

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference W10217-01	FOR FURTHER ACTION	See item 4 below
International application No. PCT/US2020/029470	International filing date (<i>day/month/year</i>) 23 April 2020 (23.04.2020)	Priority date (<i>day/month/year</i>) 06 May 2019 (06.05.2019)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant W. R. GRACE & CO.-CONN.		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 <i>bis</i> . I(a).																								
2.	This REPORT consists of a total of 5 sheets, including this cover sheet.																								
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																									
3.	This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;">☒</td> <td style="width: 30%;">Box No. I</td> <td style="width: 80%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☒	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☐	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☐	Box No. VII	Certain defects in the international application	☐	Box No. VIII	Certain observations on the international application
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4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44 <i>bis</i> .3(c) and 93 <i>bis</i> .1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44 <i>bis</i> .2).																								

	Date of issuance of this report 02 November 2021 (02.11.2021)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Simin Baharlou e-mail pct.team9@wipo.int

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: JAMES D. WITHERS WITHERS & KEYS, LLC P.O. BOX 2049 MCDONOUGH, GA 30253		Date of mailing (day/month/year) 24 JUL 2020	
Applicant's or agent's file reference W10217-01		FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US 20/29470	International filing date (day/month/year) 23 April 2020 (23.04.2020)	Priority date (day/month/year) 06 May 2019 (06.05.2019)	
International Patent Classification (IPC) or both national classification and IPC IPC - C03C 17/28; C04B 41/48; C07K 14/435 (2020.01) CPC - C03C 17/28; C04B 41/4807; C07K 14/43518; C08J 7/04			
Applicant W. R. GRACE & CO.-CONN.			

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Date of completion of this opinion 30 June 2020	Authorized officer Lee Young PCT Help Desk Telephone No. 571-272-4300
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/29470

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/29470

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 4-76

because:

☐ the said international application, or the said claims Nos. _____ relate to the following subject matter which does not require an international search (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 4-76 are so unclear that no meaningful opinion could be formed (*specify*):

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☒ no international search report has been established for said claims Nos. 4-76

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing in the form of an Annex C/ST.25 text file, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ furnish a sequence listing on paper or in the form of an image file complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b).

☐ See Supplemental Box for further details.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/29470

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-3	YES
	Claims	none	NO
Inventive step (IS)	Claims	none	YES
	Claims	1-3	NO
Industrial applicability (IA)	Claims	1-3	YES
	Claims	none	NO

2. Citations and explanations:

Claims 1-3 lack an inventive step under PCT Article 33(3) as being obvious over WO 2019/007641 A1 to Alfa Laval Corporate AB (hereinafter Alfa) in view of US 2014/0109466 A1 Schmidt et al. (hereinafter Schmidt).

Regarding claim 1, Alfa discloses a method for reducing an amount of (i) glycidol, (ii) glycidyl ester, or (iii) both glycidol and glycidyl ester (title; Pg.6 In 10-11 The process described herein may lead to reduction of the glycidyl ester content of the refined or modified edible oil) within a composition comprising a triglyceride (Pg. 6 In 11-12 reduction of the glycidyl ester content of the refined or modified edible oil; Pg. 6 In 16-21 The refined or modified edible oil may be selected from all kinds of edible fats and oils. The edible oil may comprise palm oil, soybean oil, canola...; See Instant Specification Para [0010] triglyceride-containing composition is an oil, in particular, an edible oil such as soybean oil or palm oil or the like) said method comprising: contacting the composition comprising a triglyceride with an effective amount of a particulate silica-alumina catalyst (Pg. 3 In 7-9 process of treating refined or modified edible oil, wherein the refined or modified edible oil is brought in contact with porous bodies comprising an epoxide conversion catalyst; Pg. 3 In 30-31 The epoxide conversion catalyst or acid catalyst may more preferably comprise silica-alumina) to reduce the amount of (i) glycidol, (ii) glycidyl ester, or (iii) both glycidol and glycidyl ester in the composition (Pg.6 In 10-11 The process described herein may lead to reduction of the glycidyl ester content of the refined or modified edible oil), wherein the amount of (i) glycidol, (ii) glycidyl ester, or (iii) both glycidol and glycidyl ester is reduced (Pg.6 In 10-11 The process described herein may lead to reduction of the glycidyl ester content of the refined or modified edible oil) without affecting other components of the composition comprising the triglyceride (Pg. 3 In 18-20 Neither do preferred epoxide conversion catalysts contribute to a substantial extent to other unwanted side reactions affecting, e.g., taste or smell negatively) but does not disclose wherein the catalyst is silica-zirconia comprising porous silica particles impregnated with zirconia. However, Schmidt discloses a similar method (Para [0015] the process of the invention treats a fatty acid alkyl ester-containing stream) comprising a silica-zirconia catalyst (Para [0070] oxides or mixed oxides described above and used to make the catalyst of this invention can be characterized as either acidic or basic. Acidic oxides include combinations of alumina and silica, and exemplary basic oxides include...zirconia; Para [0109] Catalyst G was prepared as follows 50 g of a silica alumina extrudate support...after drying the impregnated catalyst, the second impregnation step was similarly applied using 15 g of a zirconyl nitrate...finished material had ZrO₂ content of 5.8 wt%) comprising porous silica (Para [0109] Catalyst G was prepared as follows. 50 g of a silica alumina extrudate support...with pore volume of 0.86 cc/g) impregnated with zirconia (Para [0109] impregnation step was similarly applied using 15 g of a zirconyl nitrate...finished material had ZrO₂ content of 5.8 wt%). It would have been obvious to one of ordinary skill in the art to combine these references to use zirconia in the catalyst because can be used to remove impurities (Para [0014] removes impurities from fatty acid alkyl ester containing streams by using a catalytic process; Para [0018] Particularly suitable catalysts comprise an oxide of an element or metal selected from the group of elements or metals in Groups 3, 4, 5. Particularly suitable oxides include alumina, silica, titania, zirconia...)

Regarding claim 2, Alfa in view of Schmidt discloses the method of claim 1. Schmidt further discloses wherein the silica-zirconia catalyst (Para [0109] Catalyst G was prepared as follows 50 g of a silica alumina extrudate support...the second impregnation step was similarly applied using 15 g of a zirconyl nitrate...finished material had ZrO₂ content of 5.8 wt%) comprises zirconia located on at least a portion of the pore of the porous silica particles (Para [0109] impregnation step was similarly applied using 15 g of a zirconyl nitrate...finished material had ZrO₂ content of 5.8 wt%) but does not disclose wherein zirconia is located on at least a portion of the surface of the porous silica particles. However, it would have been obvious one ordinary skill to apply zirconia on the surface of the silica through routine experimentation to increase the the amount of zirconia in the catalyst.

Regarding claim 3, Alfa in view of Schmidt discloses the method of claim 1 or 2. Schmidt further discloses wherein the silica-zirconia catalyst comprises zirconia located in at least a portion of the pores of the porous silica particles (Para [0109] impregnation step was similarly applied using 15 g of a zirconyl nitrate...finished material had ZrO₂ content of 5.8 wt%).

Claims 1-3 have industrial applicability as defined by PCT Article 33(4) because the subject matter can ne made or used in industry.