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**Datasheet for the decision
of 4 March 2010**

Case Number: T 1960/08 - 3.2.07

Application Number: 02768327.5

Publication Number: 1409760

IPC: C23C 8/02

Language of the proceedings: EN

Title of invention:

Method or surface oxidizing zirconium and zirconium alloys and resulting product

Applicant:

SMITH & NEPHEW, INC.

Opponent:

-

Headword:

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Relevant legal provisions:

EPC Art. 54, 84, 111(1)

EPC R. 115(2)

RPBA Art. 15(3)

Relevant legal provisions (EPC 1973):

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Keyword:

"Clarity of claims (main request and first to third auxiliary requests - no)"

"Novelty (main request and first to second auxiliary requests - no)"

"Request for remittal (rejected)"

Decisions cited:

T 0150/82, T 0204/83, T 0450/89, G 0002/88

Catchword:

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Case Number: T 1960/08 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 4 March 2010

Appellant: SMITH & NEPHEW, INC
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Tennessee 38116 (US)

Representative: Connors, Martin L.H.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 15 November 2007
refusing European application No. 02768327.5
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: H.-P. Felgenhauer
Members: H. Hahn
E. Dufrasne

Summary of Facts and Submissions

- I. The applicant lodged an appeal against the decision of the Examining Division to refuse the European patent application No. 02 768 327.5.
- II. The Examining Division held that the subject-matter of claims 1 and 11 of the claims as originally filed lacked novelty over the zirconium metal as disclosed in D1 (WO-A-98 42390). It further considered that the requirement of Article 56 EPC was not met since the object of the application, i.e. to obtain a coating of blue-black or black oxidized zirconium of uniform thickness, has already been achieved by the process of D1. It did not see any special effect of choosing any particular Zr alloy since there are no specific examples in the description and since there is no other (structural or metallographic) evidence on file showing improved or superior Zr-oxide coatings by selecting a single phase crystalline material thereof.
- III. With its grounds of appeal dated 20 March 2008 the appellant requested to set aside the decision and to grant a patent on the subject-matter as defined in the claims 1 to 24 of the main request filed with said grounds of appeal. Alternatively, it requested to grant a patent on the basis of either the first, second or third auxiliary requests, all as filed with said grounds of appeal. In case that the Board intended to refuse any of the requests, oral proceedings were requested.

IV. The independent claims 1 and 11 of the main request read as follows:

"1. A method of coating a zirconium or zirconium alloy with a layer of blue-black or black oxidized zirconium of uniform thickness, comprising the steps of altering the surface roughness of a zirconium or zirconium alloy having a single phase crystalline structure and uniform composition and subsequently oxidizing said zirconium or zirconium alloy."

"11. A prosthesis for implantation in a patient, comprising:

(a) a prosthesis body having an external surface at least a portion of which is formed of zirconium or zirconium alloy; and

(b) a blue-black or black oxidized zirconium coating of uniform thickness formed on said portion of the external surface,

wherein said coating of blue-black or black oxidized zirconium is formed by the method of any of claims 1-10."

V. Independent claim 1 of the first auxiliary request differs from claim 1 of the main request in that the definition "... or zirconium alloy having a single phase ..." has been replaced by the definition "... or zirconium alloy **consisting of** a single phase ...". Independent product claim 11 of the first auxiliary request is identical with that according to the main request.

VI. Claim 1 according to the second auxiliary request reads as follows (amendments compared to claim 1 of the main request are in bold; emphasis added by the Board):

"1. A method of coating a zirconium or zirconium alloy with a layer of blue-black or black oxidized zirconium of uniform thickness, comprising the steps of altering the surface roughness of a zirconium or zirconium alloy having a single phase crystalline structure and uniform composition and subsequently oxidizing said zirconium or zirconium alloy, **characterized in that said step of altering the surface roughness of a zirconium or zirconium alloy having a single phase crystalline structure and uniform composition comprises altering the surface roughness of pure alpha phase zirconium.**"

Independent claim 10 differs from claim 11 of the main request only in that the reference to claims has been amended to claims 1-9.

VII. Claim 1 according to the third auxiliary request reads as follows (amendments compared to the claim 1 of the main request are in bold; emphasis added by the Board):

"1. A method of coating a zirconium or zirconium alloy with a layer of blue-black or black oxidized zirconium of uniform thickness, comprising the steps of altering the surface roughness of a zirconium or zirconium alloy having a single phase crystalline structure and uniform composition and subsequently oxidizing said zirconium or zirconium alloy, **characterized in that said step of altering the surface roughness of a zirconium or zirconium alloy having a single phase crystalline structure and uniform composition comprises altering**

the surface roughness of a zirconium or zirconium alloy having about 0.3 percent by weight of oxygen."

Independent product claim 10 of the third auxiliary request is identical with that according to the second auxiliary request.

VIII. With a communication dated 16 October 2009 and annexed to the summons to oral proceedings the Board gave its preliminary opinion with respect to the claims of the main request and the first to third auxiliary requests, annexing photocopies of new prior art referred to by the Board, namely of documents D3 ("High-Temperature Phase Diagram for the System Zr-O", R.J. Ackermann et al., Journal of the American Ceramic Society, Vol. 60 (1977), No. 7-8, pages 341-345) and D4 ("Experimental constraints on the phase diagram of elemental zirconium", J. Zhang et al., Journal of Physics and Chemistry of Solids 66 (2005), pages 1213-1219).

The Board indicated that it had the power in accordance with Article 111(1) EPC to examine whether or not the application and the invention to which it relates meet the requirements of the EPC and that this also applies to requirements the Examining Division had not considered in the examination proceedings or had regarded as fulfilled.

Within its preliminary and non-binding opinion the Board stated i.a. that the subject-matter of the independent claims of all requests was not clear and that the subject-matter of the independent claims of the main request, and the first and second auxiliary request was considered to lack novelty over D1, taking

account of the phase diagrams of pure Zr according to D3 and D4.

With respect to a remittal the Board stated that, provided that a request were to meet the requirements of Articles 84 and 123(2) EPC and of novelty, it will consider remittal or may exercise its competence for further prosecution of the case.

The appellant was given the opportunity to file observations to the communication.

- IX. With fax dated 5 January 2010 the appellant's representative submitted, as a response to the summons to oral proceedings, that he would have a "pre-arranged work conflict" on 3 and 4 March 2010 so that it would not be possible for him to attend the arranged oral proceedings. Therefore the appellant requested to postpone the oral proceedings.
- X. With a communication dated 14 January 2010 the Board responded to the appellant's request for the postponement of the oral proceedings. Taking account of the Notice of the Vice-President of DG3 dated 16 July 2007 concerning oral proceedings before the boards of appeal of the EPO it remarked that the request was neither sufficiently substantiated nor was it submitted as soon as possible. The Board therefore did not allow the appellant's request and the summons for oral proceedings scheduled for 4 March 2010 was maintained.
- XI. With fax dated 2 March 2010 the appellant submitted that it would not attend the oral proceedings.

Furthermore, with fax dated 2 March 2010 it requested that the oral proceedings be held *in absentia* so that the appellant can receive a written, reasoned decision after the hearing. The appellant further requested a remittal to the first instance on the basis of a suitably amended third auxiliary request (for the exact wording see point 5.1 of the reasons).

XII. Oral proceedings before the Board were held on 4 March 2010 in the absence of the appellant. At the end of the oral proceedings the Board announced its decision.

XIII. The appellant did not reply in substance to the communication of the Board dated 16 October 2009. The submissions of the grounds of appeal which are relevant for the present decision may be summarised as follows:

In accordance with T 150/82 it is not possible to define the prostheses of the "product-by-process" claims satisfactorily to their composition, structure or some other testable parameter.

The subject-matter of the independent claims 1 and 11 of the main request is novel because claims 1 and 11 do not cover elemental zirconium but only zirconium metal having a layer of blue-black or black oxidized zirconium of uniform thickness. Furthermore, "commercial zirconium or any known zirconium of normal industrial purity" does not have a single phase crystalline structure and uniform composition as required by claim 1. For example, Zircadyne 702 (Zr-702) is considered to be "commercially pure" despite the fact that it contains low levels of impurities such as iron. Such impurities can cause precipitates and other

"second phase" disruptions of the primary crystalline structure. Thus, industrial experts might refer to "commercial zirconium" or "zirconium of normal industrial desired purity" as pure, multi-phase zirconium. Zr-702 (and the Zircalloys) has second phase inclusions in a single phase matrix. Zr-702 comprises hafnium (about 2%) which exists in solid solution with the zirconium and comprises second phase particles (SPPs). Zr-702 has 1000-1500 ppm residual iron, which is above the solid solubility limit for forming $ZrFe_2$. These SPPs exist in the form of very small particles (< 5 micron). Zr-702 also comprises other miscellaneous SPPs including ZrC and Zr_3P that form as a result of residual carbon and phosphorus that are above the respective solid solubility limit. Exhibit I attached to the grounds of appeal shows coextruded Zr_2 /"pure Zr" with the "pure Zr" being nuclear grade material (without Hf) comprising less than 500 ppm Fe, which is still clearly discerned as small SPPs ($ZrFe_2$) within the bigger grains ("dots") and thus proves that such known materials are multi-phase and not single phase materials.

D1 explicitly discloses a two-phase crystalline structure (see page 7, lines 20 to 32) and does not explicitly or implicitly disclose a single phase structure as required by claim 1.

In order to destroy novelty there must be a "clear and unmistakable" disclosure (T 450/89) of all the features of the invention as claimed in combination (G 2/88), i.e. the invention must be directly and unambiguously derivable from the prior art (T 204/83).

Furthermore, if the person skilled in the art were to use "commercially pure" zirconium such as Zr-702 or the Zr-705 as disclosed in D1 he would not achieve the uniform oxide thickness as required by the present invention as defined in claim 1. The metal microstructure can be distinguished between the products of D1 and the claimed invention. Provided that the information remains confidential the applicant may be prepared to disclose an internal Research Report dated October 1997 that shows that Zr-702 has two phases, or to provide an affidavit declaring that the skilled person following the teaching of D1 would have found that the materials disclosed therein do not enable the formation of the uniform oxide thickness as required by the present invention as defined in claim 1, and as evidenced by said internal Research report.

The above arguments similarly apply to the claims of the first to third auxiliary requests.

Reasons for the Decision

1. As announced in its fax dated 2 March 2010, the appellant did not attend the oral proceedings. The appellant having been duly summoned, the oral proceedings were held in its absence pursuant to Rule 115(2) EPC and Article 15(3) RPBA.
2. Since the Board came to the conclusion that the independent claims of all requests lack clarity and that the subject-matter of the independent claims of the main request, the first and second auxiliary requests lack novelty, there exists no need to verify

whether or not the amendments comply with Article 123(2) EPC.

2.1 In the communication accompanying the summons for oral proceedings the Board raised objections under Articles 84 and 54 EPC, explaining why in the Board's opinion the independent claims of the main request and the first to third auxiliary requests were held to lack clarity and why the subject-matter of the independent claims of the main request and of the first and second auxiliary requests lacked novelty over D1 in the light of D3 and D4.

2.2 The appellant neither argued in substance with respect to these objections nor did it file amended claims and it did also not attend the oral proceedings. Since the appellant did not refute or overcome the objections raised in the cited communication, for the Board there is no reason apparent to depart from its preliminary opinion expressed therein.

3. *Clarity (Article 84 EPC)*

3.1 Firstly, the Board does not see any need for wording the independent product claim, i.e. the independent claims 11 of the main and first auxiliary requests and claims 10 of the second and third auxiliary requests, respectively, as a product-by-process claim since it is actually possible to define all product features including the surface roughness, the oxide layer thickness, etc. as structural features.

Thus the present case is considered not to fall under the exceptions as foreseen according to the decision

T 150/82 (OJ EPO 1984, 309; see also the Case Law of the Boards of Appeal of the EPO, 5th edition 2006, section II.B.6.3). According to said decision T 150/82 the onus is on the appellant to show the exceptionality of its case and that it is "absolutely necessary" to word the claim as "product-by-process" claim.

In the present case the appellant has not submitted any evidence in this respect although this deficiency has been referred to in the Board's communication.

3.2 Secondly, the independent claims 1 and 11 of the main and first auxiliary requests, and of claims 1 and 10 of the second and third auxiliary requests do not meet the requirement of Article 84 EPC for the following reasons:

3.2.1 According to Article 84 EPC the claims shall define the matter for which protection is sought and they shall be clear and concise.

At present the independent claims directed to the prosthesis *per se*, i.e. independent claims 11 of the main and the first auxiliary requests and independent claims 10 of the second and third auxiliary requests - which are written in the one-part form - are not clear because they do **not** expressly define that the zirconium or zirconium alloys **have a single phase crystalline structure** while the method referred to by the feature "wherein said coating of blue-black or black oxidized zirconium is formed by the method of any of claims 1-10" (or "any of claims 1-9" for the second and third auxiliary requests) clearly relates to zirconium or zirconium alloy having a single phase crystalline structure.

3.2.2 Furthermore, it is clear from the description of the application that "in order to form continuous and **useful oxidized zirconium coatings** of uniform thickness over the desired surface of the metal alloy prosthesis substrate, **the metal alloy should contain from about 80 to about 100 wt.% zirconium**" (see page 10, lines 20 to 23).

Since claims 1 and 11 of the main and first auxiliary request, and claims 1 and 10 of the second and third auxiliary request do not contain this limitation they do not meet the requirement of Article 84 EPC.

In this context the Board remarks that the statement in the description "**As used herein, "zirconium alloy" is defined as any metal alloy containing zirconium in any amount greater than zero**" leads to an alloy in which zirconium is a minor constituent having to be considered as a "zirconium alloy" (see page 5, paragraph [0024]). Such a definition **is inconsistent** with the aforementioned zirconium content requirement and also **not** in agreement with the common definition of a zirconium alloy, which normally requires a zirconium content of $\geq 50\%$, so that claims 1 and 11 or claims 1 and 10, respectively, of the four requests are also unclear in view of this statement.

3.2.3 Furthermore, the subject-matter of claims 1 and 10 of the third auxiliary request is considered to be unclear since "zirconium ... having about 0.3 percent by weight of oxygen" represents no (elemental) zirconium but only an alloy thereof (compare page 10, lines 29 and 30: "An example of an alloy useful in the present application

is α -phase zirconium with 0.3 wt% oxygen, an α -phase stabilizer"). Additionally, independent claim 10 does not specify said oxygen content of the zirconium alloy.

Furthermore, the term "about" of the feature "about 0.3 percent by weight of oxygen" of claim 1 of the third auxiliary request renders this claim unclear.

3.3 Consequently, each of the four requests - i.e. the main and first to third auxiliary requests - comprises independent claims not meeting the requirements of Article 84 EPC. Therefore the main request and the first to third auxiliary request are not allowable.

4. *Novelty (Article 54 EPC)*

4.1 For completeness sake the Board indicates that as referred to in its communication, the subject-matter of claims 1 and 11 of the main request and of the first auxiliary request is, like the subject-matter of claims 1 and 10 of the second auxiliary request, not novel with respect to D1 (cf. section 5.3).

5. *Request for remittal (Article 111(1) EPC)*

5.1 The Board considers the appellant's request for remittal submitted by fax dated 2 March 2010 (see point XI above) "if the Appeal Board is minded to refuse the Main, First, and Second Auxiliary requests, it be so kind as to allow remittal to the department of first instance so that the appellant **can pursue a suitably amended Third Auxiliary request that complies with Articles 84 and 123(2) EPC**, in addition to being

novel and involving an inventive step" (emphasis added by the Board) to be unclear for the following reasons:

According to this request it is not known whether such a remittal should be based on the claims of the third auxiliary request, as filed with the grounds of appeal, or on the basis of "suitably amended" claims of said third auxiliary request to be filed in the future.

- 5.2 The first alternative would imply that the Board should remit to the first instance a third auxiliary request which it considered **not** to be allowable under Article 84 EPC (see points 3 to 3.3 above) so that the appellant at the first instance then could amend it to overcome the objections made by the Board.

The second alternative would imply that the Board should remit the case to the first instance on the basis of a "**suitably amended** third auxiliary request that complies with Articles 84 and 123(2) EPC" without knowing what the subject-matter of this request should be, since the appellant has **not** submitted such a "suitably amended" third auxiliary request with its last submission which would meet the requirements of Articles 84 and 123(2) EPC.

- 5.3 An unclear request, however, has to be rejected by the Board. Furthermore, both alternatives represent no basis for an allowable remittal to the first instance.

- 5.4 Furthermore, the appellant stated that its request for remittal took account of point 6 of the Board's communication wherein it was remarked "**Provided that a request were to meet the requirements of Articles 84**

and 123(2) EPC and of novelty, **the Board will consider remittal of the case** to the department of first instance or may exercise competence for further prosecution, i.e. examination of inventive step" (emphasis added by the Board).

5.4.1 The *proviso* in said passage "provided that a request were to meet the requirements of Article 84 EPC ..." implies that first there has to be a request on file which subject-matter is defined and which fulfils the requirements of Articles 84, 123(2) and 54 EPC. Only **then** the Board may exercise its discretion in accordance with Article 111(1) EPC to either remit the case to the first instance or to exercise its competence for further prosecution.

5.4.2 Since the appellant has **not** submitted such a request which would meet the said *proviso* - and thus the requirements of Articles 84, 123(2) and 54 EPC - there is neither a basis for a remittal of the case to the first instance nor for a further prosecution of the case by the Board.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H.-P. Felgenhauer