

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference CL4536PCT | FOR FURTHER ACTION | | See item 4 below |
| International application No. PCT/US2009/068373 | International filing date (<i>day/month/year</i>) 17 December 2009 (17.12.2009) | Priority date (<i>day/month/year</i>) 19 December 2008 (19.12.2008) | |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | | |
| Applicant E. I. du Pont de Nemours and Company | | | |

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|---|-------------------------------------|---|---------------------|--------------------------|------------|----------|--------------------------|-------------|--|--------------------------|------------|----------------------------|-------------------------------------|-----------|---|--------------------------|------------|-------------------------|--------------------------|-------------|--|--------------------------|--------------|---|
| <p>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 bis.1(a).</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>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.</p> | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></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><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.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 44bis .2).</p> | <input checked="" type="checkbox"/> | Box No. I | Basis of the report | <input type="checkbox"/> | Box No. II | Priority | <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input type="checkbox"/> | Box No. VII | Certain defects in the international application | <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. II | Priority | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VI | Certain documents cited | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application | | | | | | | | | | | | | | | | | | | | | | |

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| <p align="center">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p> | <p>Date of issuance of this report 21 June 2011 (21.06.2011)</p> |
| | <p>Authorized officer</p> <p align="center">Simin Baharlou</p> <p>e-mail: pt09.pct@wipo.int</p> |

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: see form PCT/ISA/220 |
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| Date of mailing (day/month/year) see form PCT/ISA/210 (second sheet) |
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| Applicant's or agent's file reference see form PCT/ISA/220 |
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| FOR FURTHER ACTION See paragraph 2 below |
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| International application No. PCT/US2009/068373 |
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| International filing date (day/month/year) 17.12.2009 |
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| Priority date (day/month/year) 19.12.2008 |
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| International Patent Classification (IPC) or both national classification and IPC INV. C12P7/10 C13K1/02 D21C3/02 D21C3/20 C08H8/00 |
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| Applicant E. I. du Pont de Nemours and Company |
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| <p>1. This opinion contains indications relating to the following items:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> 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 <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application <p>2. FURTHER ACTION</p> <p>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.</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> <p>3. For further details, see notes to Form PCT/ISA/220.</p> |
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| Name and mailing address of the ISA:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465 |
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| Date of completion of this opinion see form PCT/ISA/210 |
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| Authorized Officer Beins, Ulrika Telephone No. +49 89 2399-7150 |
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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 and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - on paper
 - in electronic form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in electronic form.
 - furnished subsequently to this Authority for the purposes of search.
4. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in 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/US2009/068373

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

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|-------------------------------|-------------|-------------|
| Novelty (N) | Yes: Claims | |
| | No: Claims | <u>1-23</u> |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | <u>1-23</u> |
| Industrial applicability (IA) | Yes: Claims | <u>1-23</u> |
| | No: Claims | |

2. Citations and explanations

see separate sheet

1. Reference is made to the following documents:

- D1 US 5 171 592 A (HOLTZAPPLE MARK [US] ET AL) 15 December 1992 (1992-12-15)
- D2 US 2007/031919 A1 (DUNSON JAMES B JR [US] ET AL) 8 February 2007 (2007-02-08)
- D3 WO 2006/110902 A1 (DU PONT [US]; DUNSON JAMES B [US]; TUCKER MELVIN [US]; ELANDER RICHARD) 19 October 2006 (2006-10-19)
- D4 US 1 817 525 A (RICHTER GEORGE A) 4 August 1931 (1931-08-04)
- D5 US 1 891 337 A (ELMER SEAMAN STEWART) 20 December 1932 (1932-12-20)

2. The application does not meet the requirements of Article 6 PCT, because the claims are not clear.

2.1 Although claims 1 and 18 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and/or in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 and 18 is not new in the sense of Article 33(2) PCT.

3.1 Concerning independent claim 1, the document D1 discloses (the references in parentheses applying to this document):

- A method for producing carbohydrate-enriched biomass with high retention of hemicellulose comprising (column 1, lines 10-21; column 2, line 41 - column 3, line 39):
 - (a) providing lignocellulosic biomass comprising lignin, cellulose and hemicellulose (column 7, lines 53-62);
 - (b) suspending the biomass of (a) in an organic solvent solution comprising water, ammonia in an amount of about 2% to about 20% relative to weight of dry biomass and one or more nucleophile, whereby a biomass-solvent suspension is formed under alkaline conditions (column 7, lines 53-62);

- (c) heating the biomass-solvent suspension to a temperature of about 100-220 °C for about 5 minutes to about 5 hours whereby lignin is fragmented and is dissolved in the suspension; and (column 9, lines 15-20; column 10, line 8)

- (d) filtering free liquid under pressure after heating the suspension in (c) whereby the dissolved lignin is removed and whereby carbohydrate-enriched biomass with high retention of hemicellulose is produced (column 2, line 41 - column 3, line 39).

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19), D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32), D4 (the whole document) and D5 (page 1, lines 1-5,48; claims 1-23; example 1) also disclose the subject-matter of claim 1.

3.2 Concerning independent claim 18, the document D1 discloses (the references in parentheses applying to this document):

- A method of simultaneous fragmentation and selective extraction of lignin from lignocellulosic biomass to produce a substantially lignin-free biomass comprising (column 1, lines 10-21; column 2, line 41 - column 3, line 39):

- (a) providing: 1) an amount of lignocellulosic biomass comprising lignin and carbohydrate; 2) a multi-component solvent solution comprising from about 40% to about 70% ethanol in water; 3) ammonia in an amount of 2% to about 20% ' 4) and one or more nucleophile(s) (column 7, lines 53-62);

- (b) contacting said biomass with the multi-component solvent solution of (a) to form a solvent-biomass mixture (column 7, lines 53-62);

- (c) placing the solvent-biomass mixture in a sealed pressure vessel whereby the mixture of (b) is heated at a temperature of about 100 °C to about 220 °C for about 5 minutes to about 5 hours whereby lignin is fragmented and dissolved in the solvent (column 9, lines 15-20; column 10, line 8);

- (d) removing the dissolved lignin of (c) by filtration; and (e) washing the residual with organic solvent, whereby substantially lignin-free biomass is produced (column 2, line 41 - column 3, line 39).

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19), D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32), D4 (the whole document) and D5 (page 1, lines 1-5,48; claims 1-23; example 1) also disclose the subject-matter of claim 18.

4. Dependent claims 2-17,19-23 does not appear to contain any additional features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

D1 (column 1, lines 10-21; column 2, line 41 - column 3, line 39; column 7, lines 53-62; column 9, lines 15-20; column 10, line 8; claims 1-4) already discloses the subject-matter of claims 2-9, 17 and 19-21.

D2 (page 1, paragraph 13-16; page 2, paragraphs 25,26,32; page 3, paragraph 36-43; example 19) and D3 (page 1, lines 14-18; page 5, line 27 - page 6, line 32; page 14, line 15 - page 16, line 34; page 18, lines 10-14; example 5; claims 25-32) already disclose the subject-matter of claims 2-6, 10-17 and 19-23.

5. Proceeding with the application, the applicant is kindly asked to observe:

The wording "incorporated by reference" does not meet the requirements of PCT Guidelines, III-4.3 a. Therefore, this wording should have been deleted.