

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2022/050522

International filing date (day/month/year)
21.11.2022

Priority date (day/month/year)
02.12.2021

International Patent Classification (IPC) or both national classification and IPC
INV. C08F110/14 C08F4/659 F17D1/17 C08L23/20 C09K8/035

Applicant
DOW GLOBAL TECHNOLOGIES LLC

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 usually 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:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0
Fax: +49 89 2399 - 4465

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Bernhardt, Max

Telephone No. +49 89 2399-0



Box No. I Basis of the 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 43bis.1(a))
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.
 - b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13ter.1(a)),
 - ☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.
4. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established to the extent that a meaningful opinion could be formed without a WIPO Standard ST.26 compliant sequence listing.
5. Additional comments:

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)	Yes: Claims	
	No: Claims	<u>1-7</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-7</u>
Industrial applicability (IA)	Yes: Claims	<u>1-7</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

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

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 WO 2021/202302 A1 (DOW GLOBAL TECHNOLOGIES LLC [US])
(2021-10-07)

D2 US 2014/360588 A1 (BUCHER BRAD [US] ET AL) (2014-12-11)

The present application does not meet the criteria of Art. 33(1) PCT, because the subject-matter of claims 1-7 does not appear new in the sense of Art. 33(2) PCT and the subject-matter of claims 1 and 3-7 appears in addition not to involve the presence of an inventive step in the sense of Art. 33(3) PCT.

1.1 **Novelty (Art. 33(2) PCT)**

Document D1 discloses:

the same polymers, prepared with the same catalyst as the present application used as drag reducing agent (DRA). Tables 1-3 are identical in both files.

D1 does not explicitly mention a liquid carrier comprising water. However, following the arguments presented in section 3.2 minor amounts of water, which are present as residues in any solvent fall under claim 1. In addition, the DRAs from D1 are tested in water [082].

D1 is considered taking away novelty of claims 1-7.

Document D2 discloses:

a drag reducing composition comprising (claim 1):

from about 15 to about 45% by weight of said compositions of a finely divided, solid polyolefin friction reducing agent formed from mono-olefins containing from 2 to 30 carbon atoms;

a suspending medium comprising:

water in an amount of from about 2 to about 25% by wt. of said suspending medium; and

a carrier in an amount of from about 40 to about 75% by wt. of said suspending medium, said carrier comprising an organic liquid having from 10 to 14 carbon atoms, having at least one hydroxyl group and at least one other functional group containing one of oxygen or nitrogen; and

from about 3 to about 6% by weight of said composition of a partitioning agent comprising a compound having a hydrophobic group and a hydrophilic group, said partitioning agent being surface active and effective to increase the miscibility of said carrier in said water to greater than 5% by wt. at 25° C.

The polymer is polymer of alpha-olefins having 6-14 carbon atoms [0011].

D2 is silent about the Mw(abs) and Mw(abs)/Mn(abs).

Claims 1-7 appear to be novel over D2.

1.2 Inventive Step (Art. 33(3) PCT)

Notwithstanding the objections raised above, the following shall be mentioned:

D2 appears to be the closest, because it is a DRA comprising water.

D2 differs in the polymer.

No examples are given which represent this difference between D2 and claim 1. Consequently, no effect is shown resulting from this difference. In the absence of a surprising effect, the objective technical problem is considered as the provision of an alternative DRA.

D2 is not too specific about the polymer and the skilled person would, when providing an alternative, consider any C6-C14 polymers which are suitable as DRA. Consequently the skilled person would consider using the polymers of D1.

By doing so, the skilled person would obtain a DRA according to claim 1.

Claim 1 appears not to be inventive over D2 in combination with D1.

Claims 3-7 do not add any additional differentiating features. Therefore claims 3-7 appear, mutatis mutandis, not inventive over D2 in combination with D1.

In D2, the medium (present at max 82 wt.-% in the DRA) comprises max. 25 wt.-% water. D2 is therefore silent about at least 50 wt% of a total weight of the drag reducing agent being water. Claims 2 appears to be inventive.

1.3 Industrial Applicability (Art. 33(4) PCT)

The subject-matter of claims 1-7 is considered as industrial applicable.

2 Re Item VII

- 2.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents D1-D2 is not mentioned in the description, nor are these documents identified there.

3 Re Item VIII

Certain observations on the international application

- 3.1 Present claim 1 is directed towards a polymer "composed of" one or more C6-C14 α -olefin monomers. It is however clear from the description (paragraph bridging p. 9/10) that the application is directed to a polymer consisting only of C6-C14 α -olefin monomers (consisting is limiting, composed off is not). Only such polymer are supported by the description (Art. 6 PCT). In addition, it is however only shown for hexene and octene homopolymers that the invention works and leads to the aimed effect. It is considered essential that the polymers are hexene or octene homopolymers. Only these polymers seem to be a meaningful generalisation of the core of the invention (Art. 6 PCT).
- 3.2 Claim 1 defines a liquid carrier that includes water. No amounts are given for the polymer, the carrier and the water. It is however clear that the main component is water (see all examples)

At present small impurities of water in another liquid carrier, such as hexane are sufficient to fall under claim 1, which are always present - this appears however not to be the scope of the application. It appears that the scope is that EVEN if water is present in significant amounts in addition to another liquid carrier, such as hexane, there is a drag reducing effect.

In a composition comprising mainly water and a C4-C14 polymer a surfactant appears to be indispensable (essential feature) in order to avoid phase separation.

IE8 actually shows that another liquid carriers (i.e. hexane) is essential to have drag reducing effect. This is missing in claim 1.

Claim 1 appears not to be compliant with Art. 6 PCT.

- 3.3 Claims 1, 4 and 5 define a residual amount of zirconium/titanium/germanium. The residual amount is considered as an impurity which cannot confer novelty. Claims 2-4 seem not to contain any limitation (Art. 6 PCT).
- 3.4 Claims 1 and 6 list physical parameters, whose method of determination is not specified. The method of and means for measurement of the parameters should be in the claims for the unambiguous definition (Art. 6 PCT).
- 3.5 Claim 3 defines that "the drag reducing agent is treated to reduce hydrocarbon liquid carrier content and increase water content." This is not compliant with Art. 6 PCT:
- In claims 1 and 2 on which claim 3 depends, no hydrocarbon liquid carrier is defined (un-clarity).
- Claim 3 is silent how this treatment looks like and the claims is formulated as a result to be achieved.