

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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| To: BELL, Catherine, L. Exxonmobil Chemical Company Law Technology P.O. Box 2149 Baytown, TX 77522-2149 USA | | Date of mailing (day/month/year) 26 March 2020 (26.03.2020) | |
| Applicant's or agent's file reference 2018EM381 | | FOR FURTHER ACTION See paragraph 2 below | |
| International application No. PCT/US2019/062816 | International filing date (day/month/year) 22 November 2019 (22.11.2019) | Priority date(day/month/year) 30 November 2018 (30.11.2018) | |
| International Patent Classification (IPC) or both national classification and IPC C08F 210/02(2006.01)i, C08F 210/16(2006.01)i, C08F 232/02(2006.01)i, C08J 5/18(2006.01)i | | | |
| Applicant EXXONMOBIL CHEMICAL PATENTS INC. | | | |
| <p>1. This opinion contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> 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</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> <p>2. FURTHER ACTION</p> <p>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.</p> <p>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.</p> <p>For further options, see Form PCT/ISA/220.</p> | | | |

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| Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578 | Date of completion of this opinion 26 March 2020 (26.03.2020) | Authorized officer KWON, YONGKYONG Telephone No. +82-42-481-3371 |
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International application No.

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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:

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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. 5-25

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. 8,10,12,14,16,19,21
are so unclear that no meaningful opinion could be formed (*specify*):

Claims 8, 10, 12, 14, 16, 19 and 21 refer to one of the claims which are not drafted in accordance with PCT 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. 5-25

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.

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

1. Statement

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-4</u> | YES |
| | Claims | <u>NONE</u> | NO |
| Inventive step (IS) | Claims | <u>NONE</u> | YES |
| | Claims | <u>1-4</u> | NO |
| Industrial applicability (IA) | Claims | <u>1-4</u> | YES |
| | Claims | <u>NONE</u> | NO |

2. Citations and explanations :

Reference is made to the following document:

D1: US 2017-0233516 A1 (EXXONMOBIL CHEMICAL PATENTS INC.) 17 August 2017

I. Novelty and Inventive Step (PCT Article 33(2) and (3))

1. Claims 1-4

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a composition comprising a branched cyclic olefin copolymer, wherein the branched cyclic olefin copolymer consists essentially of within the range from 98 wt% to 50 wt% ethylene derived monomer units, and within the range from 2 wt% to 50 wt% of C5 to C20 cyclic olefin derived monomer units (see paragraphs [0008], [0030], [0041], [0058]; claim 18).

The subject matter of claim 1 differs from that of D1 in that a copolymer has a density of about 0.91 g/cm³ to about 0.933 g/cm³. However, it is merely a matter of design option that a person skilled in the art can choose using general knowledge in the relevant field of the art.

Concerning the additional features of claims 2-4, D1 discloses that the branched cyclic olefin copolymer comprises ethylene and norbornene as the C5 to C20 cyclic olefin derived monomer units (see paragraphs [0008], [0030], [0041], [0058]; claim 18).

Therefore, claims 1-4 lack an inventive step according to D1.

II. Industrial Applicability (PCT Article 33(4))

Claims 1-4 are industrially applicable.

[NOTE] The term "cyclopentene" in claim 3 is written twice therein, which is redundant.

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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claims 5-7, 9, 11, 13, 15, 17, 18, 20 and 22-25 do not comply with PCT Rule 6.4(a), because multiple dependent claims shall not serve as a basis for any other multiple dependent claim.