

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

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

To:

see form PCT/ISA/220

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/EP2019/082458

International filing date (day/month/year)
25.11.2019

Priority date (day/month/year)
26.11.2018

International Patent Classification (IPC) or both national classification and IPC
INV. D06M11/73 D06M11/76 D06M15/41 B32B5/02 B64B1/58

Applicant
SCEYE SARL

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
P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA/210

Authorized Officer

Blas, Valérie

Telephone No. +31 70 340-0



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:
 - 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 13ter.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 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.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:

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	<u>1-8</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-8</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-8</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

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 KR 2015 0049403 A (KUMOH NAT INST TECH ACAD COOP [KR]) 8 May 2015 (2015-05-08), a machine translation is annexed to the present opinion.
- D2 KR 101 734 895 B1 (KUMOH NAT INST OF TECH INDUSTRY-ACADEMIC COOP FOUND [KR]) 12 May 2017 (2017-05-12), a machine translation is annexed to the present opinion.
- D3 CN 103 014 901 B (HARBIN INST OF TECHNOLOGY) 24 December 2014 (2014-12-24), a machine translation is annexed to the present opinion.
- D4 SUDEEP P M ET AL: "Covalently interconnected three-dimensional graphene oxide solids", ACS NANO 20130827 AMERICAN CHEMICAL SOCIETY USA,, vol. 7, no. 8, 27 August 2013 (2013-08-27), pages 7034-7040, XP002765142, DOI: 10.1021/NN402272U cited in the application

Novelty/ Inventive Step:

1. Document D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses a method for producing a PBO fiber with increased resistance against UV-caused degradation, the method comprising providing a coating on the PBO fibers, the coating comprising polyurethane resin, a UV absorber and a hindered amine light stabilizer.

The subject-matter of claim 1 therefore differs from this known D1 in that the PBO fibers have been coated with a composition comprising graphene oxide crosslinked by polymerization with glutaraldehyde and resorcinol and is therefore new (Article 33(2) PCT).

The technical effect of this difference has not been demonstrated and hence the problem to be solved by the present invention may be regarded as the provision of an alternative method for producing PBO fiber with increased resistance against UV-caused degradation.

The solution to this problem proposed in claim 1 of the present application is considered to involve an inventive step (Article 33(3) PCT) for the following reasons: there are neither hints or suggestions to coat PBO fibers with a composition comprising graphene oxide crosslinked by polymerization with glutaraldehyde and resorcinol to improve the UV-caused degradation.

Although D4 discloses graphene oxide crosslinked with glutaraldehyde and resorcinol, the skilled person has no hint to use it as coating of PBO fibers to improve the UV-caused degradation.

2. A similar reasoning applies mutatis mutandis to the subject-matter of independent claim 4 which is thus novel and involves an inventive step (Article 33(2) & (3) PCT).

3. The subject-matter of claim 8 is related to the use of PBO fibers coated with graphene oxide crosslinked with glutaraldehyde and resorcinol which are novel and involve an inventive step, as explained her above. Hence the subject-matter of said claim is also novel and involves an inventive step (Article 33(2) & (3) PCT).

4. Claims 2-3 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

5. Claims 5-7 have been drafted as independent claims, but should be depending on claim 4 as they are containing all the features of claim 4 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

6. A similar reasoning applies started from D2.

Industrial Applicability:

The subject-matter of claims 1-8 is considered to meet the requirements of Article 33(4)PCT.

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents D1-D3 and D5 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

Claims 5-7 have been drafted as independent claims but are containing all the features of claim 4 and as such should have been drafted as depending on claim 4. Hence the requirements of Article 6 PCT are not met.