Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte KAZUMI KATO
and
HIROSHI TAODA

_____

Appeal No. 1997-2917
Application No. 08/351,697

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HEARD: OCTOBER 24, 2000

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Before PAK, KRATZ, and TIERNEY, ***Administrative Patent Judges***.

PAK, ***Administrative Patent Judge***.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 5, 6 and 8 through 10 as amended subsequent to the final Office action dated June 10, 1996, Paper No. 11. See the Amendment under 37 CFR § 1.116 dated September 5, 1996, Paper No. 13. Claims 1 through 3, the remaining claims in the application, stand withdrawn

from further consideration by the examiner as being directed to a non-elected invention. See the final Office action dated June 10, 1996. Claim 11, which was drawn to a non-elected invention, was canceled subsequent to the final Office action dated June 10, 1996. See the Amendment under 37 CFR § 1.116 dated September 5, 1996, Paper No. 13.

Appellants state (specification, pages 1 and 2) that:

> [C]eramic materials are invariably in a bulky state. Heretofore, it has been very difficult to produce a porous ceramic film, particularly a porous thin film. It has been virtually impossible to produce a porous thin film containing pores of a uniform diameter. Such methods as PVD, CVD, and sputtering and a method for anodic oxidation of metals have been available for the production of porous ceramic materials. These methods are at a disadvantage in being expensive to implement, incurring difficulty in obtaining products with large surface areas, encountering difficulty in controlling micropores, and limiting the metals usable as raw materials and consequently limiting the ceramic materials produced.

According to appellants (specification, page 4), the claimed sol-gel method for producing thin ceramic films or coatings solves the above-mentioned problems. The claimed sol-gel method is adequately described in independent claim 9 which is reproduced below:

> 9. A method for producing a ceramic film containing micropores of uniform diameter on a substrate, comprising:

a. hydrolyzing a metal alkoxide in the presence of at least one alcohol amine to produce a ceramic sol;

b. adding at least one member selected from the group consisting of polyethylene glycol and polyethylene oxide to the ceramic sol;

c. depositing the resultant ceramic sol on said substrate; and

d. heating the resultant substrate.

In support of his rejection, the examiner has relied upon the following prior art:

Nakanishi 5,009,688 Apr. 23, 1991
Kobayashi et al. (Kobayashi) 5,304,533 Apr. 19, 1994
(filed Aug. 24, 1988)

Yi et al. (Yi), "Sol-Gel Processing of Complex Oxide Films," 70 ***Ceramic Bulletin***, no. 7, 1173-79 (American Ceramic Society, 1991).

Claims 5, 6 and 8 through 10 stand rejected under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Yi, Kobayashi and Nakanishi.[1]

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[1]In view of the Amendment under 37 CFR § 1.116 dated September 5, 1996, Paper No. 13, the examiner withdrew the § 103 rejection of claims 5, 6, 8 and 9 as unpatentable over the combined disclosures of Nakanishi and Yi as set forth in the final Office action dated June 10, 1996. See Answer, pages 2-3, in conjunction with the final Office action, page 4. The examiner then extended the § 103 rejection of claim 10 as

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by the examiner and appellants in support of their respective positions. This review leads us to conclude that the applied prior art as a whole would have rendered the claimed subject matter obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103. Accordingly, we affirm the examiner's decision rejecting claims 5, 6 and 8 through 10 under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Yi, Kobayashi and Nakanishi. However, since our affirmance is based on a rationale materially different from that advanced by the examiner, we denominate our affirmance as involving a new ground of rejection under 37 CFR § 1.196(b).

As evidence of obviousness of the claimed subject matter under 35 U.S.C. § 103, the examiner relies on the combined

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unpatentable over the combined disclosures of Nakanishi, Yi and Kobayashi as set forth in the final Office action to reject claims 5, 6, 8 and 9 since these claims were either directly or indirectly amended to recite an alcohol amine which was the limitation included in claim 10. See Answer, pages 2-3, in conjunction with the final Office action, page 6.

disclosures of Yi, Kobayashi and Nakanishi. Yi discloses a sol-gel method for fabricating high quality ceramic thin films on different substrates to produce materials, such as a high temperature superconductor containing yttrium-barium-copper-oxide. See page 1173, column 1. The sol-gel method generally involves forming a solution of the elements of the desired compound in an organic solvent, polymerizing the solution to form a gel, and drying and firing this gel to displace the organic components to form an inorganic oxide. See page 1173, column 3. The solution is typically formed using a metal alkoxide, such as zirconium or titanium alkoxide, in an organic solvent, such as an alcohol. See page 1173, column 3, together with page 1174, columns 1 and 2. To obtain the desired homogeneity[2] of the gel and the desired stability of the viscosity and rheological properties of the solution, it is desirable to include a chelating organic ligand, such as organic acids, glycol, or beta-diketones, to the solution to form, for example, glycolated derivatives which are highly

[2]"The homogeneity of a gel is related to the quantity and distribution of voids within the gel and the distribution of different elements." See page 1174, column 3.

polymeric derivatives. See page 1174, column 2. Moreover, to solve the problem of the cracking of gel films, it is desirable to add ethylene glycol to the solution to introduce organic chains in the inorganic network of the gel. See page 1176, column 1. The claimed "polyethylene glycol" is embraced by the term "glycol" used in the Yi reference, see, e.g., Yi, page 1175, Fig. 2(B), and is expected to behave in the same or similar manner as ethylene glycol due to having the same dihydroxy functional groups at the end of an alkyl chain, see Yi, page 1174, column 1, together with page 1175, Fig. 2(B). The solution is deposited on a substrate prior to drying. See page 1174, column 1 and page 1176, column 3. Although the Yi reference teaches using an alcohol as indicated ***supra***, it does not mention employing an amine alcohol.

To remedy this deficiency, the examiner relies on the Kobayashi disclosure. Kobayashi discloses a process for producing a superconductor of an oxide system, such as a Y-Ba-Cu-O system using a sol-gel method. See column 1, lines 7-8, column 2, line 21, and column 4, line 52 to column 5, line 2. One of the sol-gel methods disclosed involves initially dissolving metal alkoxides, which may be dispersed

in an alcohol, in an alcohol amine, such as monoethanolamine. See column 9, lines 38-66. The alcohol amine is useful in rendering insoluble or hardly soluble metal alkoxides used in making a superconductor soluble. See column 10, lines 5-17. The dissolved metal alkoxides are hydrolyzed and sintered to form a superconductor having excellent superconducting characteristics. See column 9, lines 38-46 and column 10, lines 19-36. According to Kobayashi (column 22, lines 56-59):

> There is no particular restriction as to the sintering conditions (such as the temperature, the number of times and the atmosphere). However, it is usual to employ a temperature of from 700E to 950EC . . . .

When the dried superconducting materials are sintered at 900EC. for 4 hours, for example, they form porous products. See column 26, lines 58-60.

Given the fact that Kobayashi recognizes the advantage of using an alcohol amine, such as monoethanolamine, in a sol-gel method for producing a superconductor, one of ordinary skill in the art would have been motivated to employ the alcohol amine of the type described in Kobayashi in the sol-gel superconductor producing method described in Yi with a reasonable expectation of producing a superconductor having excellent properties.

At the hearing dated October 24, 2000, appellants' representative asserted that Yi does not teach that its film contains "micropores of uniform diameter." In other words, the gel-sol method described by Yi is not useful for forming a film containing "micropores of uniform diameter." In support of his position, appellants' representative referred to Yi's disclosure regarding the collapsing of pores of a PZT film at 400 to 1200EC. See Yi, page 1177. However, as indicated ***supra***, the superconductor material of the type described in both Yi and Kobayashi contains pores even after sintering it

at 900EC. for four hours. These pores are microscopic in nature, see Yi, pages 1175, column 2, and can be made more uniform by using particular acids, see Yi, page 1176, column 1. Nakanishi also teaches that in the sol-gel method of the type described in Yi and Kobayashi, a product of a sol-gel method sintered at the temperature described in Yi and Kobayashi can have micropores of substantially uniform diameter. See column 1, lines 58-68 and column 3, lines 15-17. Given these teachings, we determine that one of ordinary skill in the art would have been led to obtain porous superconductors having uniform pore sizes using the technique taught in Yi, Kobayashi, and/or Nakanishi, motivated by a desire to obtain a superconductor having consistent desired properties along the entire length of Yi's film.

Appellants also argue that the temperature recited in claim 8 is not suggested by the applied prior art. We do not agree. As indicated ***supra***, Kobayashi teaches that a temperature of
700E C. can be used to sinter the superconductor of the type described in the Yi reference.

For the foregoing reasons, we hold that the applied prior

art references as a whole would have suggested to one of ordinary skill in the art to arrive at the claimed subject matter within the meaning of 35 U.S.C. § 103. Accordingly, we affirm the

examiner's decision rejecting all of the appealed claims under 35 U.S.C. § 103. However, since our affirmance contains reasoning
materially different from that advanced by the examiner, we denominate our affirmance as containing a new ground of rejection under 37 CFR § 1.196(b).

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that "[a] new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner . . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record . . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED; 37 CFR § 1.196(b)

CHUNG K. PAK Administrative Patent Judge	)	
PETER F. KRATZ Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
MICHAEL P. TIERNEY Administrative Patent Judge	)	

CKP:hh

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