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RUDDOCK, ULA CORINNA

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DIEN NGUYEN, RAVI OSWAL,
TAD ARMSTRONG, and
EMAD EL BATAWI

Appeal 2015-005581
Application 12/081,124
Technology Center 1700

Before BEVERLY A. FRANKLIN, WESLEY B. DERRICK, and
JULIA HEANEY, *Administrative Patent Judges*.

HEANEY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants¹ request review pursuant to 35 U.S.C. § 134(a) of a decision of the Examiner to reject claims 1–9 and 13–15 of Application 12/081,124. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

¹ Appellants identify the real party in interest as Bloom Energy Corp. App. Br. 2.

BACKGROUND

Appellants claim an electrolyte supported solid oxide fuel cell (SOFC). Abstract. The SOFC includes a cathode electrode, a solid oxide electrolyte, and an anode electrode. Specification (“Spec.”) ¶ 5. “The electrolyte includes yttria stabilized zirconia and a scandia stabilized zirconia, such as a scandia ceria stabilized zirconia.” *Id.* Claim 1, reproduced below from the Claims Appendix of the Appeal Brief, is representative of the claims on appeal:

1. An electrolyte supported solid oxide fuel cell (SOFC), comprising:
 - a cathode electrode;
 - a solid oxide electrolyte; and
 - an anode electrode having a thickness less than 40 microns;wherein:
 - the electrolyte supports the cathode and the anode and comprises a yttria, ceria and scandia stabilized zirconia;
 - the anode electrode comprises a first sublayer having a thickness less than 10 microns comprising nickel and samaria doped ceria and a second sublayer comprising a doped ceria containing ceramic phase and a nickel containing phase;
 - the first sublayer is located between the electrolyte and the second sublayer;
 - an amount of nickel in the first sublayer is less than the amount of nickel in the second sublayer; and
 - the electrolyte is at least one order of magnitude thicker than the anode electrode.

REFERENCES

The Examiner relied upon the following prior art in rejecting the claims on appeal:

Kim et al. ("Kim")	US 6,228,521 B1	May 8, 2001
Ukai et al. ("Ukai '701")	US 2002/0048701 A1	Apr. 25, 2002
Beatty et al. ("Beatty")	US 6,972,161 B2	Dec. 6, 2005
Hata et al. ("Hata")	US 2005/0271919 A1	Dec. 8, 2005
Hickey et al. ("Hickey")	US 2006/0166070 A1	July 27, 2006
Ukai et al. ("Ukai '822")	US 7,422,822 B2	Sept. 9, 2008

THE REJECTIONS

1. Claims 1–6, 9, and 13–15 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Ukai '822, Hickey, Hata, Kim, and Beatty.
2. Claims 7 and 8 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Ukai '822, Hickey, Hata, Kim, Beatty, and Ukai '701.

DISCUSSION

Rejection 1

Appellants argue claim 1 and do not present separate argument for any of the dependent claims. App. Br. 5–8. We select claim 1 as representative; all other claims stand or fall with claim 1. *See* 37 C.F.R. § 41.37 (c)(1)(iv). We have reviewed each of Appellants' arguments, and find that a preponderance of the evidence supports the conclusion of obviousness. Accordingly, we sustain the rejection for the reasons explained in the Answer. We add the following primarily for emphasis.

Appellants argue that the rejection is based on impermissible hindsight because the Examiner relies on multiple references (Hickey, Hata, Kim, and Beatty) to replace two-thirds of the materials of the fuel cell of Ukai '822, i.e., the anode electrode and solid oxide electrolyte. App. Br. 5–7; Reply Br. 2–5. As Appellants contend, “one of ordinary skill in the art would not have performed the double manipulation of both the *electrolyte* and *the anode* of Ukai '822 to reach the device of claim 1 without knowledge gleaned only from the Appellants' disclosure.” Reply Br. 5. This argument alone does not persuade us of reversible error. Reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. *See In re Gorman*, 933 F.2d 982 (Fed. Cir. 1991) (affirming rejection of a detailed claim to candy shaped like a thumb on a stick based on thirteen prior art references.) The Examiner's determination of obviousness is based on sound reasoning, such as substitution of a known material based on its suitability for its intended use, which is not impermissible hindsight. *See Ans. 2–7*. If the Examiner has articulated a reason having rational underpinnings for making a proposed combination of prior art teachings, then that articulated reasoning demonstrates the combination is not based on hindsight. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”) (*cited with approval in KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 419 (2007)).

Appellants further argue that there would have been no reason to combine Kim's thick and porous anode, having sublayers with different nickel content, with the electrolyte-supported cell of Ukai '822, because a person of ordinary skill in the art would have understood that Kim's higher

anode porosity and greater power density are not required in Ukai's fuel cell. App. Br. 7–8; Reply Br. 5–6. This argument is not persuasive because Appellants provide no evidence in support, but merely attorney argument. Further, the Examiner relies on Kim only for its teaching of a graded anode bilayer comprised of nickel and yttria stabilized zirconia (“YSZ”). Ans. 6. Thus, Appellants' arguments concerning the thickness and porosity of Kim's anode are not persuasive of error in the rejection.

Rejection 2

Claims 7 and 8 depend from claim 1 and additionally recite specific ratios of YSZ to scandia stabilized zirconia (“SSZ”) in the solid oxide electrolyte. App. Br. 12, Claims Appx. The Examiner finds that Ukai '701 teaches that adjusting the YSZ or SSZ mol % in the solid electrolyte of a SOFC leads to “hardly cracking cells and improved reliability for the SOFC” and determines that discovery of optimum amounts of YSZ and SSZ would have been obvious. Ans. 9–10, citing Ukai '701 ¶¶ 28, 43, 54. Appellants argue that Ukai '701 does not teach a preferred ratio of YSZ to SSZ, but merely a preferred range of each component. App. Br. 9. This argument is not persuasive of harmful error – although Appellants address what Ukai '701 explicitly discloses, they have not addressed what a person of ordinary skill in the art would have understood from Ukai '701's teaching, such as calculation of a ratio of YSZ to SSZ based on the mol % of each of those components. Further, Appellants have not identified any unexpected result based on the ratios of YSZ to SSZ recited in claims 7 and 8. Accordingly, we sustain the rejection.

SUMMARY

We affirm the rejection of claims 1–9 and 13–15.

Appeal 2015-005581
Application 12/081,124

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

AFFIRMED