

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT J. CAVA and
CHANG-BEOM EOM

Appeal No. 95-3898
Application 08/156,953¹

ON BRIEF

Before THOMAS, JOHN D. SMITH and BARRETT, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

¹ Application for patent filed November 19, 1993. According to the appellants, this application is a continuation of Application 07/940,426, filed September 4, 1992.

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DECISION ON APPEAL

Appellants have appealed to the Board from the examiner's final rejection of claims 1 to 8, which constitute all the claims in the application.

Representative claim 1 is reproduced below:

1. A device comprising a substrate and a plurality of compositionally distinguishable thin film layers formed on said substrate characterized in that at least one layer of said plurality comprises an epitaxial region of $\text{Sr}_x\text{Ca}_{1-x}\text{RuO}_3$ where $0 \leq x \leq 1$ wherein said region has essentially isotropic electrical conductivity.

The following references are relied on by the examiner:

Hoekje et al. (Hoekje) 3,990,957 Nov. 9,
1976

Kidoh, et al. (Kidoh), "Ferroelectric Properties of Lead-Zirconate-Titanate Films Prepared by Laser Ablation," **Appl. Phys. Lett.**, vol. 58, pp. 2910-2912, June 24, 1991.

Lichtenberg, et al. (Lichtenberg), " Sr_2RuO_4 : A Metallic Substrate for the Epitaxial Growth of $\text{Yba}_2\text{Cu}_3\text{O}_{7-x}$," **Appl. Phys. Lett.**, vol. 60, pp. 1138-1140, March 2, 1992.

Claims 1 to 8 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Hoekje in

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view of Lichtenberg as to claims 1 to 3 and 6 to 8, with the addition of Kidoh as to claims 4 and 5.²

Rather than repeat the positions of the appellants and the examiner, reference is made to the brief and the answer for the respective details thereof.

OPINION

Inasmuch as we are in agreement with the well-reasoned positions and legal-factual analysis of the teachings of the references expressed by the examiner in the responsive arguments portion of the answer beginning at page 6 through the end of the answer, we will sustain both rejections of the claims under 35 U.S.C. § 103. We will not, for the sake of brevity, repeat that which has been clearly set forth by the examiner in this portion of the answer. To round-out the examiner's detailed art-based analysis of the claimed invention and teachings and suggestions of the references relied upon and appellants' arguments, we add the following.

² As indicated at pages 2 and 10 to 11 of the answer, the examiner has withdrawn a rejection of claim 8 under the second paragraph of 35 U.S.C. § 112.

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The examiner's above-noted portion of the answer takes as its starting points the teachings and suggestions in Hoekje. However, a detailed, considered study of the examiner's position leads us to conclude that just as well Lichtenberg may have been properly used as a starting point from which to analyze the collective teachings and suggestions from an artisan's perspective, as the examiner has done, to arrive at the conclusion of the obviousness of the present subject matter on appeal. The examiner's reasoning clearly sets forth a prima facie case of obviousness of the desirability and/or motivation to have combined the collective teachings and suggestions of the references from an artisan's perspective, contrary to the assertions made by appellants in the brief as to the Hoekje-Lichtenberg combination. The examiner's position even considers the merits and opinions of declarant Donald Murphy in the examiner's analysis. Significantly, there is no reply brief to rebut the examiner's reasoning and positions set forth in this portion of the answer.

To embellish upon the examiner's reasoning of combinability, the entire first paragraph of Lichtenberg indicates that the art as well as the authors of Lichtenberg's

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article continued to search for desirable metals that were compatible with high temperature superconductors. This paragraph as well as the remaining portions of Lichtenberg's article indicates that the art desired to minimize lattice mismatches between layered materials to increase overall conductivity. The same may be said of the resistivity measurements in various planes of orientation.

This first paragraph of Lichtenberg at column 1 on page 1138 also indicates that SrTiO_3 was considered in the art to be a standard insulating substrate for the growth of superconducting copper oxide films, which is the same basic substrate utilized by appellants in their disclosed, but unclaimed invention. The paragraph in the middle of the second column at page 1139 of Lichtenberg also indicates that certain epitaxial relationships existed between well known superconductor materials and their substrates. This paragraph also indicates that the Sr_2RuO_4 , utilized primarily in Lichtenberg as a substrate for the growth of superconducting materials, has an in-plane alignment of the perovskite axes of the film and the substrate. Since this Sr_2RuO_4 is stated to have perovskite axes, this alone would have suggested to the

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artisan, in addition to the examiner's rationale, that the "family" of perovskite-forming crystal structures listed in Hoekje would have performed in a similar manner. Indeed, SrRuO₃ is specifically stated at col. 4, lines 9 and 10 of Hoekje as having such a perovskite crystalline structure. In any event, the examiner makes good use of the teaching at the bottom of the first column of Lichtenberg at page 1140 which indicates that Sr₂RuO₄ likely could have been grown by standard thin-film techniques on commonly used substrates such as SrTiO₃. Obviously then, in line with the examiner's reasoning, it would have been obvious to have used SrRuO₃ in a similar manner.

In our view, the examiner's art-based reasoning expressed in the responsive arguments portion of the answer does not lead us to reverse the rejection even though it sets forth a rationale which may be fairly characterized as a generally disfavored obvious to try approach. However, obviousness does not require absolute predictability of success, only a reasonable expectation of success. In re O'Farrell, 853 F.2d 894, 903-904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). Indeed, it is stated, as expressed and noted by the examiner, at

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columns 3 and 4 of Hoekje that there existed in the art the preferred perovskite crystal structure materials and mixtures thereof of those set forth in the generic formula in claim 1, even as modified by dependent claims 2 and 3. This portion of Hoekje even sets forth the preferred compound of SrRuO_3 , the same material the bulk of appellants' own disclosure is directed to. Indeed, in light of what was well known in the art, even as represented by appellants' own prior art discussion as well as that in Lichtenberg, there were well known thin film manufacturing processes. Overall, the collective teachings of both references clearly would have led the artisan to a relatively limited number of possibilities utilizing conventional techniques with relatively specific guidance.

The positions set forth by the examiner in the responsive arguments portion of the answer appear to have addressed the arguments presented by appellants in the brief as to the rejections under 35 U.S.C. § 103. Additionally, the weight of the evidence from the teachings and suggestions of Hoekje and Lichtenberg as well as the positions advocated by the examiner in this portion of the answer lead us to conclude that thin

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film layers of the generic compound set forth by appellants in independent claim 1 on appeal would have been formed in epitaxial regions which would have exhibited "essentially" isotropic electrical conductivity.

The position advocated by appellants at page 7 of the brief as to claims 4 and 5, is misplaced. From the perspective advocated by the examiner in the responsive arguments portion of the answer, there are no noted deficiencies in the combination of Hoekje and Lichtenberg. Appellants' position does not contest in any reasonably specific manner the subject matter of claims 4 and 5 on appeal. On the other hand, the examiner's reliance upon Kidoh and the reasoning at page 10 of the answer, is persuasive. Additionally, we note that page 1 of appellants' specification also recognizes that the formation of ferroelectric layers adjacent to epitaxial regions was known in the art anyway.

In view of the foregoing, the decision of the examiner rejecting claims 1 to 8 under 35 U.S.C. § 103 is affirmed.

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

AFFIRMED

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JAMES D. THOMAS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JOHN D. SMITH)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
LEE E. BARRETT))
Administrative Patent Judge)	

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