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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/251,873	12/14/2020	Bhaskar V. Velamakanni	80764US004	1553

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Solventum Intellectual Properties Company  
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EXAMINER
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GASPAR, KYLIE MARIE

ART UNIT	PAPER NUMBER
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3772

NOTIFICATION DATE	DELIVERY MODE
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10/22/2024

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> 17/251,873	<b>Applicant(s)</b> Velamakanni et al.	
	<b>Examiner</b> Kylie M Gaspar	<b>Art Unit</b> 3772	<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 24 June 2024.  
☐ 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) 1-4,7,10,14,17,19,26,29,33,36,42,45-46,50,68 and 72-73 is/are pending in the application.  
5a) Of the above claim(s) 17,19,26,29,33,36,42 and 45-46 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 1-4,7,10,14,50,68 and 72-73 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 \_\_\_\_ 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.

### ***Response to Arguments***

1. **Applicant's arguments filed 06/24/2024 have been fully considered but they are not persuasive.**

It is noted that Applicant has not explicitly traversed Examiner's fact finding and reasons for modification of the prior art. That is, although Applicant disagrees with the combination, articulated arguments to the Examiner's position and rationale have not been provided.

**Regarding applicant's arguments on page 8 that Zaltsman does not teach or suggest a layer of metal oxide on a shell as Zaltsman teaches that the metal oxide serves as a core, and the core can no longer be deemed a metal oxide post-functionalization.** Functionalization is the addition of functional groups to a unit. The functionalization of metal oxides does not change the binary compound of oxygen and a metal chemical element (Liu et al. NPL) at the core of the unit of Zaltsman. As taught by Shabatina et al. (see NPL), metal oxide nanoparticles ordinarily include functionalized groups that can interact with the surface active centers of the metal oxide (pg. 2 "Introduction"). Note that the existence of metal oxides in the larger compound does not change because it is part of a larger compound (Shabatina et al. pg. 2; Zaltsman 0150, 0157 final three lines). Further, Zaltsman teaches that the (metal oxide) core may be attached to an

additional unit directly [Zaltsman 0157 final three lines]. It is noted that applicant has not claimed that a layer of metal oxide and nothing else is on the first major surface. Therefore, as Zaltsman teaches a layer of the coating including a metal oxide can be included on a dental appliance [Zaltsman 0221 lines 1-7], DeSimone as modified by Zaltsman above discloses the device as claimed.

### ***Claim Rejections - 35 USC § 103***

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis (i.e., changing from AIA to pre-AIA) for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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.

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.

2. **Claims 1-4, 10, 50, 68, and 72-73 are rejected under 35 U.S.C. 103 as being unpatentable over DeSimone et al. (US 7,641,828 B2) in view of Zaltsman et al. (US 2019/0062528 A1) as reference by Dumé (NPL cited and mailed 10/02/2023).**

**Claim 1**, DeSimone discloses a dental appliance (Fig. 1) comprising:

a polymeric shell (10)[col. 4 lines 18-19] with a first major surface (the surface on the inside of the device adjacent to the teeth and the outside of the device away from the teeth have a surface) comprising a plurality of cavities for receiving one or more teeth (Fig. 1)[col. 4 lines 18-20]; and

a second transparent barrier layer on the first major surface (Fig. 4, 310)[col. 10 lines 25-27].

DeSimone is silent regarding the second transparent barrier layer is metal oxide.

**Zaltsman** discloses antimicrobial coatings for dental applications [0221 lines 1-7] including wherein a layer of metal oxide can be applied on a surface of a dental article [0221 lines 4-6 wherein the composition is that of 0154].

It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to cause the second layer of DeSimone to be a metal oxide as taught by Zaltsman as doing so would improve the device of DeSimone according to known methods.

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