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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/810,897	01/18/2011	Ola Nilsen	DEH-PT001	9883
3624	7590	05/12/2014	EXAMINER	
VOLPE AND KOENIG, P.C. UNITED PLAZA 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103			WILLS, MONIQUE M	
			ART UNIT	PAPER NUMBER
			1721	
			NOTIFICATION DATE	DELIVERY MODE
			05/12/2014	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):

eoffice@volpe-koenig.com

Office Action Summary

Application No. 12/810,897	Applicant(s) NILSEN ET AL.	
Examiner MONIQUE WILLS	Art Unit 1721	AIA (First Inventor to File) Status No

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 1/22/2014.
 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) 1-9 and 12-25 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) 4,5,9 and 14-25 is/are allowed.
- 7) Claim(s) 1-3,6-8,12 and 13 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 6/28/2013 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/08)
Paper No(s)/Mail Date _____
- 3) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 4) Other: _____

DETAILED ACTION

The present application is being examined under the pre-AIA first to invent provisions.

Response to Amendment

This Office Action is responsive to the Amendment filed October 18, 2013. The following rejections are overcome:

- Claims 3-5, 7 & 9 under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.
- Claims 1-3, 6-8, 10 & 12-13 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Gordon et al. U.S. Pub. 2005/0277780.
- Claim 11 under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Gordon et al. U.S. Pub. 2005/0277780 in view of Jensen et al. U.S. Pub. 2008/0026929.

Claims 4-5, 9 and newly added claims 14-25 are allowed. Claims 1-3, 6-8 & 12-13 are rejected as follows:

Allowable Subject Matter

Claims 4-5, 9 & 14-25 are allowed. The instant claims would be allowable over the prior art of record, because the prior art is silent to a method for formation of a Li-comprising layer on a substrate by atomic layer deposition comprising: pulsing a lanthanum precursor through a reaction chamber; reacting said lanthanum precursor with at least one surface of the substrate; purging the reaction chamber; pulsing an oxygen precursor through the reaction chamber; reacting the oxygen precursor with the surface of the substrate; purging the reaction chamber' pulsing a lithium precursor through the reaction chamber' reacting the lithium precursor with a surface layer of the substrate; purging the reaction chamber' pulsing an oxygen precursor through the reaction chamber; reacting the oxygen precursor with the surface of the substrate' purging the reaction chamber; repeating in order to form a thin film layer of lithium and lanthanum.

The prior art, such as Gordon U.S. Pub. 2005/0277780, teaches a lithium precursor deposited on a substrate, and the chamber is subsequently purged. However, the reference is silent to separate lithium and lanthanum sources deposited on the substrate with subsequent purging then oxygen pulsating in between. Therefore, the claims are patentably distinct from Gordon.

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Claims 9 & 14-25 are allowed based on their dependency to claims 4 & 5.

Claim Rejections 35 USC § 103

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

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-8 & 12-13 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Gordon et al. U.S. Pub. 2005/0277780 in view of Jensen et al. U.S. Pub. 2008/0026929.

With respect to **claims 1 & 3**, Gordon teaches a method for formation of a Li-comprising layer on a substrate by atomic layer deposition comprising the following steps: a) providing a substrate in a reaction chamber wherein said reaction chamber is arranged for gas-to-surface reactions (Metal silicates or phosphates are deposited on a heated substrate by the reaction of vapors of alkoxysilanols or alkylphosphates along with reactive metal amides, alkyls or alkoxides; see the Abstract), b) pulsing a lithium precursor through said reaction chamber (supplying lithium precursor vapors in alternating pulses (See the Abstract), c) reacting said lithium precursor with at least

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one surface of said substrate (exposing a substrate to one or more vapors (par. 39) with a lithium phosphate precursor (par. 91)) d) purging of said reaction chamber by sending a purge gas through said reaction chamber for the purging of the reaction chamber (carrier gas used for purging of reaction byproducts and un-reacted reactant vapor (par. 98)). Further concerning **claim 3**, Gordon teaches pulsing an oxygen precursor through said reaction chamber, reacting said oxygen precursor with said at least one surface of said substrate. See paragraph 71. With respect to **claim 8**, the film is oxidized. See paragraph 71. See also paragraph 9. With respect to **claims 12 & 13**, the limitation “for the production of a lithium-comprising electrolyte thin film for use in a battery” is an intended use. Intended use limitations are considered to the extent that they impart structure (capable of use) to the device. Here, the method and materials are identical to the instant claims. Therefore, it would be reasonable to expect the resulting lithium phosphate thin film is capable of use in an electrolyte thin film lithium battery.

Gordon does not expressly disclose a multimetallic compound precursor material (**claim 1**); and repeating steps b) to d) a desired number of times in order for the formation of a thin film layer of a lithium comprising material upon said at least one surface of said substrate (**claims 1-3 & 6-7**).

However, Jensen teaches that it is well known in the art to employ organometallic (par. 161), wherein the metal containing precursor may include Al, Ba, Li, Nb, Mg, Pb, Pt, Si, Sr, Ta, Hf, Y, La, Mo *or a combination of different* precursors (paragraph [0162]) or lithium and titanium precursors (par. 162) to form lithium containing products.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the multimetal organometallic precursor of Jensen, to form the lithium containing film layer of Gordon, in order to improve conductivity of the film layer material. The skilled artisan recognizes that the increased conductivity enhances performance in electrical applications.

With respect to repeating steps, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to repeat steps b) to d) in the method of Gordon in order to obtain the desired thickness and characteristics of the film. The skilled artisan recognizes that continuing to pulse lithium, react with the substrate and purge will form a film of desired homogenous thickness. Furthermore, selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

Response to Arguments

Applicant asserts that the incorporation of subject matter derived from claims 10 and 11 into claim 1 overcomes the previous rejections of record. This argument is persuasive and the previously pending rejections are overcome. With respect to claim 10, Applicant asserts that Table 2 of Gordon does not teach lithium alkyls. This argument is moot as claim 1 requires a laundry list of precursor materials in addition to lithium alkyls. With respect to claim 11, Applicant asserts that "organometallic compounds" is a wide-ranging term encompassing a wide variety of compounds

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featuring organic groups bound to a metal and there is no mention of bimetallic compounds. This argument is not persuasive. Claim 11 has been cancelled and partially incorporated into claim 1. Claim 1 now requires a wide range of precursor materials in addition to bimetallic materials. Additionally, the term "bimetallic" is also a wide-ranging term encompassing a wide variety of compounds and does not preclude organometallic compounds with two metals. Jensen specifically discloses in paragraph [0162], the metal containing precursor in the organometallic compound includes *a combination of different metal precursors*. Therefore, Jensen teaches organo-multimetallic compounds, satisfying the multi-metallic compound materials of claim 1.

Conclusion

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

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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.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Mark Huff, may be reached at 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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 <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Monique M Wills/
Examiner, Art Unit 1721

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1721