

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte ALAN CISAR and TODD ADAMS

Appeal 2007-2124
Application 10/175,515
Technology Center 1600

Decided: July 31, 2007

Before DEMETRA J. MILLS, LORA M. GREEN, and RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1, 8-13, 19, 26-28, 36-38, and 47-52. We have jurisdiction 35 U.S.C. § 6(b). We reverse.

STATEMENT OF CASE

The claims are directed to a rhenium-188 (Re-188) generator. Re-188 is “an excellent isotope for radiotherapeutic applications” (Specification 2). “However, [Re-188] has a half-life of only 16.9 hours which is too short for the isotope to be conveniently shipped, and thus means that it must be generated at the site of use” (Specification 2). The prior art discloses several

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approaches for generating Re-188 from the more stable We-188 isotope at the site of use (Specification 2-4). The invention is described as providing an Re-188 generator which contains “a matrix comprising a substantially non-elutable inorganic layered hydroxide compound containing tungsten-188” to generate Re-188 (Specification 4).

The Examiner relies on the following evidence of unpatentability:

Ehrhardt US 4,859,431 Aug. 22, 1989

Claims 1-53 are pending (Supp. Br. 1). Claims 1, 8-13, 19, 26-28, 36-38, and 47-52 stand rejected under 35 U.S.C. § 103(a) as obvious over Ehrhardt (Supp. Br. 2). Claims 2-7, 14-18, 20-25, 29-35, 39-46, and 53 “stand objected to as being dependent upon a rejected base claim but would be patentable if rewritten in independent form including all of the base limitations of the base claim and any intervening claims” (Suppl. Br. 2).

There are four independent claims, 1, 13, 19, and 28. Each of the independent claims involves an inorganic layered hydroxide compound for producing Re-188. We select claim 1 as representative. Claim 1 reads as follows:

A rhenium-188 generator comprising an elutable container defining an eluant flow path, the container containing a matrix comprising a substantially non-elutable inorganic layered hydroxide compound containing tungsten-188.

ISSUE ON APPEAL

The Examiner contends that Ehrhardt describes a tungsten compound and a base, such as sodium hydroxide, meeting the claimed limitation of an “inorganic layered [hydroxide] compound containing tungsten-188” (Answer 5-6). Appellants contend that the phrase “inorganic layered

hydroxide” as recited in claim 1 is properly interpreted as “a mixture of at least two cations with surrounding shells of bound hydroxyl groups” as defined in the Specification (Supp. Br. 8-9). They contend that Ehrhardt’s tungsten compound does not have this structure (Supp. Br. 8-9).

The sole issue in this appeal is the proper interpretation of claim 1, particularly whether the Ehrhardt’s tungsten compound is “a substantially non elutable inorganic layered hydroxide compound” as recited in claim 1.

CLAIM INTERPRETATION

During patent examination, the words in a claim must be given their the broadest reasonable meaning “in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). See also *In re Crish*, 393 F.3d 1253, 1256, 73 USPQ2d 1364, 1367 (Fed. Cir. 2004). With this as guidance, we turn to the interpretation of claim 1.

Claim 1 is directed to a rhenium-188 generator comprising an elutable container containing “a matrix comprising a substantially non-elutable inorganic layered hydroxide compound containing tungsten-188.” The Specification describes on page 5 what is meant by an inorganic layered hydroxide:

The insoluble inorganic layered hydroxides of the invention comprises a mixture of at least two cations with surrounding shells of bound hydroxyl groups, for example magnesium aluminate and lithium aluminate.

In view of this specific description in the Specification, we find that the broadest reasonable interpretation of an inorganic layered hydroxide compound is that it must be “a mixture of at least two cations with surrounding shells of bound hydroxyl groups” (Specification 5).

Our interpretation is consistent with the usage of the phrase “layered hydroxide” by persons of ordinary skill in the art. Appellants provided a publication which describes “layered double hydroxides” as represented by the general formula “[M^{II}_{1-x}M^{III}_x(OH)₂]^{x+} [Aⁿ⁻_{x/n}·yH₂O]^{x-}”, where M are cations, and A is an anion (Kovanda, *J. Solid State Sciences*, 5: 1019-1026 (2003) at p. 1019). This formula of a layered hydroxide has at least two cations with surrounding hydroxyl (OH) shells. This prior art definition is similar to the formula of magnesium aluminate shown in the instant Specification, e.g., Mg_(2n)Al_n(OH)₄Z_n·mH₂O (Specification 6). See also Specification 7 for the formula of lithium aluminate.

THE PRIOR ART

Ehrhardt

1. Ehrhardt describes a process for preparing a tungsten-188 (W-188) / rhenium-188 (Re-188) generator (Ehrhardt, Abstract).
2. The generator comprises a tungstate matrix containing W-188 producing by irradiating tungsten-186 (Ehrhardt, Abstract).
3. Tungsten-186 trioxide (WO₃) is irradiated to produce W-188 (Ehrhardt, col. 3, ll. 49-51).
4. The irradiated tungsten trioxide is dissolved in a basic solution (Ehrhardt, col. 3, ll. 52-55).
5. “The base may be sodium hydroxide, potassium hydroxide, ammonium hydroxide or a similar source of hydroxyl ion” (Ehrhardt, col. 3, ll. 56-58).

6. The basic solution is combined with an acid solution containing zirconyl ion to precipitate the zirconyl tungstate matrix (Ehrhardt, col. 3, ll. 24-27 and 60-68).
7. “It is preferable to slowly add the basic tungsten solution to the acid solution . . . to promote formation of zirconyl tungstate. This is because of the tendency of the zirconyl cation to form zirconium hydroxide” which is undesirable (Ehrhardt, col. 4, ll. 5-12).
8. After the zirconyl tungstate matrix is precipitated, the pH of the slurry comprising the matrix is adjusted to from 5 to 7 using a base such as sodium hydroxide to prevent the zirconyl tungstate from re-dissolving (Ehrhardt, col. 4, ll. 19-23).
9. “Any zirconium hydroxide which forms from the excess zirconyl cation used as described above, may precipitate when the slurry is adjusted to a basic pH. This precipitate may remain associated with the matrix and adsorb any solubilized tungsten released from the matrix which would otherwise contaminate the eluate” (Ehrhardt, col. 4, ll. 23-29).
10. The matrix material may be transferred to an empty container, such as a glass column used in standard chromatography, for eluting and harvesting the daughter compound Re-188 (Ehrhardt, col. 4, ll. 40-47).

DISCUSSION

The dispute in this appeal turns on the proper interpretation of the phrase “inorganic layered hydroxide.” The Examiner contends that Ehrhardt teaches a tungsten compound which contains hydroxide, meeting the limitation in claim 1 of an “inorganic layered hydroxide” (Answer 3-4). Appellants assert that the Examiner improperly interprets the claimed

“inorganic layered hydroxide compound” to read on the tungsten compound described in Ehrhardt (Suppl. Br. 8-9). We agree with Appellants that the Examiner has not given the words in claim 1 their broadest *reasonable* interpretation.

The Examiner argues that Ehrhardt’s teaching of tungsten trioxide dissolved in a base, such as sodium hydroxide or a similar source of hydroxyl ions (Answer 5-6; Ehrhardt, col. 3, ll. 52-58; Findings of Fact 4, 5) would have been recognized by the person of ordinary skill in the art as an “inorganic layered hydroxide compound containing tungsten-188” (Answer 6).

The Examiner appears to have presumed that any tungsten-188 compound comprising a hydroxide is an inorganic layered hydroxide. However, we have interpreted the claimed compound in view of the Specification and its ordinary usage by persons of skill in the art to require a specific structure: a mixture of at least two cations with surrounding shells of bound hydroxyl groups. The Examiner does not explain how Ehrhardt’s tungsten trioxide solution, or any other tungsten compound disclosed in Ehrhardt, meets this limitation or could be modified to meet it.

Ehrhardt makes no mention of inorganic layered hydroxides. It is the Examiner’s burden to provide reason to believe that the claimed subject matter may be an inherent characteristic of the prior art. *See In re Thrift*, 298 F.3d 1357, 1365, 63 USPQ2d 2002, 2007 (Fed. Cir. 2002); *In re Schreiber*, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997); *In re Swinehart*, 439 F.2d 210, 213, 169 USPQ 226, 228 (CCPA 1971). In this case, it is the Examiner’s burden to provide evidence or some logic to explain why it is reasonable to presume that Ehrhardt’s tungsten compound

in combination with sodium hydroxide is an inorganic layered hydroxide. Because no evidence has been provided, we find that the Examiner failed to meet his burden in establishing that Ehrhardt's tungsten compound satisfies the claimed limitation of an inorganic layered hydroxide.

Ehrhardt also teaches that, in acidifying the basic tungsten trioxide solution with an acid solution comprising zirconyl ions, zirconium hydroxide may form and "remain associated" with the zirconyl tungstate matrix (Ehrhardt, col. 3, ll. 24-27 and 6-68; col. 4, ll. 5-29; Findings of Fact 6-9). Once again, we find no evidence in the record to provide a reason for believing that the zirconyl matrix comprising zirconium hydroxide has the specific structure of an inorganic layered hydroxide compound as required by claim 1.

Furthermore, the Examiner has also given no reason for persons of skill in the art to have modified Ehrhardt's compound to produce a inorganic layered hydroxide in the scope of the claim. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007) (Obviousness requires a "a reason that would have prompted a person of ordinary skill in the relevant field" to have modified the prior art "in the way the claimed new invention does.")

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We reverse the rejection of claims 1, 8-13, 19, 26-28, 36-38, and 47-52.

REVERSED

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