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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Application Number: 13/089,986
Filing Date: 19 Apr 2011
Appellant(s): Cooper et al.

Stephen L. Peterson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 01/15/19.

(1) Grounds of Rejection to be Reviewed on Appeal

Every ground of rejection set forth in the Office action dated 02/08/18 from which the appeal is taken is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS."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."

(2) Response to Argument

Background: The claimed invention is directed to a nuclear fusion method (Claim 1: "method of generating ^{4}He atoms and energy...comprising...transmuting the deuterium to 4He atoms and energy"; see also [0017] and [0054]). Its asserted utility is "generating non-ionizing radiation or non-ionizing ^{4}He" ([002] as well as "meeting current and future energy needs" [004]).

Nuclear fusion is known to occur at extremely high temperatures and pressures (e.g., in the core of the sun and other stars). In man-made nuclear fusion devices, energy must be input to achieve what is known in the art as the "Lawson Criteria" to initiate nuclear fusion reactions. For the deuterium-deuterium fusion reaction that purportedly occurs in the present invention, temperatures of hundreds of degrees Kelvin are required to provide sufficient energy for the deuterium atoms to fuse (see Lawson " Some Criteria for a Power Producing Thermonuclear Reactor" in the OA Appendix). The present invention is disclosed to operate at temperatures near room temperature, far below what is recognized in the art as necessary to achieve nuclear fusion. Accordingly, the examiner has characterized the present invention as directed to what is known in the art as "cold fusion."

The alleged mode of operation of the present invention is similar to the "Fleishman-Pons" class of devices named for the scientists who pioneered the field of "cold fusion" in the 1990s. Fleischman-Pons devices purportedly lower the energy barrier to nuclear fusion reactions by concentrating hydrogen isotope ions from heavy water in the crystal lattice of a material with high affinity for

hydrogen—palladium (citation provided in final office action). The present invention loads hydrogen isotope ions into the crystal lattice of a carbon-based material ([005-6]).

Cold fusion has been theorized for several decades, but the scientific community has repeatedly disproven such claims. The examiner set forth a factual explanation of this in the office actions of 01/12/16 (see paras. 5-20) and 08/01/16 (see paras. 19-35). In short, the scientific literature as a whole suggests that cold fusion does not and cannot occur, i.e., that any invention that involves cold fusion is wholly inoperable.

Claim rejections under 35 U.S.C. 101 and 112: Based on the technological field of the present invention—cold fusion—and the state of the art in this field, one of ordinary skill in the art would have cause to doubt the asserted utility of the present invention. To properly reject a claimed invention under 35 U.S.C. 101, the Office must (A) make a prima facie showing that the claimed invention lacks utility, and (B) provide a sufficient evidentiary basis for factual assumptions relied upon in establishing the prima facie showing. *In re Gaubert*, 524 F.2d 1222, 1224, 187 USPQ 664, 666 (CCPA 1975) "Accordingly, the PTO must do more than merely question operability - it must set forth factual reasons which would lead one skilled in the art to question the objective truth of the statement of operability." If the Office cannot develop a proper prima facie case and provide evidentiary support for a rejection under 35 U.S.C. 101, a rejection on this ground should not be imposed. See, e.g., *In re Oetlker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant. If examination at the initial stage does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent."). See also *Fregeau v. Mosslnghoff*, 776 F.2d 1034, 227 USPQ 848 (Fed. Cir. 1985) (applying prima facie case law to 35 U.S.C. 101); *In re Piasecki*, 745 F.2d 1468, 223 USPQ 785 (Fed. Cir. 1984). MPEP 2107.02(IV).

The examiner has provided a proper showing that the claimed invention lacks utility by stating on the record that the present invention is directed to cold fusion (see, e.g., Office action 01/12/16, paras. 6-7). Furthermore, evidentiary basis for this statement was provided (see, e.g., Office action 01/12/16, paras. 8-20). Consequently, the burden of proving operability and utility shifted to Applicant.

Applicant has attempted to meet this burden by filing declarations (08/25/15 and 10/06/15), referencing an experimental study performed by LLNL (in the declaration of 08/25/15; report not made of record); and various NPL (Guo, which is not of record, and as filed on the IDS of 08/25/15). These submissions are insufficient to demonstrate operability and utility of the present invention, for the reasons set forth previously, and as detailed in the final office action (referring to MPEP 2107.02 and 716.01(c)).

Appeal Brief Argument A: Applicant argues that the examiner has mischaracterized the present invention as cold fusion (pp. 8-10). The examiner respectfully disagrees. It is well-documented and accepted fact in the art that nuclear fusion requires extremely high temperatures. There is no evidence of record that the present invention achieves the conditions necessary to initiate nuclear fusion reactions. It is for this reason that the examiner has characterized the present invention as cold fusion. Furthermore, there are some similarities between the present invention and the Fleishman-Pons scheme also characterized as cold fusion. Applicant correctly notes that there are also some differences between the present invention and the Fleishman-Pons cold fusion experiments. However, Applicant concludes "[t]o equate the two processes, by ignoring the fundamental characteristics of the operative materials and calling two materials solids is to obscure the facts." This conclusion ignores the main basis of the Examiner's characterization of the present invention as cold fusion: it does not achieve the conditions necessary to initiate fusion. Any differences between the present invention and the Fleishman-Pons devices do not undermine this fundamental fact.

Appeal Brief Argument B: Applicant further argues that Fleishman-Pons cold fusion process are operative (pp. 10-11). Applicant cites a DIA report, alleging that such a report provides "clear evidence that some type of nuclear reaction can take place at low temperatures" and "prove[s] that if current scientific theory indicates that fusion cannot take place at low temperatures, then current scientific theory must be wrong because it conflicts with observable facts." This is a blatant misinterpretation of the findings of this report. DIA concludes in the executive summary "DIA assesses with high confidence that *if LENR can produce nuclear-origin energy at room temperatures,* this disruptive technology could revolutionize energy production and storage." In fact, the phrase "if LENR can produce nuclear-origin energy at room temperatures" in the conclusion illustrates that DIA, at the time of the assessment, could not make a determination that LENR produces energy. The report also includes the phrase "[i]f nuclear reactions in LENR experiments are real and controllable," indicating that the DIA analysts did not believe that the research detailed in the report was sufficient to conclude that LENR is a real and controllable phenomenon. There is another flaw in Applicant's argument that the DIA report should be weighed as evidence in favor of operability of the present invention: the DIA report ignores the research generated by the scientific community that alleged "results" of cold fusion experiments can in fact be attributed to experimental error or to chemical phenomena. For example, the following discrepancies were documented during scrutiny of cold fusion experiments by the scientific community:

- After Fleischmann and Pons announced their fusion device competing researchers attempted to reproduce their results. The results of these attempts were primarily negative. The few initial positive results were either retracted or later shown to be in error by subsequent experiments (citation provided in final office action).
- The general consensus by those skilled in the art and working at these various laboratories is that the fusion conclusion made by Fleischmann and Pons was based on experimental error (citation provided in final office action).

- Experimenters who previously found evidence of excess heat could not reproduce their results when better calorimetry equipment was used (citation provided in final office action).
- Experimenters at the Naval Research Laboratory had mistakenly reported the production of particular palladium isotopes by neutron transmutation in cold fusion cells (citation provided in final office action).

Appeal Brief Argument C: Applicant argues that "the Applicants have shown, in four different types of experiments that their technology produces energy consistent with some type of low temperature nuclear reaction" (pp. 12-17). The examiner disagrees. At a minimum, as shown by the extensive scrutiny, evaluation, and rigorous verification attempts by the scientific community cited by the Examiner, results showing "energy consistent with some type of low energy nuclear reaction" cannot be construed as evidence of operability in cold fusion experiments. Over several decades, many experiments have demonstrated results "consistent with" cold fusion. However, upon further analysis (as documented above and throughout prosecution), these results, in fact, were attributed to non-nuclear phenomena.

The examiner does not agree that the experimental testing of the present invention demonstrates operability and should be accepted as facts. The alleged "facts" of the performance of the present invention have not been rigorously evaluated and scrutinized by the scientific community as a whole, they do not shift the balance of the totality of evidence in the record towards patentability. Because many previous cold fusion experiments producing "results consistent with nuclear fusion" were later—under further scrutiny and more rigorous evaluation—found to be inoperable, the examiner cannot accept the experimental results of record as irrefutable proof that nuclear fusion occurs in the present invention.

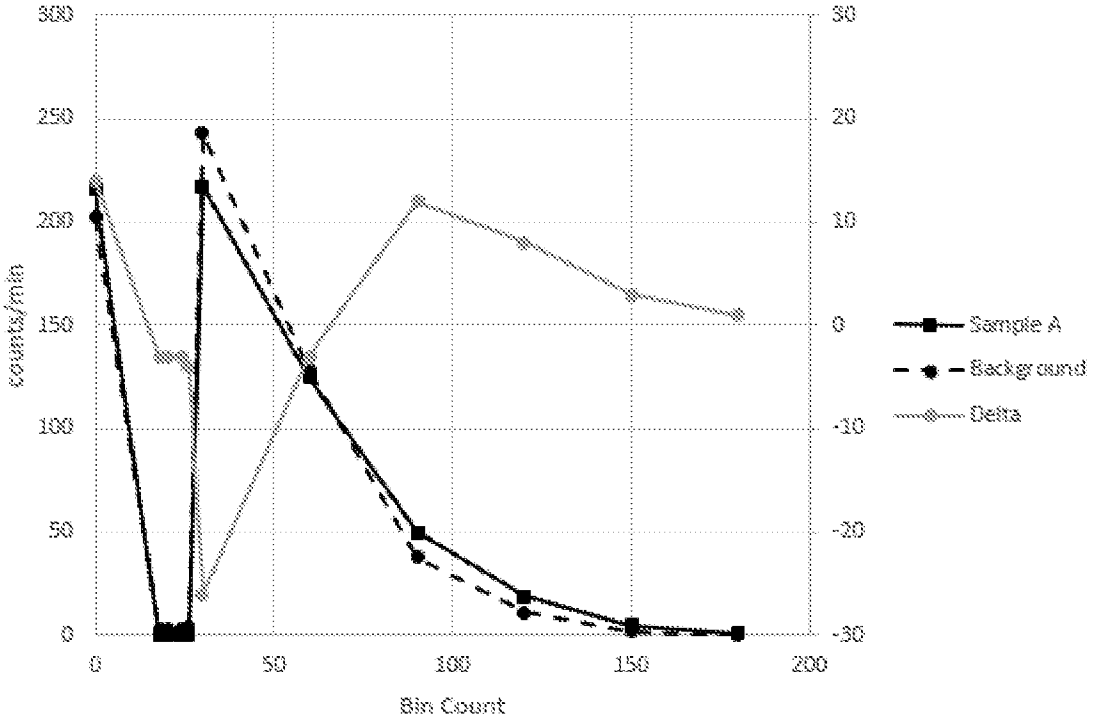
Because the examiner's position in challenging the asserted utility of the present invention is based on established scientific beliefs and principles, evidence of similar weight would have to be made of record to rebut the finding of inoperability and lack of utility. There is no predetermined amount or character of evidence that must be provided by an applicant to support an asserted utility, therapeutic or otherwise. Rather, the character and amount of evidence needed to support an asserted utility will vary depending on what is claimed (*Ex parte Ferguson*, 117 USPQ 229 (Bd. App. 1957)), and whether the asserted utility appears to contravene established scientific principles and beliefs. *In re Gazave*, 379 F.2d 973, 978, 154 USPQ 92, 96 (CCPA 1967); *In re Chilowsky*, 229 F.2d 457, 462, 108 USPQ 321, 325 (CCPA 1956).

The present invention is disclosed to operate by a mechanism that does not obey the laws of physics as currently understood by the scientific community, so substantial empirical proof of operability that has been rigorously evaluated by objective scientists skilled in the art would be required to demonstrate operability. The bar for demonstrating operability is quite high for the present invention because of the large number of similar experiments allegedly demonstrating cold fusion that were subsequently disproven when subjected to more rigorous scrutiny. Lindstrom ("Believable statements of uncertainty and believable science" provided in the OA Appendix) addresses this issue:

> "Anomalous observations may indeed point to new phenomena, but simple explanations are usually most probably. 'The first principle is that you must not fool yourself—and you are the easiest person to fool' (R. P. Feynman, 1974 Caltech commencement address). Science is a communal activity whose practitioners build upon each other's work. To exploit the literature we must understand its limitations, which is possible only if the authors of publications understand the uncertainties in their measurements and conclusions, and make us, the readers, understand them in the same way."

The experimental results of record are insufficient to demonstrate that the present invention achieves nuclear fusion in view of the large body of evidence that indicates that cold nuclear fusion cannot occur. To paraphrase Lindstrom, the evidence provided is not believable because it is not supported by a discussion of uncertainties and does not rule out simple explanations for the observed results. For example,

- The first Loan affidavit provides radiation count data purportedly obtained by placing a radiation detector near the present invention. However, the data obtained does not appear to be statistically different from the background radiation also collected. In fact, in many instances, the background radiation is higher than the radiation supposedly emanating from the invention. Displaying this data in a different format (below), one of ordinary skill in the art would be unconvinced that the results definitely prove that the present invention provides a radiation output above background radiation. In fact, the close correlation with the sample and the background indicates that there is no real difference between the two measurements. Notably, the report of these results does not indicate the error bar associated with the particular instrumentation used or any documentation of calibrating the instrumentation, so one cannot determine whether the difference between the measurements is meaningful or whether it falls within the expected error level of the instrumentation.



Furthermore, the detector used in these experiments does not detect neutrons, which would be a key signature indicating fusion was occurring. A key factor in disclosing a significant and meaningful result is collecting data from multiple experiments and consolidating that data together. Such experimentation provides an indication of the reproducibility of the results. It is the reproducibility issue that has been the downfall of previous cold fusion experiments, as discussed above.

- The second Loan affidavit provides additional "data" purportedly collected from the present invention. However, this data clearly has not been subjected to the rigorous examination required by the scientific method. For example, the chart between paragraphs 21 and 22 has no labels on its axes, so it is impossible to tell what is being displayed. Furthermore, Loan admits "the fact that the detector we used detected gamma rays, X-rays and neutrons, the fact the sample sizes were small, and the presence of polypropylene shielding....prevented us from determining the exact amount and nature of any radiation produced." It would seem however, that an experiment designed to prove the existence of cold fusion would, in fact, necessarily

need to provide an indication of the "exact amount and nature of any radiation produced." This experimentation, accordingly, seems to be flawed.

- The quotation of a single sentence in what probably is a several-hundred page report produced by LLNL is insufficient evidence of operability. Loan himself admits "the experiments produced mixed results." Again, the Examiner notes that the downfall of cold fusion experimentation has historically been reproducibility. The LLNL report that has not been made of record in this application allegedly states "Of these [various test results] the CNT sample event of October 25, 2006 at 16:14 provides evidence for a DD fusion source." Accordingly, it appears that *a single moment in a single experiment among many* provided an indication consistent with fusion. The overall conclusions of the LLNL report have not been made of record. The experimental details have not been made of record. The experimental results have not been made of record. Accordingly, there is no indication that the LLNL report provides irrefutable proof of cold fusion because there is no description that would make this statement "believable" to one of ordinary skill in the art.
- The present invention is disclosed and claimed to produce energy. However, there is no disclosure whatsoever of any calorimetry experiments that would verify this claim.

Regarding the alleged testing of the present invention in experiments conducted at LLNL, the examiner finds the information submitted to be insufficient for demonstrating operability (as discussed in the foregoing paragraph). The previous examiner has made a request for information to evaluate any such report of experimental evaluation. Applicant has responded by stating that the report is unavailable. However, the standard non-publication clause of a typical government contract report is insufficient to establish that the referenced experimental evidence is not able to be made of record. This clause is directed to publication of the report, and specifically states (with emphasis added), "Sponsor

may disclose the content of any report provided to the Sponsor by the Contractor resulting from the work under this Agreement."

The examiner notes that the request for information was made in this application based on declaration statements that additional empirical evidence may exist to overcome the Examiner's position that the present invention is inoperable and therefore lacking utility. Applicant's refusal to provide evidence that possibly could shift the determination of patentability in favor of Applicant is perplexing. It would seem that if the inventors possessed information that would prove the present invention is operable, they would be eager to provide this to the Office as well as to publish it in scientific journals to prove to the scientific community that the dismissal of cold fusion is in error.

Applicant concludes (p. 21) "if the facts are in conflict with current scientific theory, it is the theory that must be changed to conform with the facts. Discounting indisputable facts because they are in conflict with current theory is scientifically and legally indefensible." Applicant is suggesting that the examiner should ignore decades of research conducted by hundreds of scientists that was collectively found by the scientific community as a whole to disprove the existence of cold fusion in favor of some experimental "facts" that have not been subjected to the same level of scrutiny! The examiner emphatically disagrees that the experimental results of record can be considered to be "indisputable." There is no evidence of record that Applicants have sought peer review of the experimental results of the present invention, which would be the only path to changing current scientific theory. The examiner—and the USPTO—does not have the ability, mission, or responsibility to change scientific theory. It is the function of the scientific community utilizing the scientific method to observe, hypothesize, validate, disprove. Only through these activities can current scientific theory undergo change.

Appeal Brief Argument D: There are peer-reviewed journal articles supporting Applicant's position that cold fusion occurs in the present invention (pp. 18-21). The Examiner respectfully disagrees

that the referenced NPL publications provide evidentiary support of the operability of the present invention. The findings of Guo were addressed in detail at paras. 9-13 of the Office action of 08/01/16. The NPL publications of the IDS of 08/26/17 are similarly insufficient in overcoming the totality of evidence presented by the Examiner in support of inoperability. The finding of inoperability and lack of utility of the present invention is based entirely on the fact that the present invention requires that nuclear fusion occur. Accordingly, any objective evidence in support of operability must demonstrate that nuclear fusion occurs in the present invention. Without such a connection, the evidence fails to meet the nexus requirement (see MPEP 716.01(b)).

- Guo describes a chemical interaction between water (light water, H2O) molecules and carbon nanotubes, resulting in the production of hydrogen gas via electrolysis. It contains no support for the production of helium or tritium via nuclear fusion. Guo explicitly discloses "[t]he non-labeled peaks are either attributable to the fragments of [He, CH4, H2O, CO, C2H6, and CO2] or are rather insignificant." Accordingly, Guo attributes the peak at AU 3 to instrumental noise, rather than to tritium, as the Loan affidavit alleges. Furthermore, the Loan affidavit argues that the peak at AU 3 "can only be made by ^{3}He (Helium 3) or T (tritium ^{3}H). Both of these gases are transmutation byproducts of a nuclear reaction." Loan ignores the fact that ^{3}He is a naturally occurring isotope as well as the fact that H-D would also have an AU of 3. Accordingly, the non-labeled peak at AU 3 that Guo dismisses as not exceeding the signal-to-noise ratio of its instrumentation is attributable to naturally occurring substances and cannot be taken alone to be statistically significant evidence of nuclear fusion. The Guo article further does not meet the nexus requirement because the present invention is directed to an interaction between deuterium and carbon nanotubes.
- Moreover, the NPL documents of the IDS of 08/26/17 fail to meet the nexus requirement. The publications describe the discovery of an interesting quantum interaction between water (light

water, H2O) molecules and beryl (beryllium aluminum silicate), resulting in proton delocalization. There is no indication that the interaction produces helium or nuclear fusion. It similarly does not meet the nexus requirement because the present invention is directed to the interaction of deuterium and carbon materials.

Rejections under 35 U.S.C. 102: Regarding the claim rejections under 35 U.S.C. 102, Applicant's arguments (pp. 21-27) are unpersuasive. Applicant's arguments seem to be conflating issues of enablement under 35 U.S.C. 112(a) with issues of anticipation under 35. U.S.C. 102. Accordingly, Applicant's argument that "Hagelstein fails to provide an enabling disclosure with respect to the claimed subject matter" is moot. "Even if a reference discloses an inoperative device, it is prior art for all that it teaches." *Beckman Instruments v. LKB Produkter AB*, 892 F.2d 1547, 1551,13 USPQ2d 1301,1304 (Fed. Cir. 1989). Therefore, "a non-enabling reference may qualify as prior art for the purpose of determining obviousness under 35 U.S.C. 103." *Symbol Techs. Inc. v. Opticon Inc.*, 935 F.2d 1569,1578,19 USPQ2d 1241,1247 (Fed. Cir. 1991). MPEP § 2121.

Furthermore, Applicant argues that Hagelstein fails to disclose the generation of energy by contacting carbon materials with deuterium. The examiner disagrees. Paragraph [0274] states (with emphasis added) "molecular deuterium 25 fuses into another helium 37 thereby releasing energy into the lattice structure...Some of the energy release from the molecular transformations is lost to the metal lattice 31 and appears as heat energy." In one of the embodiments of the invention the material 202 of the metal lattice is carbon-based (see [0322]) and comprises molecular deuterium ([0312]). That Hagelstein fails to explicitly disclose all of the claim elements in a single paragraph or section is moot.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert, denied, 469 U.S. 851 (1984). "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are

concerned. They are part of the literature of the art, relevant for all they contain." In re Heck, 699 F.2d 1331,1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009,158 USPQ 275, 277 (CCPA 1968)). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert, denied, 493 U.S. 975 (1989). See also *Celerita Technologies Ltd. v. Rockwell International Corp*., 150 F.3d 1354, 1361, 47 USPQ2d 1516,1522-23 (Fed. Cir. 1998) (The court held that the prior art anticipated the claims even though it taught away from the claimed invention. "The fact that a modem with a single carrier data signal is shown to be less than optimal does not vitiate the fact that it is disclosed.") Although Hagelstein discloses many examples of materials that can perform its energy production method, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442,169 USPQ423 (CCPA 1971).

Rejection under 35 U.S.C. 112, first paragraph as lacking enablement: Applicant argues that the present invention is enabled because the August Loan Declaration addresses the Wands Factors (pp. 30-31). The examiner respectfully disagrees. Loan's analysis does not consider the evidence as a whole. Based on the evidence regarding the below factors (*In re Wands,* 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)), the specification at the time the application was filed, would not have taught one skilled in the art how to make the full scope of the claimed invention without undue experimentation.

Based on the evidence as a whole:

- The claims are overly broad because one of ordinary skill in the art would not be able to use the claimed process to achieve nuclear fusion. There is no description of conditions in the claims that would allow the claimed process to result in nuclear fusion.
- The nature of the invention—cold fusion— and the state of the art with respect to cold fusion necessitates that an enabling disclosure must include exact conditions and

experimentation that would allow one of ordinary skill in the art to achieve nuclear fusion.

- The level of one of ordinary skill in the art would not have enabled one to make the claimed invention given the lack of literature available that would guide one to achieve nuclear fusion by the claimed method. There currently exists no literature demonstrating cold fusion. Additionally, there is no predictability in the art of cold fusion. Identical experiments have been found to produce different results.
- The amount of direction provided by the disclosure would not have enabled one of ordinary skill in the art at the time of the invention to make the claimed invention. Because the specification does not reliably establish that the present invention achieves nuclear fusion, one of ordinary skill in the art would have no way to verify whether replication of the present invention was successful.
- The absence of working examples indicates one of ordinary skill in the art would not have been enabled to make the claimed invention. No cold fusion experiments to date have provided definitive proof that cold fusion is operative.
- One of ordinary skill in the art would have had to conduct undue experimentation to use the claimed invention. For one of ordinary skill in the art to use the claimed invention, one would need to perform the claimed process and achieve nuclear fusion. Based on the foregoing factors, it is unlikely that any amount of experimentation would provide this result.

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

Respectfully submitted,

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RQAS – OPQA

Requirement to pay appeal forwarding fee. In order to avoid dismissal of the instant appeal in any application or ex parte reexamination proceeding, 37 CFR 41.45 requires payment of an appeal forwarding fee within the time permitted by 37 CFR 41.45(a), unless appellant had timely paid the fee for filing a brief required by 37 CFR 41.20(b) in effect on March 18, 2013.