

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAKAO NAKAMURA

Appeal No. 1997-3031
Application No. 08/411,509

HEARD: May 4, 2000

Before JOHN D. SMITH, OWENS and LIEBERMAN, Administrative
Patent Judges.

JOHN D. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal pursuant to 35 U.S.C. § 134 from the
examiner's final rejection of claims 1, 3 through 5, and 8
through 11.

Claim 1 is representative and is reproduced below:

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1. A process for preparing a film formed on an oxide material on a substrate by using an apparatus comprising a vacuum chamber in which an oxidizing gas of O_2 including O_3 is supplied near the substrate so that pressure around the substrate is increased to 5×10^{-7} to 5×10^{-6} Torr while maintaining a high vacuum of 1×10^{-11} to 1×10^{-9} Torr around an evaporation source and Knudsen cell evaporation sources arranged in the vacuum chamber wherein the substrate is heated, molecular beam of constituent atoms of the oxide excluding oxygen are supplied from the K cell evaporation sources, an oxidizing gas of O_2 including about 70 volume percent O_3 is locally supplied to the vicinity of the substrate and a growing thin film is illuminated by ultraviolet having a wavelength of 200 nanometers or less so as to increase the O_3 content of the oxidizing gas.

The references of record relied upon by the examiner are:

DeLozanne 5,004,721 Apr.

2, 1991

Berkley et al. (Berkley), "Ozone processing of MBE grown $YBa_2Cu_3O_{7-x}$ films," IEEE Transactions on Magnetics, Vol. 25, No. 2, March 1989, pp. 2522-2525.

Sawa et al. (Sawa), "Effect of using pure ozone on in situ molecular beam epitaxy of $YBa_2Cu_3O_{7-x}$ thin films at low pressure," Appl. Phys. Lett. 64(5) Jan. 1994, pp. 649-651.

Siegrist et al. (Siegrist), "Growth of $YBa_2Cu_3O_{7-x}$ in pure ozone irradiated with ultraviolet light," Appl. Phys. Lett. 60(20), May 1992, pp. 2489-2490.

Yokoyama et al. (Yokoyama), "Atomic Layer Growth of Bi-Sr-Ca-Cu-O by Molecular Beam Epitaxy Using Ozone under UV Irradiation," Jpn. J. Appl. Phys. Vol. 30, No. 1B, Jan. 1990,

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pp. L106-L109.

Appealed claims 1 and 3 through 5 stand rejected under 35 U.S.C. § 103 as unpatentable over the admitted prior art in view of DeLozanne and Sawa, further in view of Yokoyama and Siegrist. Appealed claims 8 through 11 stand similarly rejected

under the same section of the statute over the above references, further in view of Berkley.

The subject matter on appeal is directed to a process for preparing a film formed of an oxide material such as an oxide superconductor thin film using a molecular beam epitaxy (MBE) method and a reactive co-evaporation method. More specifically, appellant's method forms a growing oxide material on a substrate by supplying a molecular beam of constituent atoms of the oxide excluding oxygen from a Knudsen cell evaporation source and locally supplying in the vicinity of the substrate an oxidizing gas of oxygen including about 70 volume percent ozone.

Further, according to the claimed process, the growing thin oxide film is "illuminated by ultraviolet having a wavelength

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of 200 nanometers or less so as to increase the O₃ content of the oxidizing gas." See appealed claim 1 reproduced above.

We have carefully reviewed the detailed stated rejection found in the answer with further explanation in the examiner's supplemental answer as to why the subject matter defined by the appealed claims would have been obvious to a person of ordinary skill in the art. However, we agree with appellant essentially for the reasons set forth in his brief and reply brief that the examiner has failed to establish a prima facie case of

obviousness for the subject matter defined by the appealed claims.

As a starting point for the examiner's stated rejection, the examiner refers to certain "admitted prior art" found in the specification at page 1, line 18, through page 3, line 21, that describes prior art processes for forming either oxide superconductor films or dielectric films by a molecular beam epitaxy technique combined with a reactive co-evaporation technique. As appellant accurately points out in his reply brief at page 3, this "admitted prior art" is really nothing

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more than a framework for the examiner's stated rejection which provides little or no motivation for any of the proposed modifications even in light of the teachings of the applied references. The mere fact that this "admitted prior art" process could be modified as proposed by the examiner is not sufficient to establish a prima facie case of obviousness. See In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). The examiner must persuasively explain why the prior art would have suggested to one of ordinary skill in the art the desirability of the proposed modifications. See Fritch, 972 F.2d at 1266, 23 USPQ2d at 1783-84.

Even if we agreed with the examiner that the relied upon prior art references would have suggested to one of ordinary skill in the art the desirability of carrying out a prior art process under the ultra low vacuum conditions defined by the herein claims, we cannot agree with the examiner that the relied upon prior art references would have suggested to one of ordinary skill in the art 1) the desirability of utilizing an oxidizing gas of oxygen including about 70 volume percent ozone locally supplied in the vicinity of the substrate, and 2) illuminating the growing film with ultraviolet having a

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wavelength of 200 nanometers or less so as to increase the ozone content of the oxidizing gas. With respect to these claimed requirements, the closest prior art cited by the examiner is the Yokoyama publication which exemplifies the use of an oxygen/ozone mixture containing an ozone content of approximately 10 percent which is exposed to an ultraviolet wavelength of 253.7 nanometers for the purpose of disassociating the ozone to generate oxygen atoms which are said to be "quite effective in enhancing the oxidation reaction." (col. 1, line 3 of page L107). The examiner's argument that one of ordinary skill in this art would have been led to use an oxidizing gas containing 70 percent by volume of ozone in a process as claimed because it would lead to "expected success" (answer, page 6), ignores the disclosure of Yokoyama at col. 2, lines 28 and 29 of page L107 that "ozone and UV irradiation may enhance the dissociation of CuO to produce Cu₂O" which is unfavorable for the synthesis of a superconducting oxide film. In addition, the examiner's analysis also ignores the disclosures of Yokoyama at page L108 in the paragraph bridging columns 1 and 2 where Yokoyama discusses prior processes using pure ozone, and states that,

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"it is clear that without the use of dangerous pure ozone, film of comparable quality can be grown by using diluted ozone and UV irradiation."

With respect to the claim requirement of illuminating the growing thin film by ultraviolet having a wavelength of 200 nanometers or less so as to increase the ozone content of the oxidizing gas, the examiner relies on the Siegrist publication as teaching that it is known that ozone absorbs UV radiation very efficiently at wavelengths shorter than 300 nanometers. The examiner thus argues that the selection of an optimized wavelength within the "disclosed wavelength range" of Siegrist would have been within the expected skill of the routineer in this art. However, appellant points out that Siegrist, like Yokoyama, is directed towards dissociating ozone, i.e., lowering the ozone content to produce excited states of atomic oxygen and of O₂, not increasing the ozone content of the oxidizing gas which is the requirement of the claims. Moreover, contrary to the implied suggestions of the examiner, Siegrist does not specifically state that ozone absorbs UV radiation very efficiently at all wavelengths shorter than 300 nanometers. Indeed, appellant argues that the use of a UV

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light having a wavelength of 200 nanometers or less produces a different reaction with ozone and oxygen than does a process using a UV wavelength of about 250 nanometers, as exemplified by the examiner's prior art references. See the brief at pages 14 and 15, the reply brief at pages 14 and 15 and the publication of Noyes, of record and attached to the appeal brief which arguably supports appellant's contentions.

In light of the above, we reverse the examiner's stated rejections of the herein appealed claims for obviousness.

NEW GROUND OF REJECTION

We enter the following new ground of rejection pursuant to 37 CFR § 1.196(b).

The appealed claims are rejected under the first paragraph of 35 U.S.C. § 112, as failing to comply with the written description requirement of this section of the statute. As discussed in our opinion above, a significant requirement of the appealed process involves the illumination of a growing thin film by ultraviolet having a wavelength of 200 nanometers or less so as to increase the O₃ content of the oxidizing gas. This claim language was introduced into claim 1 by an amendment filed on October 18, 1995. Ipsis verbis

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description is not found in the specification as originally filed for this amendatory claim language. More specifically, the originally filed application includes the broad disclosure that the ultraviolet preferably has a wavelength of 150 to 300 nanometers to promote reactions near a surface of a growing thin film and migration of deposited atoms. See the specification at page 5, lines 12 through 15. At page 9, line 25, to page 10, line 2, the specification does report on an ultraviolet light source **15** which produces ultraviolet light having wavelength of 172 nanometers. Again at page 10, lines 9 through 12, the specification indicates that the ultraviolet light source **15** is preferably a low pressure mercury lamp of wavelength of around 150 to 300 nanometers having an output of around 5 to 100 watt, which is preferably disposed at a distance of 100 to 500 mm from the substrate **4**. Consistent with the original disclosure in the specification, original dependent claim 2 simply defines the ultraviolet light as having a wavelength of 150 to 300 nanometers. As originally filed, therefore, the application does not reasonably convey to one skilled in the art that appellant had possession of the

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later claimed subject matter involving the use of ultraviolet light having a wavelength of 200 nanometers or less so as to increase the ozone content of the oxidizing gas.

It is also significant that appellant has consistently argued throughout the prosecution of this application that the use of a UV light having a wavelength of 200 nanometers or less produces a different reaction with ozone and oxygen than does a process using a UV wavelength of about 250 nanometers. Thus, although appellant originally describes the use of UV wavelengths of around 150 to 300 nanometers and exemplifies the use of UV light having a wavelength of 172 nanometers, there is no indication or hint in the originally filed application that a UV light having a wavelength of 200 nanometers or less produces a different reaction with ozone and oxygen than does a process using a UV wavelength of about 250 nanometers as exemplified in the applied prior art references and covered by the originally described broad range of around 150 to 300 nanometers. Where the broad described range pertains to a different invention than the narrow (and subsumed) claimed range, the broader range does not describe the narrower range. See In re Wertheim, 541 F.2d 257, 264-65,

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191 USPQ 90, 98 (CCPA 1976). Thus, by virtue of the later claimed requirement that the ultraviolet light have a wavelength of 200 nanometers or less so as to increase the ozone content of the oxidizing gas, the appealed claims violate the written description requirement of 35 U.S.C. § 112, first paragraph.

In summary, the examiner's rejections of the appealed claims for obviousness are reversed. A new ground of rejection has been stated against the appealed claims under the first paragraph of 35 U.S.C. § 112, written description requirement.

This decision contains new a 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. and 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 appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new

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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).

REVERSED; 37 CFR § 1.196(b)

JOHN D. SMITH)	
Administrative Patent Judge)	
)	
)	
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TERRY J. OWENS)	
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)	
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