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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/196,632	08/03/2005	Youssef M. Mikhail	GP-305881	4922

65798 7590 01/12/2012

MILLER IP GROUP, PLC
GENERAL MOTORS CORPORATION
42690 WOODWARD AVENUE
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BLOOMFIELD HILLS, MI 48304

EXAMINER	
YANCHUK, STEPHEN J	
ART UNIT	PAPER NUMBER
1729	

MAIL DATE	DELIVERY MODE
01/12/2012	PAPER

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The time period for reply, if any, is set in the attached communication.

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BEFORE THE BOARD OF PATENT APPEALS

AND INTERFERENCES

Ex parte YOUSSEF M. MIKHAIL,
MAHMOUD H. ABD ELHAMID,
and GAYATRI VYAS

Appeal 2010-009835
Application 11/196,632
Technology Center 1700

Before BRADLEY R. GARRIS, CHARLES F. WARREN, and MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-3, 5-9, and 11-22. We have jurisdiction under 35 U.S.C. § 6.

We REVERSE.

Appellants claim a fuel cell comprising a bipolar plate 18, 30 and an MEA (i.e., membrane electrode assembly) including a catalyst layer 22, 26 and a diffusion media layer 20, 24 and a decomposition catalyst (e.g., ruthenium oxide) which decomposes hydrogen peroxide and which is formed as a layer on the bipolar plate, the MEA and the diffusion media layer (claim 1; Fig. 1). Appellants also claim an alternative fuel cell embodiment comprising an anode-side bipolar plate and an MEA including a catalyst layer, wherein the bipolar plate and the MEA include a layer of ruthenium oxide facing the MEA for decomposing hydrogen peroxide (claim 11). Finally, Appellants claim a fuel cell stack comprising a plurality of bipolar plates, MEAs and diffusion media layers wherein all of the bipolar plates, the MEAs and the diffusion media layers include a ruthenium oxide layer that decomposes hydrogen peroxide (claim 17).

Representative claims 1, 11, and 17, which are all of the independent claims on appeal, read as follows:

1. A fuel cell comprising:

at least one bipolar plate;

an MEA including a catalyst layer; and

a diffusion media layer positioned between the MEA and the at least one bipolar plate, wherein each of the at least one bipolar plate, the diffusion media layer and the MEA include a decomposition catalyst that decomposes hydrogen peroxide, where the decomposition catalyst is formed as a layer on the at least one bipolar plate, the MEA and the diffusion media layer.

11. A fuel cell comprising:

an anode-side bipolar plate; and

an MEA including a catalyst layer, said bipolar plate and said MEA including a layer of ruthenium oxide facing the MEA for decomposing hydrogen peroxide.

17. A fuel cell stack including a stack of fuel cells, said stack comprising:

a plurality of bipolar plates;

a plurality of MEAs each including a catalyst layer; and

a plurality of diffusion media layers positioned between the MEA and the bipolar plates, wherein all of the bipolar plates, the diffusion media layers and the MEAs include a ruthenium oxide layer that decomposes hydrogen peroxide.

The references listed below are relied upon by the Examiner in the rejections before us:

Horiguchi	US 2003/0039875 A1	Feb. 27, 2003
Hampden-Smith	US 2004/0038808 A1	Feb. 26, 2004
Bekkedahl	US 2004/0106034 A1	Jun. 3, 2004
Brady	US 2005/0238873 A1	Oct. 27, 2005

The Examiner rejects the appealed claims[1] as follows:

claims 1-3, 5, 6, 8, 11-13, 15, and 17-21 under 35 U.S.C. § 102(b) as anticipated by Hampden-Smith;

---

[1] The following claim informalities are deserving of correction. Claims 5 and 6 depend from now canceled claim 4. The appealed claims include two claims which are denominated as claim "21", and these two claims contain different limitations. Further, claim 22 depends from claim "21" which might be referring to either or both of the so-denominated claims.

claims 7, 14, and 21 under 35 U.S.C. § 103(a) as unpatentable over Hampden-Smith in view of Brady; and

claims 1-3, 5-9, and 11-22 under 35 U.S.C. § 103(a) as unpatentable over Hampden-Smith in view of Horiguchi and Bekkedahl.

For each of the above rejections, the Examiner finds that Hampden-Smith discloses a fuel cell comprising an MEA including layers of electro-catalyst materials wherein "[t]he catalyst materials comprise RuO_2 and other materials [Paragraph 100]" (Ans.. para. bridging 4-5; *see also id.* at 6, 7). The Examiner also finds that "the 'decomposition' function of the catalyst is an inherent property" (*id.*). It is the Examiner's ultimate finding that the fuel cell of Hampden-Smith fully satisfies the independent claims 1, 11, and 17 requirements for layers of hydrogen peroxide-decomposition catalyst such as ruthenium oxide on the bipolar plate and on the MEA and/or on the diffusion media layer (*id.*).

We agree with Appellants that Hampden-Smith contains no express or inherent teaching of ruthenium oxide as a catalyst for decomposing hydrogen peroxide or as a layer of such catalyst on the bipolar plate and on the MEA and/or on the fluid distribution layer (i.e., the claimed diffusion media layer) of Hampden-Smith's fuel cell (App. Br. 8-10, 13-15; Reply Br. 2).

As correctly explained by Appellants and contrary to the Examiner's above finding, paragraph [0100] of Hampden-Smith discloses ruthenium oxide, not as a catalyst but rather, as support particles for electrocatalysts (*id.*). Moreover, the Examiner has provided this record with no basis in support of the above finding that the ruthenium oxide of Hampden-Smith would inherently perform the hydrogen peroxide decomposition function of

the independent claims. On this record, it appears that hydrogen peroxide would not even be able to contact Hampden-Smith's ruthenium oxide since the ruthenium oxide particles support, and therefore are coated with, electrocatalytic material.

Appellants are also correct that the Examiner has erred in finding the fuel cell of Hampden-Smith to include a ruthenium oxide layer on the bipolar plate as required by each of the independent claims (*id.*). This finding appears to be not only unsupported but inconsistent with Hampden-Smith's disclosure, for example, at Figure 2 which shows bipolar plates 208, 214 spaced from ruthenium oxide-containing layers 220, 222. According to the Examiner, "[i]t can be interpreted that the bipolar plate 'includes a ruthenium oxide layer' even if not directly attached to said layer" (Ans. 10). However, the Examiner has not even alleged much less established that such an interpretation of the claims would be reasonable and consistent with Appellants' Specification.

For the above stated reasons, we cannot sustain the § 102 rejection of claims 1-3, 5, 6, 8, 11-13, 15, and 17-21 as anticipated by Hampden-Smith. We also cannot sustain the § 103 rejection of claims 7, 14, and 21 as unpatentable over Hampden-Smith in view of Brady or the § 103 rejection of claims 1-3, 5-9, and 11-22 as unpatentable over Hampden-Smith in view of Horiguchi and Bekkedahl. The secondary references in these rejections are not relied upon by the Examiner to supply the previously discussed deficiencies of Hampden-Smith. Instead, the Examiner relies on Brady for making bipolar plates of certain materials (e.g., as required by claim 7) (Ans. 6-7) and relies on Horiguchi and Bekkedahl for applying a hydrophilic material such as ruthenium oxide "between the plates in the region defined

by S2 [of Horiguchi] . . . [in order to obtain] an efficient cooling mechanism for a fuel cell" (*id.* at 7-8) (e.g., as required by claim 9).

The decision of the Examiner is reversed.

REVERSED

cam

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/196,632	08/03/2005	Youssef M. Mikhail	GP-305881	4922

65798 7590 07/16/2010

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EXAMINER	
YANCHUK, STEPHEN J	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
07/16/2010	PAPER

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Appeal No: 2010-009835
Application: 11/196,632
Appellant: Youssef M. Mikhail et al.

Board of Patent Appeals and Interferences
Docketing Notice

Application 11/196,632 was received from the Technology Center at the Board on July 12, 2010 and has been assigned Appeal No: 2010-009835.

In all future communications regarding this appeal, please include both the application number and the appeal number.

The mailing address for the Board is:

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The facsimile number of the Board is 571-273-0052. Because of the heightened security in the Washington D.C. area, facsimile communications are recommended. Telephone inquiries can be made by calling 571-272-9797 and referencing the appeal number listed above.

By order of the Board of Patent Appeals and Interferences.

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65798 7590 07/08/2010

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
11196632	8/3/2005	MIKHAIL ET AL.	GP-305881

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EXAMINER
STEPHEN YANCHUK

ART UNIT	PAPER
1795	20100701

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Commissioner for Patents

Reply Brief has been received. The Examiner has no further remarks to make regarding the issue. The Examiner maintains that the materials of the prior art and the instant application are the same and located in the same positions within the fuel cells and therefore read on the structure claims presented.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

/STEPHEN YANCHUK/
Examiner, Art Unit 1795

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	11/196,632
Filing Date:	August 03, 2005
Appellant:	Youssef M. Mikhail
Group Art Unit:	1795
Examiner:	Stephen J. Yanchuk
Title:	DURABILITY FOR THE MEA AND BIPOLAR PLATES IN PEM FUEL CELLS USING HYDROGEN PEROXIDE DECOMPOSITION CATALYSTS
Attorney Docket:	GP-305881

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Commissioner for Patents
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APPELLANT'S REPLY BRIEF

This is Appellant's Reply Brief filed in response to the Examiner's Answer mailed May 19, 2010 to which a response is due by July 19, 2010. Please consider the comments below.

Appellant respectfully maintains that the catalyst layers 220 and 222 disclosed by Hampden-Smith are nothing more than the standard electrocatalyst layers common to most fuel cells. Appellant's parallel electrocatalyst layer is disclosed in paragraph [0015] of Appellant's specification. The claimed decomposition catalyst on each of the bipolar plate, the diffusion media layer and the MEA is discussed in paragraph [0019] of Appellant's specification. Thus, Appellant respectfully maintains that Hampden-Smith does not anticipate Appellant's claimed invention because, as discussed above, there is a clear structural difference.

As discussed on page 9 of the Appeal Brief, Hampden-Smith does not expressly or inherently disclose a decomposition catalyst layer on the fluid distribution layers or the bipolar plates. Thus, Appellant respectfully maintains that this structural aspect of Appellant's claimed invention does not exist in Hampden-Smith.

As disclosed in paragraph [0100] of Hampden-Smith, the supported catalysts include an active species phase that is dispersed on a support phase. The support particles may be RuO_2. Clearly Hampden-Smith is not teaching a layer of RuO_2 as the electrocatalyst layer, because the electrocatalyst layer is dispersed on a support which may be RuO_2. Thus, the electrocatalyst layer does not even include RuO_2, as it is merely supported by RuO_2. Accordingly, Appellant respectfully disagrees with the Examiner's assertion, on page 10 of the Examiner's Answer that, "A layer that includes a specific particle is a layer of the particle."

The Examiner asserts, also on page 10 of the Examiner's Answer, that the limitation "facing the MEA" does not specify the location of the catalyst. Appellant respectfully submits that this statement lacks a rational basis and ignores the plain meaning that one of ordinary skill would apply to "facing the MEA." Appellant respectfully submits that there is a finite amount of space inside a fuel cell, and the language "facing an MEA" imparts a meaning that one skilled in the art would understand, particularly as applied to the layer of ruthenium oxide on the bipolar plate.

It is the Examiner's position, on page 11 of the Examiner's Answer, that methods of depositing RuO_2 do not impact the structure of the claims. Appellant respectfully reminds the Board of MPEP 2113, which states, "The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps

would be expected to impart distinctive structural characteristics to the final product." See *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979). Hampden-Smith discloses RuO_2 as a support, whereas Appellant's claimed invention discloses a decomposition catalyst deposited by a chemical vapor deposition process. Appellant respectfully submits that the process of depositing, via chemical vapor deposition, indicates that the resulting layer is clearly different from a support structure upon which a layer may be deposited. Accordingly, Appellant maintains that Hampden-Smith does not teach Appellant's exact structure, and therefore does not anticipate Appellant's claimed invention.

Finally, the Examiner states, also on page 11 of the Examiner's Answer, that the depth of the layer is interpreted to have the thickness claimed by Appellant. However, the catalyst layer discussed by Hampden-Smith is the layer that is supported by a metal oxide, and has nothing to do with a decomposition catalyst layer as claimed by Appellant.

In view of the foregoing, it is respectfully requested that the Examiner's rejections be reversed.

Respectfully submitted,

MILLER IP GROUP, PLC
Attorney for Appellant

Date: 6/28/10

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Electronic Acknowledgement Receipt

EFS ID:	7909028
Application Number:	11196632
International Application Number:	
Confirmation Number:	4922
Title of Invention:	Durability for the MEA and bipolar plates in PEM fuel cells using hydrogen peroxide decomposition catalysts
First Named Inventor/Applicant Name:	Youssef M. Mikhail
Customer Number:	65798
Filer:	John Albert Miller/Catherine Cardinale
Filer Authorized By:	John Albert Miller
Attorney Docket Number:	GP-305881
Receipt Date:	28-JUN-2010
Filing Date:	03-AUG-2005
Time Stamp:	18:04:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reply Brief Filed	GP-305881_reply-brf.pdf	149933 3e0914c5a704f41de07b86c6cdf7e246826f5865	no	3

Warnings:	
Information:	

Total Files Size (in bytes):	149933

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 11/196,632
Filing Date: August 03, 2005
Appellant(s): MIKHAIL ET AL.

John Miller
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 3/05/2010 appealing from the Office action mailed 11/12/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-3, 5-9, 11-22

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

Independent claims 1, 11, and 17 pertain to a fuel cell with a bipolar plate, diffusion layer, and MEA. A "decomposition catalyst" is located on one of the bipolar plates, MEA, or diffusion media. The applicant has identified Ruthenium Oxide as a "decomposition catalyst" [Claim 2, 11, 17].

Other elements claimed by the dependant claims include material selection for various elements as well as various controllable parameters such as thickness of layers. These elements do not seem to be in question as being taught by the prior art.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner agrees with the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

2004/0038808	Hampden-Smith	4-2003
2005/0238873	Bradey	3-2005
2003/0039875	Horiguchi	9-2002
2004/0106034	Bekkedahl	11-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-3, 5-6, 8, 11-13, 15, 17-20, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Hampden-Smith et al (PGPUB 2004/0038808).

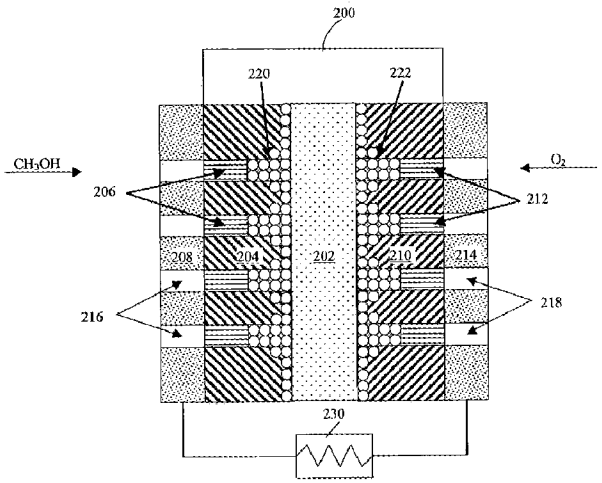

Fig. 2

Claim 1-3, 11-12, 15, 17-18: '808 teaches figure 2 of a fuel cell comprising an anode (204), cathode (210), and membrane (202) wherein a layer of catalyst material is clearly depicted as layer 220 and 222 between an MEA (202) and a diffusion layer (206) [Figure 2, Paragraph 77-110]. The layer of 220, 222 is taught to be comprised of multiple materials wherein the materials are taught to be electrocatalyst materials [Paragraph 34-35]. The catalyst materials comprise RuO_2 and other materials [Paragraph 100]. The claim language of "decomposition catalyst" is interpreted to be RuO_2 as defined by claim 2 and the specification wherein the "decomposition" function of the catalyst is an inherent property. It is also taught that a direct-write tool can deposit an ink composition onto any of the PEM, fluid distribution substrate, fluid distribution layer, or bi-polar plate [Paragraph 305]. The bi-polar plate is taught to be modified by depositing conductive metal powders [Paragraph 78] wherein an example

of a conductive metal that can be inked is taught to be RuO_2 [Paragraph 100]. Following the formation steps presented in paragraph 305 and subsequent, the bi-polar plate is taught to be coated and then form either figure 1 or figure 2. The claim limitation states the decomposition catalyst (RuO_2) is in contact with the MEA, diffusion layer, and bi-polar plate wherein in the sandwich of the final product, only 2 layers of catalyst need only actually exist.

Claim 17: '808 teaches the individual cell as described in the rejection for claim 1 above and wherein the fuel cell exists in a stack [Background]. The stack is taught to have a plurality of anodes and cathodes [Paragraph 6, 7].

Claims 5, 19 are product by process limitations wherein the art of reference produces the same product.

MPEP 2113 – Product By Process

> "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) Claim was directed to a novolac color developer. The process of making the developer was allowed. The difference between the inventive process and the prior art was the addition of metal oxide and carboxylic acid as separate ingredients instead of adding the more expensive pre-reacted metal carboxylate. The product-by-process claim was rejected because the end product, in both the prior art and the allowed process, ends up containing metal carboxylate. The fact that the metal carboxylate is not directly added, but is instead produced in-situ does not change the end product.

Claim 6, 13, 20: '808 teaches the catalyst being a thickness of 50nm-2000nm per layer can be formed using the direct-write tool [Paragraph 201].

Claim 8, 19: '808 teaches many different catalysts that are electrically conductive [Paragraph 100].

Claim 18: '808 teaches adding layers to both the bi-polar layers and between the MEA and the diffusion media. This art reads on "outer surface of..." since outer is a relative term that has not be specified to a region that overcomes the art of '808.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 7, 14, and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. (PGPUB 2004/0038808), as applied to claim 1, 17 and their dependants, above, and further in view of Brady et al. (PG Pub 2005/0238873).

The structure of the fuel cell is rejected by Hampden-Smith in the claims above. Hampden-Smith et al. teaches a graphite bipolar plate [Paragraph 007] and indicates that bipolar plates may also be fabricated from metals, but fails to teach a bipolar plate that can be constructed specifically with stainless steel, titanium, aluminum, or a carbon polymer.

Brady et al. teach that stainless steels, titanium, or aluminum would be ideal as bipolar plates in fuel cells [Paragraph 6]. Brady et al. discuss the disadvantages of using carbon or graphite composite bipolar plates [Paragraph 5]. It would have been

obvious to one of ordinary skill in the art at the time of the invention to make the fuel cell of Hampden-Smith et al. with the bipolar plates of Brady et al. in order to increase the structural properties of the fuel cell as taught by Brady et al. It would also have been obvious to one of ordinary skill in the art at the time of the invention to combine these prior arts since Hampden-Smith et al. provide motivation for using metal in place of graphite for the bipolar plate.

3. Claims 1-3, 5-9, 11-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hampden-Smith et al. (PGPUB 2004/0038808), and further in view of Horiguchi et al (PGPUB 2003/0039875) and Bekkedahl et al (PGPUB 2004/0106034).

Claim 1-3, 7-9, 11-12, 14-18, 21-22: '808 teaches figure 2 of a fuel cell comprising an anode (204), cathode (210), and membrane (202) wherein a layer of catalyst material is clearly depicted as layer 220 and 222 between an MEA (202) and a diffusion layer (206) [Figure 2, Paragraph 77-110]. The layer of 220, 222 is taught to be comprised of multiple materials wherein the materials are taught to be electrocatalyst materials [Paragraph 34-35]. The catalyst materials comprise RuO_2 and other materials [Paragraph 100]. The claim language of “decomposition catalyst” is interpreted to be RuO_2 as defined by claim 2 and the specification wherein the “decomposition” function of the catalyst is an inherent property. ‘808 fails to teach a structure that has two plates and a material between them.

Horiguchi teaches a separator that has a coolant passage between two plates (S2) [Figure 8]. The separators are taught to be made of steel and titanium [Paragraph

67]. Horiguchi teaches a process of making the plates hydrophilic by applying a metal oxide of TiO2 [Paragraph 73-75] between the plates in the region defined by S2. It would have been obvious for one of ordinary skill in the art to use Horiguchi to modify '808 because Horiguchi teaches an efficient cooling mechanism for a fuel cell that making the fuel cell large [Abstract]. The examiner in an effort to speed up prosecution identifies the applicant's intent to have "decomposition catalyst" mean RuO_2 as indicated in other claims as well as the spec. In light of this the examiner uses Bekkedahl which teaches a process of making a material hydrophilic by using either RuO_2 or TiO_2 [Paragraph 55] which implies they are equivalents with the similar characteristics of making a structure more hydrophilic. Bekkedahl is used to show the equivalency of the two materials.

Claim 17: '808 teaches the individual cell as described in the rejection for claim 1 above and wherein the fuel cell exists in a stack [Background]. The stack is taught to have a plurality of anodes and cathodes [Paragraph 6, 7].

Claims 5, 19 are product by process limitations wherein the art of reference produces the same product.

MPEP 2113 – Product By Process

> "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted) Claim was directed to a novolac color developer. The process of making the developer was allowed. The difference between the inventive process and the prior art was the addition of metal oxide and carboxylic acid as separate ingredients instead of adding the more

expensive pre-reacted metal carboxylate. The product-by-process claim was rejected because the end product, in both the prior art and the allowed process, ends up containing metal carboxylate. The fact that the metal carboxylate is not directly added, but is instead produced in-situ does not change the end product.

Claim 6, 13, 20: '808 teaches the catalyst being a thickness of 50nm-2000nm per layer can be formed using the direct-write tool [Paragraph 201].

Claim 8, 19: '808 teaches many different catalysts that are electrically conductive [Paragraph 100].

Claim 18: '808 teaches adding layers to both the bi-polar layers and between the MEA and the diffusion media. This art reads on "outer surface of..." since outer is a

(10) Response to Argument

A. Hampden-Smith

The "catalyst layer" associated with the MEA does not specify a structural difference from the "decomposition catalyst" and therefore they can be one and the same. The phrase "including a catalyst layer" is functional language that further defines the MEA to have a catalyst layer, wherein that catalyst is the decomposition catalyst.

The "decomposition catalyst" only gains as much structural weight as the material definition, Ruthenium Oxide. The phrase "decomposes hydrogen peroxide" is not a material property of the catalyst, but is a method of operating the fuel cell and therefore not a positively recited structure limitation. The prior art also teaches 220 and 222 can be made of a plurality of catalysts whereby two or more catalysts exist wherein one is RuO_2.

The argument of "While the layers of 220 and 222 of the MEA 200 may include RuO_2 support particles, the layers 220 and 22 are not layers of RuO_2," is erroneous. A layer that includes a specific particle is a layer of that particle. The applicant has not limited the layer to a specific amount of "decomposition catalyst" contained in this layer. Even so, Hampden-Smith teaches these layers comprising one or more catalysts whereby the layer would be RuO_2 as argued by the applicant.

The claim limitation "facing the MEA" [Instant Claim 11] does not specify the location of a catalyst whereby the existence of a layer of this catalyst anywhere in the system would "face" the layer. This claim limitation does not specifically specify the location of the catalyst to overcome the prior art's catalyst layer.

The claim limitation "Wherein all of the bipolar plates, diffusion media layers, and the MEAs include a ruthenium oxide layer …" does not structurally claim a plurality of ruthenium oxide layers directly bound to each layer. It can be interpreted that the bipolar plate "includes a ruthenium oxide layer" even if not directly attached to said layer.

The specifics of the argument regarding Hampden-Smith have been shown to be needed specifically on the bipolar plate as claimed, but the examiner maintains that depositing a coating using a direct write tool would include RuO_2.

The claim limitation leads to two catalyst layers, one on each side of the MEA. Arguments supporting this interpretation are found above.

Hampden-Smith teaches two catalyst layers and a finite number of possible suggested catalysts wherein one is RuO_2. The argument that the applicant is making

regarding "Hampden-Smith does not disclose a layer of ruthenium oxide on the MEA" is erroneous. A layer is catalyst layer is taught, that layer is in connection with the MEA, and the catalyst is specifically taught to be RuO_2. Therefore, the examiner respectfully submits that the structure of independent claim 1, 11, and 17 are expressly disclosed by Hampden-Smith, and thus the rejection is maintained.

A. Dependant Claims

Since the "decomposition catalyst" is RuO_2, the prior art's teaching of RuO_2 is sufficient to overcome the structural limitation presented in the claims.

Methods of depositing RuO_2 do not impact the structure of the claims and therefore do not hold patentable weight.

The "catalyst layer" of the prior art comprises RuO_2. Therefore the depth of the catalyst layer is interpreted to have a thickness as claimed. If this layer is a plurality of catalysts or singular, it still is still interpreted that the layer amount of RuO_2 will be within the range claimed.

A catalyst's conductivity properties are inherent to the material. The RuO_2 of the prior art that is the same as the instant application has the same properties, the applicant does not gain a patent by labeling a structure a different name.

Regarding claim 18, Figure 2 shows a catalyst connected to the fluid distribution channels which is apart of the bipolar plate and is therefore in on the bipolar plate.

Claim 18 is also taught by a direct write tool depositing on the bipolar plate.

B. Hampden-Smith and Brady

The applicant has not properly claimed the material as "decomposition catalyst on the bipolar plates and the diffusion media and the MEA.

Brady is used to teach a specific material which does not seem to be contested by the applicant.

C. Hampden-Smith, Horiguchi and Bekkedahl

In response to applicant's argument that RuO_2 as a hydrophilic element is not a "decomposition catalyst", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

The catalyst is taught to be on the bipolar plate directly in order to more closely and thoroughly reject the instant application.

The same arguments from above should be applied to this section. Horiguchi and Bekkedahl are relied upon to teach RuO_2 directly applied to the bipolar plate. The motivation for its addition may be different from the applicant's, but that does not hold weight when structurally analyzing the instant application.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/STEPHEN YANCHUK/

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