



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

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	EXAMINER	
MILLER IP GROUP, PLC GENERAL MOTORS CORPORATION 42690 WOODWARD AVENUE SUITE 200 BLOOMFIELD HILLS, MI 48304			YANCHUK, STEPHEN J	
			ART UNIT	PAPER NUMBER
			1729	
			MAIL DATE	DELIVERY MODE
			01/12/2012	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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

UNITED STATES PATENT AND TRADEMARK OFFICE

---

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<sup>1</sup> 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;

---

<sup>1</sup> 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<sub>2</sub> 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

Appeal 2010-009835  
Application 11/196,632

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