

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT C. LINARES and PATRICK J. DOERING

Appeal 2008-5766
Application 10/977,083
Technology Center 1700

Decided: November 21, 2008

Before ADRIENE LEPIANE HANLON, TERRY J. OWENS, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL
STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-5, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6(b).

The Invention

The Appellants claim a phosphorus-doped single crystal synthetic diamond. Claim 1 is illustrative:

1. A synthetic diamond comprising an alloy single crystal diamond composition consisting of ^{12}C , ^{13}C , and phosphorous.

The References

Iida	5,223,721	Jun. 29, 1993
J. Ruzylo, “Semiconductor Glossary”, http://www.semiconductorglossary.com/default.asp?searchterm=diamond (undated).		

The Rejection

Claims 1-5 stand rejected under 35 U.S.C. § 102(b) over Iida.¹

OPINION

We reverse the Examiner’s rejection. We need to address only the independent claims, i.e., claims 1 and 4. Those claims require “synthetic diamond” comprising “an alloy single crystal diamond composition consisting of ¹²C, ¹³C, and phosphorous”.

Issue

Have the Appellants shown reversible error in the Examiner’s determination that Iida discloses each element of the claimed invention?

Findings of Fact

Iida discloses “a diamond n-type semiconductor comprising a substrate and a phosphorus element-doped diamond thin film deposited on the substrate, which has been formed by vaporizing a solution comprising a liquid organic compound as a diamond material and diphosphorus pentoxide (P₂O₅) dissolved therein, and subjecting the resultant gas to the hot filament

¹ The Examiner relies upon Ruzylo for a definition of “semiconducting diamond” (Ans. 4). The Appellants argue that Ruzylo, which has a copyright date of 2001-2006 (p. 2), is not prior art with respect to their 35 U.S.C. § 119(e) priority application filed May 15, 1998 (Reply Br. 2-3). Because Ruzylo does not provide the definition alleged by the Examiner, we need not address the issue of whether the definition in Ruzylo relied upon by the Examiner sets forth the meaning that the defined term had prior to the Appellants’ priority date.

CVD method” (col. 1, l. 66 – col. 2, l. 5). Iida’s disclosed dopant-providing materials (col. 3, ll. 22-30) do not include the phosgene used by the Appellants (Spec. 43:8 – 44:14).

Ruzyllo defines “diamond” as “single-crystal carbon; material featuring outstanding semiconductor properties; wide bandgap semiconductor; in theory the best semiconductor …” (p. 1).

Analysis

“Anticipation requires that every limitation of the claim in issue be disclosed, either expressly or under principles of inherency, in a single prior art reference.” *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1255-56 (Fed. Cir. 1989).

The Appellants argue that Iida does not disclose a synthetic diamond comprising an alloy single crystal diamond consisting of ^{12}C , ^{13}C isotopes, and that the Examiner has not shown that ^{12}C , ^{13}C must necessarily coexist in a synthetic diamond comprising an alloy single crystal diamond (Br. 14-15).

The Examiner argues that Iida discloses phosphorus-doped diamond, and that Ruzyllo defines “semiconducting diamond” as “a single crystal diamond that is doped” (Ans. 2-4).

The definition provided by Ruzyllo (p. 1) is a definition of “diamond” not “synthetic diamond” as required by the Appellants’ claims. Moreover, even if Ruzyllo’s definition means that all single crystal diamond is semiconducting, it does not follow that all semiconducting diamond is single crystal diamond.

The Examiner argues that both ^{12}C and ^{13}C isotopes are present in natural carbon, and that “[t]his is a fact of nature and admitted in the instant specification” (Ans. 5).

The Appellants’ Specification does not indicate that synthetic diamond, which is what the Appellants claim, necessarily includes both ^{12}C and ^{13}C isotopes. The Specification’s disclosure that “[d]iamond that consists of all ^{13}C atoms has a smaller spacing between the carbon atoms than normal diamond (which contains 99% ^{12}C and 1% ^{13}C)” (Spec. 22:14-16) indicates that synthetic diamond can consist entirely of ^{13}C atoms. Thus, the evidence relied upon by the Examiner does not indicate that Iida’s synthetic diamond inherently contains ^{12}C and ^{13}C isotopes. An inherent characteristic must be inevitable, and not merely a possibility or probability. *See In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981).

The Appellants (Spec. 43:13 – 44:7) and Iida (col. 2, ll. 4-5) both use chemical vapor deposition (CVD) to make their synthetic diamond. However, in the Appellants’ prophetic Example 7, which appears to provide the written descriptive support for the phosphorous-doped single crystal diamond recited in claims 1 and 4, the phosphorus is provided by phosgene (Spec. 43:24), whereas Iida’s phosphorus is provided by diphosphorus pentoxide (P_2O_5) (col. 2, l. 3). The record does not indicate that if diamond formed by CVD using phosgene is single crystalline, diamond formed by CVD using diphosphorus pentoxide necessarily is single crystalline. *See Oelrich*, 666 F.2d at 581.

Thus, the Examiner has not shown that every limitation of the Appellants’ independent claims is disclosed, either expressly or under principles of inherency, in Iida. *See Corning*, 868 F.2d at 1255-56. Hence,

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the Examiner has not established a prima facie case of anticipation of the Appellants' claimed invention.

Conclusion of Law

The Appellants have shown reversible error in the Examiner's determination that Iida discloses each element of the claimed invention.

DECISION/ORDER

The rejection of claims 1-5 under 35 U.S.C. § 102(b) over Iida is reversed.

It is ordered that the Examiner's decision is reversed.

REVERSED

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sld

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