even if the alleged technical effect was absent, this alone does not mean that there is a lack of inventive step. In such a case the problem has to be reformulated and reasoned with respect to the state of the art, as

is required by Article 56 EPC (see for example T1212/11 point 3.2, T 2375/10 point 2, T 306/09 point 4 and T 87/08 point 6).

4.11 Appellant I suggested that in the absence of a technical effect, the problem should be reformulated to providing an alternative tantalum powder. However, it remains unlikely that the skilled person, when considering tantalum powders for capacitors would consider adjusting the hydrogen content of the powders since, as discussed above, it would appear from common knowledge in the art that there would be no or little hydrogen in the final product. There is thus no incentive starting from either D1 or D2 for the skilled person to adjust the hydrogen content in accordance with claim 1.

4.12 Since there is no suggestion in the prior art to adjust the hydrogen content and surface area of the powders of D1 or D2 in the claimed manner, the subject-matter of claim 1 has an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained unamended.

The Registrar: The Chairman:

C. Spira G. Ashley

Decision electronically authenticated