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.
16/806,760	03/02/2020	Thomas Schenkel	GGL-300670	2299

149556 7590 02/09/2022

GGL c/o BEVER, HOFFMAN & HARMS, LLP
ATTN: Carrie Reddick, Office Manager
18486 Spring Valley Drive
Grass Valley, CA 95945

EXAMINER
DEVORKIN, JOSHUA CRAIG

ART UNIT	PAPER NUMBER
3646	

NOTIFICATION DATE	DELIVERY MODE
02/09/2022	ELECTRONIC

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.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

creddick@beverlaw.com

Office Action Summary	Application No. 16/806,760	Applicant(s) Schenkel et al.	
	Examiner JOSHUA C DEVORKIN	Art Unit 3646	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 11/04/2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1,3-6 and 8-13 is/are pending in the application.

5a) Of the above claim(s) 8-10 and 12-13 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1 and 3-6 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☑ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Status of Claims

2. Claims 1, 3-6, and 8-13 are pending with claims 8-13 withdrawn. Claims 1 and 3-6 are examined herein.

Response to Arguments

3. Applicant's arguments, in view of the amendments, with respect to the 35 U.S.C 112(b) rejections have been fully considered and are persuasive. The 35 U.S.C 112(b) rejections have been withdrawn.

4. Applicant's arguments, in view of the amendments, with respect to the 35 U.S.C 103 rejections have been fully considered. The arguments are directed towards the amendments and are therefore addressed below.

5. Applicant's arguments, with respect to the 35 U.S.C 101 and 112(a) rejections have been fully considered but are not persuasive. Moreover, upon further consideration, a new grounds of rejection is made in view of 35 U.S.C 112(a) for new matter.

6. Applicant argues (pages 13-17) that the examiner's "erroneous LENR" argument relies entirely on language that is improperly "cherry-picked" from Applicant's specification and/or misrepresents Applicant's clearly intended meaning.

7. The claims are directed toward an apparatus for sourcing fusion reaction products to "generate a fusion reaction when a high-k light element particle of said high-k light element particles operably collides with an associated low-k light element particle" (claim 1). The specification (see [0015]) states:

> Preliminary experimental results generated by the methods and system described above (i.e. where fusion reactions occur in a metal such as palladium) indicate possibly significant changes to the presently understood branching ratio of deuterium-deuterium fusion reactions, indicating the discovery of potentially new nuclear processes. If these preliminary experimental results are confirmed and the underlying mechanisms of these new nuclear processes can be understood, then implementation of the present invention could lead to fusion energy without the need for very hot plasmas (i.e., without fulfilling the Lawson criteria), thereby providing a path to low cost, carbon free electricity.

8. Accordingly, Applicant's preliminary experimental results and underlying mechanisms of the reaction, which have yet to be confirmed or understood, are the result of an apparatus that allegedly generates a fusion reaction without the need for very hot plasma (i.e., without fulfilling the Lawson criteria).

9. As such, the invention is a result of a low-energy nuclear reaction (LENR), also known as "cold fusion," an attempt to achieve nuclear fusion at temperatures less than those known to provide sufficient energy to achieve fusion reactions. As is known in the art, "the temperatures required to overcome the coulomb barrier for fusion to occur are so high as to require extraordinary means for their achievement. Such thermally initiated reactions are commonly called thermonuclear fusion. With particle energies in the range of 1-10keV, the temperatures are in the range of 10^7-10^8 K". Therefore, the argument that the claimed invention is not directed towards "cold fusion" is not found persuasive. Additionally, Applicant does not provide

any experimental evidence or evidence in the instant specification to refute the fact that the invention is cold fusion.

10. Additionally, Applicant argues (pages 17-18) that the claimed apparatus for sourcing fusion reaction products is enabled. The argument that the claimed apparatus is enabled and/or possess credible utility is not persuasive. The invention is directed toward cold fusion with claim 1 reciting "to generate a fusion reaction" and ([0015]) states the apparatus could allegedly generate fusion energy (i.e., through a fusion reaction) without out the need for very hot plasma. The claim and the specification are devoid of any mechanism for achieving and maintaining the temperatures of hundreds of millions degrees Kelvin known to be required to achieve nuclear fusion. As such, the invention is directed to LENR or cold fusion.

11. The specification (e.g. [0005]-[0006]) describes conventional neutron generators utilized in many research facilities. Examiner agrees that conventional neutron generators have a recognized utility. Examiner does not agree that cold fusion-initiated neutron generators have a recognized utility.

12. An undue amount of experimentation would be required to produce neutrons from the alleged nuclear fusion with the presently disclosed methodology. The specification is devoid of useful information that would allow a skilled artisan to follow the methodology set forth and achieve the purported result of the invention. Fusion occurring at lower-than-accepted temperatures is not a phenomenon currently accepted by mainstream scientists. Therefore, given the state of art as here discussed, it is more likely than not that a person skilled in the art would not consider credible the utility for the claimed invention and it would be unreasonable

to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation.

13. Additionally, Applicant argues (pages 18-19) that the objections and 101/112 rejections arguable contradict the restriction entered 01/04/2021. Examiner would like to point out that the utility and enablement analyses provided herein are directed towards the claimed invention, which has a utility of generating useful amounts of neutrons from a nuclear "fusion reaction," claim 1. The cited portions of the Specification are relevant because they disclose details regarding this alleged low-energy nuclear fusion reaction.

Claim Objections

14. Claim 11 is objected to because of the following informalities: the header of claim 11 should be "withdrawn".

Specification

15. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

16. The specification is objected to under 35 U.S.C. §112(a) as failing to provide an enabling disclosure. The specification fails to provide an adequate written description of the invention and fails to adequately describe how to make and/or use the invention as required by 35 U.S.C. §112(a).

17. As set forth in MPEP 2107 (MPEP 2107.02(IV)), examination requires a review of the claims and the supporting written description to determine if the application has asserted for the claimed invention any specific and substantial utility that is credible. If no assertion of specific and substantial utility for the claimed invention made by the applicant is credible, and the claimed invention does not have a readily apparent well-established utility, a rejection of the claim(s) under 35 U.S.C. 101 on the grounds that the invention as claimed lacks utility is proper. A prima facie showing of no specific and substantial credible utility must establish that it is more likely than not that a person skilled in the art would not consider credible any specific and substantial utility asserted by the applicant for the claimed invention. The prima facie showing must contain the following elements: (i) an explanation that clearly sets forth the reasoning used in concluding that the asserted specific and substantial utility is not credible; (ii) support for factual findings relied upon in reaching this conclusion; and (iii) an evaluation of all relevant evidence of record, including utilities taught in the closest prior art.

18. The asserted utility of the present invention is an "apparatus for sourcing fusion reaction products" (preamble claim 1) and the specification states that the utility of the disclosed invention is for "providing a path to low cost, carbon free electricity" (see [0015]).

19. There is no reputable evidence of record to support the claim that the present invention involves "could lead to fusion energy without the need for very hot plasmas" (see [0015]); nor does the Specification provide acceptable evidence that the invention is capable of operating as indicated or capable of producing the alleged fusion reaction to provide low cost, carbon free electricity.

20. As is known by those having ordinary skill in the art, overcoming the Coulomb barrier to achieve critical ignition for nuclear fusion is only known to occur at extremely high kinetic energies, i.e., extremely high temperatures, such as those present on the sun. Georgia State University[1] explains:

> "The temperatures required to overcome the coulomb barrier for fusion to occur are so high as to require extraordinary means for their achievement. Such thermally initiated reactions are commonly called thermonuclear fusion. With particle energies in the range of 1-10keV, **the temperatures are in the range of 10^7–10^8 K."**

21. The "device" claimed by Applicant is not capable of producing or sustaining such a reaction at such temperature. Rather, the present invention is directed to cold fusion, also known as low energy nuclear reactions (LENR).

22. The specification repeatedly indicates that the disclosed invention falls into the realm of LENR, which is defined as *attempted nuclear fusion at temperatures less than those known to provide sufficient energy to achieve fusion reaction*. The specification describes the present invention could lead to fusion energy without the need for very hot plasmas (see [0015]) by "using deuterons having kinetic energies of 1keV" (see [0038]). As further noted in the instant specification (see [0015]) "Preliminary experimental results generated by the methods and system described above (i.e. where fusion reactions occur in a metal such as palladium) indicate possibly significant changes to the presently understood branching ratio of deuterium-deuterium fusion reactions, indicating the discovery of potentially new nuclear processes."

23. The presumption that the nuclear fusion may occur in a low-temperature environment is wholly unsupported by modern nuclear and plasma physics**.** Examiner cannot find, and

[1] http://hyperphysics.phy-astr.gsu.edu/hbase/NucEne/coubar.html

Applicant has not supplied, any reputable and peer-reviewed papers published in which the Applicant's theory for producing sustainable nuclear fusions reaction through electrochemically loading light element atoms into a target electrode and direction a high-energy light element toward the surface (Fig. 2). Accordingly, a skilled artisan would doubt that the present invention possess a credible utility based on the prevailing scientific community view of LENR:

- A 2004 review conducted by the Department of Energy[2] found "the occurrence of low energy nuclear reactions is not conclusively demonstrated by the evidence presented" (pp. 4), echoing the conclusions of a similar study conducted in 1989.
- Authors Berlinguette et al. of "Revisiting the cold case of cold fusion," explored three experimental set-ups to generate cold fusion. As explained in the nature perspective the experimental set-ups "found no evidence that cold fusion is possible[3]".
- Berlinguette[4] summarizes this area of research, noting "light-ion fusion does not violate the conservation of energy, so one cannot completely reject the possibility (however remote) that the clever use of chemistry and materials science could access such phenomena... Isolated groups have continued its pursuit, but have yet to produce a credible 'reference experiment' that provides unambiguous evidence of anomalous heat or nuclear reaction products that can be independently verified and advanced." (pp. 45).

---

[2] US DOE "Report of the Review of Low Energy Nuclear Reactions" 2004, available at https://www.lenr-canr.org/acrobat/ DOEreportofth.pdf. (Year: 2004)

[3] Google revives controversial cold-fusion experiments. Nature https://www.nature.com/articles/d41586-019-01683-9 May 2019. Google revives controversial cold-fusion experiments. Nature https://www.nature.com/articles/d41586-019-01683-9 May 2019.

[4] Berlinguette, C.P., Chiang, YM., Munday, J.N. et al. Revisiting the cold case of cold fusion. Nature 570, 45-51 (2019).

- Gu[5] et al. of "Experimental study on cold fusion using a deuterium gas and deuterium ion beam with palladium" explored three experimental set-ups using three different types of ion beams (hydrogen, nitrogen and deuterium) and a microwave heater. Gu et al. did not find any conclusory evidence that cold fusion exists stating "no conclusions can be drawn" (Pg. 330-331).

Reproducibility

24. The amount of guidance or direction necessary to enable an invention is inversely related to the amount of knowledge in the state of the art, as well as to the predictability of the art. In re Fisher, 427 F.2d 833,839, 166 USPQ 18, 24 (CCPA 1970); MPEP § 2164.03. The art of the present invention, a device for sourcing a fusion reaction through an ion beam collision with a target loaded by an electrochemical cell is too undeveloped to be considered to have a body of existing knowledge associated with it, much less predictability of results. Reproducibility must go beyond one's own laboratory. One must produce a set of instructions—a recipe—that would enable a skilled artisan to produce the same results. If reproducibility occurs only in one's own laboratory, errors (such as systematic errors) would be suspect.

25. Reproducibility of alleged low-temperature nuclear fusion results is a critical feature in determining if a disclosure adequately teaches other practitioners how to make and use an invention. Applicant's disclosure is insufficient as to how the embodiments described therein are based upon valid and reproducible methodology.

[5] Gu, A.G., Teng, R.K.F., Miller, M.S. et al. Experimental study on cold fusion using deuterium gas and deuterium ion beam with palladium. J Fusion Energ 9, 329–331 (1990).

26. Applicant has provided unsupported theory and speculative embodiments based upon questionable science. Therefore, such theories and the experimental results attributed to them are also questionable until such a time that Applicant rigorously proves that the suggested concepts are plausible. Since Applicant has not yet established the operability of the presently claimed invention, it is considered that the invention is lacking in utility. Given the state of the art as here discussed, it would be unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation.

Undue Experimentation

27. It is the Examiner's position that an undue amount of experimentation would be required to produce an operative embodiment of Applicant's invention.

28. In its present form, the disclosure is devoid of useful instruction that might enable a person skilled in the art to operate the device as claimed, in a temperature region which the literature suggests is incapable of achieving nuclear fusion.

29. To determine whether a given claim is supported in sufficient detail (by combining the information provided in the disclosure with information known in the art) such that any person skilled in the art could make and use the invention as of the filing date of the application without *undue* experimentation, at least the following factors should be included:

(A) The breadth of the claims;
(B) The nature of the invention;
(C) The state of the prior art;
(D) The level of one of ordinary skill;
(E) The level of predictability in the art;
(F) The amount of direction provided by the inventor;
(G) The existence of working examples; and
(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

This standard is applied in accordance with the U.S. Federal Court of Appeals decision *In re Wands*, 858 F.2d at 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). See also *United States v. Telectronics Inc.*, 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1046 (1989).

30. Reviewing the aforementioned *Wands* factors, Examiner summarizes the above-elaborated explanations as to why Applicant's invention fails to satisfy the enablement requirement:

(A) *The breadth of the claims*: Applicant's claims to achieve nuclear fusion by "a device comprising a controller for generating a cold fusion in a target in a reaction chamber", as recited in claim 1, are extremely broad as evidenced by their too-simple-to-be-true steps for the alleged cold fusion reaction, as well as the fact that this process necessarily abandons modern nuclear physics, such that the outcome of the recited structure cannot be reasonably predicted and measured (see [0015] "indicate possible significant changes to the presently understood branching ratio of deuterium-deuterium fusion reactions"). See MPEP 2164.08.

(B) *The nature of the invention*: The nature of the invention, i.e., the subject matter to which the claimed invention pertains, revolves around the viability of a low temperature fusion reaction; as currently disclosed by Applicant, such viability involves a complete departure from the accepted and well-tested theories that comprise known nuclear and plasma physics, chemistry, and electromagnetism. As such, the subject matter to which the invention pertains lies outside the realm of working science. See MPEP § 2164.05(a).

(C) *The state of the prior art*: The effects claimed by Applicant have not been verified by the existing body of scientific work and are, in fact, incompatible with it. See MPEP § 2164.05(a).

(D) *The level of one of ordinary skill*: The level of ordinary skill in the art cannot be ascertained because the art encompassing low-temperature nuclear fusion research lies within the realm of fringe science and subsequently does not possess a recognizable standard level of associated skill. See MPEP § 2164.05(b).

(E) *The level of predictability in the art*: Low-temperature nuclear fusion experiments are predictably unable to produce expected, reproducible, or meaningful empirical data. See MPEP § 2164.03.

(F) *The amount of direction provided by the inventor*: Applicant's underlying explanation is speculative at best as disclosed (see [0015] "If these preliminary experimental results are confirmed and the underlying mechanisms of these new nuclear processes can be understood"). MPEP § 2164.03.

(G) *The existence of working examples*: Applicant does not disclose any operating parameters and provides no existence of working examples. The theory does not appear to have been tested in any manner and it best appears as an idea for an invention and not an invention that has been reduced to practice. See MPEP § 2164.02.

(H) *The quantity of experimentation needed to make or use the invention based on the content of the disclosure*: The quantity of experimentation needed is infinite, as the practical guidance provided is insufficient to enable one to build or operate a working prototype of the invention, and the provided theoretical guidance is insufficient to enable one to understand the underlying sequence of phenomena required to attempt such an endeavor. See MPEP § 2164.06.

31. As evidenced above, the specification, in its present state, fails to teach a person having ordinary skill in the art how to make and use the invention, and the specification is therefore inadequate. The disclosed invention is not, as required by 35 U.S.C. 101, an operable invention of any practical use to the public. To be patentable, the claimed invention as a whole must be useful and accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." See *In re Alappat*, 33 F.3d 1526, 1544, 31 USPQ2d 1557 (Fed. Cir. 1994) and also *State Street Bank & Trust Co. v. Signature Financial Group*, 149 F.3d 1368, 1373-4, 47 USPQ2d 1596 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999). The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or

hopeful concept, or subject matter that is simply a starting point for future investigation or research. For more examples of this real-world applicability requirement being applied, see *Brenner v. Manson*, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966); *In re Fisher,* 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); *In re Ziegler,* 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993).

Claim Rejections - 35 USC § 101

32. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

33. Claims 1 and 3-6 are rejected under 35 U.S.C. 101 because the disclosed invention is **inoperative** and therefore lacks patentable utility for the detailed reasons provided above in the specification objection that are accordingly incorporated herein.

34. Applicant's claimed invention is directed towards an "apparatus for sourcing fusion reaction products" (preamble claim 1). The production of said fusion reaction products from a low-temperature fusion reaction to produce viable electricity is considered as being Applicant's specified utility ("providing a path to low cost, carbon free electricity" (see [0015]).

35. In describing said specified utility, Applicant has set forth the inadequately supported theory that utilizes an electrochemical loading process to load low-k light element into a target electrode and an ion source to direct high-k light element particles against the target electrode such that the ion species collisions in a cold fusion environment can produce and sustain fusion reactions (e.g., specification at [0009]). This fact creates a type of deficiency in which an

assertion of specific and substantial utility for the claimed invention made by an Applicant is not credible. See MPEP 2107.01 (II) for further examples of the Federal courts' treatment of inventions claiming incredible utility. The Examiner has provided a preponderance of evidence as to why the asserted operation and utility of Applicant's invention is inconsistent with known scientific principles, making it speculative at best as to whether attributes of the invention necessary to impart the asserted utility are actually present in the invention. As set forth in the objection to the specification above, there is currently no reputable evidence of record to indicate the invention has been reduced to the point of providing an operative low-temperature nuclear fusion system. See also In re Sichert, 566 F.2d 1154, 196 USPQ 209 (CCPA 1977). Accordingly, the invention as disclosed is deemed inoperable

36. Claims 1 and 3-6 are further rejected under 35 U.S.C 101 because the claimed invention is not supported by either a **credible asserted utility** or a well-established utility, for the same reasons set forth in the above objection to the specification as well as in the prior section, which are accordingly incorporated herein.

37. As set forth in MPEP § 2107.01 (IV), a deficiency under 35 U.S.C. 101 also creates a deficiency under 35 U.S.C. 112, first paragraph. See In re Brana, 51 F.3d 1560, 34 USPQ2d 1436 (Fed. Cir. 1995). Citing In re Brana, the Federal Circuit noted,

> "Obviously, if a claimed invention does not have utility, the specification cannot enable one to use it."

Claim Rejections - 35 USC § 112

38. The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to

> enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

39. Claims 1, and 3-6 are rejected under 35 U.S.C. 112(a) as failing to comply with the **enablement** requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, for the same reasons set forth in the above objection to the specification, which are accordingly incorporated herein.

40. Claims 1 and 3-6 are further rejected under 35 U.S.C. 112(a) as failing to comply with the **written description** requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor at the time the application was filed, had possession of the claimed invention. Specifically, it is doubtful that Applicant had actual or constructive possession of the claimed device at the time of filing.

41. Claims 1 and 3-6 are still further rejected under U.S.C. 112(a) because the claimed invention is not supported by either a **credible asserted utility** or a well-established utility for the same reasons set forth in the above objection to the specification as well as in the 101 section above, which are accordingly incorporated herein; as such, one skilled in the art clearly would not know how to use the claimed invention.

42. Claim 1 is additionally rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications

subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention. Newly amended claim 1 recites the limitation "when a second voltage that is sufficiently positive relative to the first voltage is applied to the counter electrode, the counter electrode produces a glow discharge plasma." The phrase "second voltage that is sufficiently positive" is not supported by the instant disclosure and is therefore **new matter**. The specification as filled states "particle accelerator 130A is implemented using a plasma ion source 130A having a counter electrode 131A configured to produce a glow plasma discharge 133A, which may also be an electrically pulsed plasma discharge, between counter electrode 131A and target electrode 110A" ([0040]). Applicant's arguments (page 22) indicate that support for this amendment is provided, for example, in paragraphs [0013] and [0045] (i.e., "…During operation, a suitable high voltage signal V_p is applied….). However, in describing the specific elected embodiment, as shown in Fig 3, there is no discussion of a second voltage applied to the counter electrode that is sufficiently positive relative to the first voltage of the target electrode.

Claim Rejections - 35 USC § 103

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

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

44. The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

45. For applicant's benefit portions of the cited reference(s) have been cited to aid in the review of the rejection(s). While every attempt has been made to be thorough and consistent within the rejection it is noted that the PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS. See MPEP 2141.02 VI.

Note on desired result-type language

46. The claims include statements that are either essentially method limitations or statements of intended or desired use:

- Claim 1: "…such that the high-k light element particles comprise dissociated light element gas molecules that are accelerated by the glow discharge plasma and directed onto an entirety of the first surface of the target electrode with sufficient energy to generate a fusion reaction when a high-k light element particle of said high-k light element particles operably collides with an associated low-k light element particle of said low-k light element particles absorbed by the target electrode."

- Claim 3: "…such that the low-k light element particles are driven from the electrolyte solution to the second surface, whereby the driven low-k light element particles are absorbed through the second surface and diffuse through the light-element-absorbing material to the first surface."

47. These clauses, as well as other statements of intended use, do not serve to patentably distinguish the claimed structure over that of the reference as long as the structure of the cited

references is capable of performing the alleged intended use. See MPEP 2111-2115. As stated in MPEP 2114, Section II:

> "[A]pparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).
>
> A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

48. As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim. The apparatus in the cited reference is capable of being used in the same manner and for the intended or desired use as the claimed invention. Note that it is sufficient to show that said alleged capability exists, which is the case for the cited reference.

49. The claims are further being interpreted under MPEP 2111.04, in which the “such that” clauses are not given patentable weight because they simply suggest intended results that may allegedly follow naturally from the claimed structures.

50. The desired result-type clauses not being given patentable weight are shown in the rejections with brackets: **[**…**]**.

51. Claims 1 and 3 are rejected under 35 U.S.C. 103 as being unpatentable over Applicant admitted prior art (AAPA), in view of Stubbers et al. US Pub 20110091000, and further in view of Simons et al. WO 9010935.

52. Regarding claim 1, AAPA discloses an apparatus for sourcing fusion reaction products (Fig. 13) comprising:

a vacuum chamber (58) containing a rarefied atmosphere ([0005] "is maintained at a near-vacuum pressure level") comprising light element gas molecule ([0005] "Hydrogen isotope particles (e.g., deuterium gas molecules D2 and/or tritium gas molecules) are fed from a hydrogen source 51 (e.g., a hydrogen gas supply or a hydrogen getter material)");

a target electrode (56) biased to a first voltage and having a first surface ("front surface") and an opposing second surface (side opposing the front surface) and comprising a light-element-absorbing material ([0005] "hydrogen absorbing material");

low-kinetic-energy (low-k) light element particles (57);

a particle accelerator (53) configured to direct a plurality of high-kinetic-energy (high-k) light element particles (54/55) toward the first surface of the target electrode (shown by arrow),

wherein the target electrode is configured such that the first surface is exposed to the rarefied atmosphere ([0005] "accelerating and directing the ionized hydrogen isotope ions 55 (e.g., deuterons D+ and/or tritons) toward the front surface of a target 56"),

wherein the particle accelerator (53) comprises a plasma ion source (52) including a counter electrode (unlabeled electrode on left side of 52) disposed in the vacuum chamber (58) and configured to produce a glow discharge plasma between the counter electrode and the target electrode ([0005] "produces an ion beam 54 by accelerating and directing the ionized hydrogen isotope ions 55 (e.g., deuterons D+ and/or tritons) toward the front surface of a target 56")

[such that the high-k light element particles (54/55) comprise dissociated light element gas molecules that are accelerated by the glow discharge plasma and directed onto an entirety

of the first surface of the target electrode ([0005]) with sufficient energy to generate a fusion reaction when a high-k light element particle of said high-k light element particles operably collides with an associated low-k light element particle of said low-k light element particles absorbed by the target electrode] (AAPA is capable of this alleged desired result: [0005] "fusion reactions occur when the path of a high-energy ionized hydrogen isotope atom 55 intersects the fusion cross section of a hydrogen isotope atom 57 and the high-energy hydrogen isotope atom nucleus has enough kinetic energy… whereby the high-energy hydrogen isotope atom nucleus fuses with the nucleus of the hydrogen isotope atom in target 56").

53. AAPA does not explicitly disclose a metal foil biased to a first voltage, an electrochemical cell.

54. Stubbers, however, teaches a target electrode (Fig. 14: 1410) including a metal foil ([0015] "Typical thickness of a target may be between 2 μm to 2000 μm" and [0045]) biased to a first voltage (1410 is biased to a first voltage through power supply 1420); an electrochemical cell (Fig. 14) including an electrolyte liquid (heavy water) containing low-kinetic-energy (low-k) light element particles ("D/T"); and wherein the electrochemical cell is configured to maintain contact between the an electrolyte liquid and the second surface of the target electrode (heavy water is in contact with back of 1410) such that some of the low-k light element particles are absorbed from the electrolyte liquid into the target electrode through the second surface (1425 "electrolytic loading").

55. The combination of AAPA as modified by the target electrode of Stubbers has sufficient structure such that when a second voltage that is sufficiently positive relative to the first voltage (the target electrode of Stubbers is connected to a power source and therefore can be

biased to any voltage) is applied to the counter electrode (positive voltage applied to the electrode of the left side of 52), it is configured to produce a glow discharge plasma between the counter electrode and the target electrode.

56. It would have been obvious to one of ordinary skill in the art before the effective filling of the claimed invention to modify AAPA system with the electrochemical cell of Stubbers for the predictable advantage such that “as the ion beam impinges on the target surface and disrupts the lattice, releasing trapped hydrogen, replacement hydrogen isotopes can be added back into the target to maintain a high loading concentration” ([0141]). Such a modification is further motivated by AAPA which discloses that “a gradual decrease over time in the number of deuterium atoms 57 on the near-front surface of target 56 leads to gradually decreasing rates of nuclear fusion rates” ([0005]), thereby suggesting a method to improve the number of deuterium atoms near the front side of the surface, i.e., electrolytic loading.

57. The AAPA-Stubbers system does not explicitly teach an electrolyte liquid is in a solution.

58. Simons, however, does and teaches an electrochemical cell (Fig. 1-3: 24) including an electrolyte solution containing low-kinetic energy light element particles (Pg. 19/20 "an electrolyte solution of deuterated water containing ordinary water and/or tritiated water, containing an electrolyte such as LiOD or Li_2SO_4, for example"). One of ordinary skill in the art before the effective filling of the claimed invention would have found it obvious to modify the system of AAPA-Stubbers with the electrolyte solution of Simons for the predictable advantage of adding an electrolyte to decompose to produce more isotopic hydrogen atoms (Pg. 19).

59. Regarding claim 3, the combination of the apparatus of AAPA with the electrochemical cell of Stubbers and the electrolyte solution of Simons teaches all the elements of the parent

claim. Modified Stubbers further teaches wherein the electrochemical cell further comprises an electrochemical anode (unlabeled electrode on right of 1410 penetrated by the coolant inlet and outlet) disposed in contact with the electrolyte solution (in contact with heavy water and as modified by Simons Pg. 19/20) and operably coupled to a bias source (1420) that is configured to apply an electrochemical bias between the target electrode and the electrochemical anode

[such that the low-k light element particles are driven from the electrolyte solution to the second surface (1425 and arrows showing D/T loading), whereby the driven low-k light element particles are absorbed through the second surface and diffuse through the light-element-absorbing material to the first surface] ([0141] "replacement hydrogen isotopes can be added back into the target to maintain a high loading concentration" and [0049] "Hydrogen undergoes diffusive transport through a lattice by jumping from site to site, until it reaches a grain boundary or other free surface).

60. Claims 4-6 are rejected under 35 U.S.C. 103 as being unpatentable over Applicant admitted prior art (AAPA), in view of Stubbers et al. US Pub 20110091000, in view of Simons et al. WO 9010935 and further in view of Holmes et al. US Pub 20050029124.

61. Regarding claim 4, the above-described combination teaches all the elements of the parent claim. Stubbers teaches a bias source (1420) but is silent with respect to adjusting the level of electrochemical bias applied to the anode.

62. Simons teaches an electrochemical cell (Fig. I-3) comprising a bias source (44) that supplies an electrochemical bias to the electrochemical anode (Pg. 22 "The charge-generator source is designed to produce a current between the electrodes"), whereby a diffusion rate of

the low-k light element through the light-element absorbing material is selectively adjustable (Pg. 23 "in a charging operation to accumulate isotopic hydrogen atoms… the charge-generating source is initiated by being set to a desirable current level"). One of ordinary skill in the art before the effective filling of the claimed invention would have found it obvious to modify the system of AAPA-Stubbers with the biasing source of Simons for the predictable advantage of controlling the diffusion of isotopic hydrogen atoms into the metal lattice (Pg. 22).

63. The combination of AAPA-Stubbers-Simons is silent with respect to a bias control device.

64. Holmes, however, teaches a bias control device (53) operably coupled to the bias source (50) and configured to adjust a level of the electrochemical bias applied to the electrochemical anode in response to an externally applied bias control signal ([0056] "A controller 53 receives the signal from the ion sensor 59… and sends a control signal to the variable voltage supply 50 to control the voltage output to the electrodes 40, 45"), whereby a diffusion rate of the low-k light element particles through the light-element-absorbing material is selectively adjustable by way of variances in a level of the externally applied bias control signal ([0058]). It would have been obvious to one of ordinary skill in the art before the effective filling of the claimed invention to modify the AAPA-Stubbers-Simons system with the bias control device of Holmes for the predictable advantage of a adjusting the voltage to the cell in response to the control signal ([0059]).

65. Regarding claim 5, the above-described combination teaches all the elements of the parent claim. AAPA further discloses wherein the target electrode (56) comprises a hydrogen absorbing material ([0005] "Target 56 is typically a hydrogen absorbing material") and both the

low-k light element particles (57) and the high-k light element particles (55) comprise hydrogen isotope particles (deuterium).

66. Regarding claim 6, the above-described combination teaches all the elements of the parent claim. AAPA further teaches hydrogen isotope particles (57), and therefore the above combination of AAPA-Stubbers-Simons teaches the electrolyte comprising hydrogen isotope particles.

67. AAPA is silent with respect to the target electrode material and Stubbers teaches a variety of materials ([0045]) but does not explicitly teach palladium.

68. Simons, however, teaches a palladium electrode (Pg. 31 "palladium film") It would have been obvious to one of ordinary skill in the art before the effective filling to modify the AAPA-Stubbers system with the palladium electrode for the predictable advantage of promoting surface adsorption and diffusion of isotopic hydrogen atoms (Pg. 31).

Conclusion

69. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a)

will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

70. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA C DEVORKIN whose telephone number is (408)918-7563. The examiner can normally be reached on Monday -Fridays 7:30 - 4:30 PT.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.C.D./
Examiner, Art Unit 3646

/JACK W KEITH/
Supervisory Patent Examiner, Art Unit 3646