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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/772,588	06/12/2020	Kelvin J. Witcher	79826US006	8117
32692	7590	09/22/2023	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			KANE, TREVOR LOGAN	
PO BOX 33427			ART UNIT	PAPER NUMBER
ST. PAUL, MN 55133-3427			1657	
			NOTIFICATION DATE	DELIVERY MODE
			09/22/2023	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):

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<b>Office Action Summary</b>	<b>Application No.</b> 16/772,588	<b>Applicant(s)</b> Witcher et al.	
	<b>Examiner</b> TREVOR L KANE	<b>Art Unit</b> 1657	<b>AIA (FITF) Status</b> 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 8/7/23.  
☐ 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) 1-16 is/are pending in the application.  
5a) Of the above claim(s) 8-15 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-7 and 16 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](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

#### Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 6/12/20 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: \_\_\_\_\_

## **DETAILED ACTION**

### ***Notice of Pre-AIA or AIA Status***

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

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/7/23 has been entered.

### ***Priority***

Application claims priority to 62/607,688 provisional application with an effective filing date of 12/19/17. Claims of the instant application are supported by the provisional application and thus have a priority date of 12/19/17.

Claims 1-16 are pending. Claims 8-15 are withdrawn. Amended claims 1-7 and 16 are under examination herein.

### **Information Disclosure Statement**

The IDS filed on 9/3/22 has been fully considered except where references have been lined through

***Response to Amendment***

This action is written in response to applicant's amendments received on 8/7/23.

Any objection or rejection not reiterated herein has been overcome by amendment.

Claims 1-16 are pending. Claims 8-15 are withdrawn. Amended claims 1-7 and 16 are under examination herein.

***Claim Rejections - 35 USC § 103***

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.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Modified rejection due to amendment. **Claims 1-7 and 16** are rejected under 35 U.S.C. 103 as being unpatentable over **Lee** (Lee, I., *et al.* (2016). Antibacterial performance of various amine functional polymers coated silica nanoparticles. Polymer, 83, 223-229) in view of **Albert**

(Albert, H., *et al* (1998). Biological indicators for steam sterilization: characterization of a rapid biological indicator utilizing *Bacillus stearothermophilus* spore-associated alpha-glucosidase enzyme. Journal of applied microbiology, 85(5), 865-874.) and **Ghosh** (Ghosh, *et al* "Surface modification of nano-silica with amides and imides for use in polyester nanocomposites." Journal of Materials Chemistry A 1.19 (2013): 6073-6080).

**Regarding claim 1**, Lee teaches surface modification of silica nanoparticles with amines (abstract). Lee teaches tertiary amine-modified silica nanoparticles and using those nanoparticles in a liquid medium containing water to kill the bacteria (p 224 right column lines 4-19, p224 right column lines 32-39, and figure 1). Lee further teaches that the tertiary amine-modified silica nanoparticles are able to kill both gram positive and gram-negative bacteria (abstract, figure 5 and 6, p227 left column lines 5-10). Examiner notes claim 1 requires no greater than 30 wt% organic solvent, and zero meets the limitation. Further, "less than 30%" must encompass 0% as it was previously modified with the phrase "if present". The phrase "comprising water and no greater than 30-wt% organic solvent" is construed herein to include compositions free of organic solvent because under BRI 0% is less than 30% and the claim was previously modified with the phrase "if present" indicating that the phrase necessarily includes compositions having no organic solvent within its scope. Lee teaches that the nanoparticles are in distilled water (liquid medium) which is inherently free of organic solvent (less than 30 wt% organic solvent) and thus meets the limitation of less than 30wt% organic solvent (p 224 right column lines 4-19).

Lee fails to teach an indicator compound or explicitly teach that the amine groups are covalently attached to the silica nanoparticle surface.

Albert teaches biological indicators for sterilization (title). Albert teaches that sterilization monitoring is important to ensure adequate sterilization and that biological

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