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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LIXIN CAO, YU-MIN TSOU, and EMORY DE CASTRO

Appeal 2015-000657
Application 11/720,384^{1, 2}
Technology Center 1700

Before BRADLEY R. GARRIS, LINDA M. GAUDETTE, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ This application was the subject of Appeal No. 2011-004211 in which the Board affirmed the Examiner's rejections.

² BASF Fuel Cell GmbH is indicated as the real party in interest (App. Br. 2).

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 25–39. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM.

Appellants' invention is directed to a platinum-alloy carbon-supported electrocatalyst suitable for incorporation in a gas diffusion electrode or a catalyst-coated membrane structure (Spec. 1: 5–7).

Claim 25 is illustrative:

1. A carbon-supported platinum alloy catalyst obtainable by the method comprising the following steps:
 - a) in situ forming platinum dioxide by converting a platinum precursor on a carbon support,
 - b) forming at least one transition metal hydrous oxide by conversion of a soluble salt on said carbon support,
 - c) simultaneous chemical reducing the situ-formed platinum dioxide and of the at least one transition metal hydrous oxide on said carbon support, wherein
 - d) said platinum precursor being dihydrogen hexahydroxyplatinate and
 - e) the in situ formation of the platinum dioxide is obtained by variation of pH reaching a pH between 2 and 9 and raising temperature to a final temperature of 30°C to 100°C,
 - f) the variation of pH in step e) is effected by the addition of an alkali or ammonia to the acidic starting solution until a pH between 2 and 9 is reached.

App. Br. 11 (Claims Appendix).

Appellants appeal the following rejections (App. Br. 4):

1. Claims 25, 26, 27, 28, and 30 are rejected under 35 U.S.C. § 103(a) as unpatentable over Itoh (US 5,876,867, issued Mar. 2, 1999).

2. Claim 29 is rejected under 35 U.S.C. § 103(a) as unpatentable over Itoh in view of Reetz (US 7,244,688 B2, issued July 17, 2007) and Cao (US 2005/0227862 A1, published Oct. 13, 2005).
3. Claims 32–39 are rejected under 35 U.S.C. § 103(a) as unpatentable over Reetz in view of Itoh and Cao.

Appellants do not present the Examiner’s rejection of claims 25, 26 and 31 under 35 U.S.C. § 102(b) as anticipated or alternatively under 35 U.S.C. § 103(a) as obvious over Reetz for review on appeal in the principal Brief (App. Br. 4). Appellants do provide, however, untimely arguments against the §§ 102(b)/103(a) rejection over Reetz on page 2 of the Reply Brief. 37 C.F.R. § 41.41(b)(2)(2013). There is no apparent reason why Appellants could not have presented their arguments regarding this rejection in the principal Brief and Appellants provide no reason for the late submission of these arguments (Reply Br. 2). Appellants’ untimely submission of the arguments in the Reply Brief deprives us of the benefit of the Examiner’s response to these arguments. We shall not consider these arguments presented in the Reply Brief regarding the §§ 102(b)/103(a) over Reetz. 37 C.F.R. § 41.41(b)(2) (2013). Because no timely arguments were made regarding this rejection, we affirm the Examiner’s §§ 102(b)/103(a) rejections of claims 25, 26 and 31 over Reetz.

FINDINGS OF FACT & ANALYSIS

REJECTION (1): § 103 over Itoh

Appellants’ arguments focus on claim 25 only (App. Br. 4-6).

Appellants argue that one of ordinary skill in the art would not have had a reason to select all of the process conditions of claim 32 to produce a novel catalyst as recited in claim 25 according to the method steps therein (App. Br. 5). Appellants contend that Itoh does not suggest simultaneous chemical reduction of the in situ-formed platinum dioxide and of the at least one transition metal hydrous oxide on said carbon support according to the present claims. *Id.* Appellants contend that Itoh does not teach a simultaneous chemical reduction of platinum with a transition metal hydrous oxide. *Id.* Appellants contend that one of ordinary skill in the art could not have predicted platinum crystallite diameter can be controlled by choosing a specific starting material in the controlled temperature range and pH range as recited in claim 25. *Id.* Appellants contend that Example 9 in the Specification compares the catalyst particle size achieved in Appellants' Example 6 to the particle size achieved in Itoh's comparative example 1 (App. Br. 6). Appellants contend that Appellants' example 6 yields a particle size of 37 Angstroms, while Itoh's process yields a particle size of 53 Angstroms. *Id.*

It is undisputed that claim 25 is a product-by-process claim. In a product-by-process claim, patentability of a product does not depend on its method of production; if the product in a 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, 697 (Fed. Cir. 1985). In the present case, claim 1 does not recite any limitation with regard to catalyst particle size. Rather, claim 1's structural recitation includes a "carbon-supported platinum alloy catalyst." Appellants do not dispute that the catalyst of Itoh meets that

structural feature. Moreover, Itoh teaches that platinum crystallite diameter of the platinum skeleton alloy supported catalyst (i.e., the catalyst alloy remaining after partial removal of the base metal) may be from 15 to 100 Angstroms (col. 7, ll. 10–12 and 54–58). Therefore, Itoh teaches that smaller diameter catalysts are possible and is not limited to the example relied upon by Appellants in their comparative Example 9. Appellants' arguments regarding the process used to form the product fails to direct us to any structural limitation in the claim that expresses a patentable distinction over that disclosed by Itoh.

On this record, we affirm the Examiner's § 103 rejection over Itoh.

REJECTION (2): Claim 29 § 103 Itoh in view of Reetz and Cao

Claim 29 depends from claim 25 and recites “wherein said chemical reduction is carried out with hydrogen gas at a temperature of at least 300°C.”

Appellants contend that Reetz does not teach using dihydrogen hexahydroxyplatinate and instead only teaches to use dihydrogen hexachloroplatinate (App. Br. 7). Appellants contend that there is insufficient motivation from Cao and Reetz to replace the hexachloroplatinate with hexahydroxyplatinate (App. Br. 7). Appellants contend that Reetz and Cao fail to teach combining dihydrogen hexahydroxyplatinate with second metal or controlling pH during the entire process. *Id.*

Claim 29, like claim 25, is a product-by-process claim. As noted *supra*, if the product in a product-by-process claim is 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. *Thorpe*, 777 F.2d at 697. Appellants argue differences in the process and starting materials used in forming the catalyst by Reetz and Cao, but fail to direct us to any structural difference in the final catalyst formed. On this record, we affirm the Examiner's § 103 rejection over Itoh in view of Reetz and Cao.

REJECTION (3): Claim 32 § 103 Reetz in view of Itoh and Cao

Claim 32 is directed to a method to produce carbon-supported platinum alloy catalyst.

Appellants argue that Reetz fails to disclose the in situ formation of platinum dioxide obtained by variation of pH between 2 and 9 and raising the temperature to a final temperature of 30 to 100°C, that the variation of pH is effected by the addition of an alkali or ammonia to the acidic starting solution until a pH between 2 and 9 is reached, and the use of dihydrogen hexahydroxyplatinate (App. Br. 8). Appellants contend that one of ordinary skill in the art would not have substituted Itoh's dihydrogen hexahydroxyplatinate for Reetz's dihydrogen hexachloroplatinate because the processes are different. *Id.* Appellants contend that Reetz uses an in situ process, while Itoh uses a two-step reduction process such that there is no reason to use Itoh's dihydrogen hexahydroxyplatinate from a two-step process in Reetz's in situ process (App. Br. 8).

Appellants' arguments are not persuasive because the Examiner does not rely solely on Itoh to teach the use of dihydrogen hexahydroxyplatinate (Ans. 7 and 11). The Examiner finds that Itoh and Cao both teach using dihydrogen hexahydroxyplatinate and Cao teaches using the dihydrogen hexahydroxyplatinate in an in situ process for producing platinum catalysts.

Id. Accordingly, the teachings of the applied references as a whole would have suggested using dihydrogen hexahydroxyplatinate as a suitable material in methods of making platinum sources. Indeed, Cao teaches advantages in using dihydrogen hexahydroxyplatinate as the platinum precursor material (Cao ¶¶ 15–17).

Appellants argue that the pH control and temperature control of steps (e) and (f) in claim 32 provide substantial effects and Itoh would not have yielded the claimed invention (App. Br. 9).

Appellants' argument is not persuasive because Cao teaches the advantages of using dihydrogen hexahydroxyplatinate including the ability to use temperature and/or pH to start precipitation and control crystal size (Cao ¶¶ 15–17). Appellants' arguments regarding Itoh fail to address the Examiner's findings with respect to Reetz's and Cao's teachings on pH and temperature control (Ans. 6–7). Although Appellants argue that paragraph 19 of Cao cited by the Examiner on page 7 of the Answer does not relate to simultaneous chemical reduction of in situ-formed platinum dioxide and of at least one transition metal hydrous oxide according to step (c) (Reply Br. 3), Appellants' argument attacks the references individually instead of addressing what the combined teachings would have suggested to the ordinarily skilled artisan. In the present case, the Examiner relies on Reetz to teach the use of transition metal oxides with platinum in making a catalyst. The Examiner proposes to substitute Itoh's or Cao's dihydrogen hexahydroxyplatinate for the chloroplatinic acid in Reetz. Cao provides advantages for making such a substitution and optimizing pH and temperature parameters for reducing the platinum dioxide formed on the carbon support (Cao ¶¶ 15–17 and 19).

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On this record, we affirm the Examiner's § 103 rejection over Reetz
in view of Cao and Itoh.

DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with
this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

ORDER

AFFIRMED