

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|---|---|
| Applicant's or agent's file reference 64139-32 | FOR FURTHER ACTION | see Form PCT/ISA/220 as well as, where applicable, item 5 below |
| International application No. PCT/CA2017/050096 | International filing date (<i>day/month/year</i>) 27 January 2017 (27-01-2017) | (Earliest)Priority date (<i>day/month/year</i>) 28 January 2016 (28-01-2016) |
| Applicant NANO-GREEN BIOREFINERIES INC. | | |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out 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)).

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (see Box No. II).

3. **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1A

- as suggested by the applicant.
- as selected by this Authority, because the applicant failed to suggest a figure.
- as selected by this Authority, because this figure better characterizes the invention.

b. none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2017/050096

A. CLASSIFICATION OF SUBJECT MATTER
 IPC: **C30B 7/14** (2006.01), **C30B 29/58** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC: **C30B 7/14** (2006.01), **C30B 29/58** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Databases: Orbit Questel, Scopus, Google

Keywords: Cellulose, cellulosic material, crystalline, transition metal, catalyst, hypohalite, hydrogen peroxide.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|--|
| X Y | US 2014/0200335 A1 (Olkowski et al.) 17 Jul. 2014 (17-07-2014) *abstract, paragraphs [0105; 0107;0108; 0111; 0112; 0115; 0117; 0129; 0131] ; claims 1-16, 18-22, 24, 28 and 30* | 4, 5, 8, 9,11-13 1-3, 6, 7, 10, 14-19 |
| X Y | US 4 480 089 A (Chen et al.) 30 Oct. 1984 (30-10-1984) *the entire document* | 2-5, 8, 10-12, 16, 17 1, 6, 7, 9, 13-15, 18, 19 |
| Y | Conversion of Lignocellulosic Biomass to Nanocellulose: Structure and Chemical Process. LEE et al. The Scientific World Journal, Volume 2014 (2014), Article ID 631013, 20 pages, Published 27 August 2014. *page 14 paragraph 6.1* | 1, 2, 10, 16-18 |

Further documents are listed in the continuation of Box C.

See patent family annex.

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|--------------------------------------|--|--------------------------|--|
| * "A" "E" "L" "O" "P" | Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance earlier application or patent but published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed | "T" "X" "Y" "&" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family |
|--------------------------------------|--|--------------------------|--|

Date of the actual completion of the international search
10 April 2017 (10-04-2017)

Date of mailing of the international search report
03 May 2017 (03-05-2017)

Name and mailing address of the ISA/CA
 Canadian Intellectual Property Office
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 Gatineau, Quebec K1A 0C9
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2017/050096

| Patent Document Cited in Search Report | Publication Date | Patent Family Member(s) | Publication Date |
|---|------------------------------|--|--|
| US2014200335A1 | 17 July 2014 (17-07-2014) | US2014200335A1 US9388251B2 AU2012276247A1 BR112013033063A2 CA2839348A1 CN103635628A EA201490184A1 EP2726670A1 EP2726670A4 NZ620218A US2017016179A1 WO2013000074A1 WO2013000074A9 | 17 July 2014 (17-07-2014) 12 July 2016 (12-07-2016) 13 February 2014 (13-02-2014) 24 January 2017 (24-01-2017) 03 January 2013 (03-01-2013) 12 March 2014 (12-03-2014) 30 May 2014 (30-05-2014) 07 May 2014 (07-05-2014) 25 March 2015 (25-03-2015) 26 August 2016 (26-08-2016) 19 January 2017 (19-01-2017) 03 January 2013 (03-01-2013) 14 March 2013 (14-03-2013) |
| US 4 480 089 A | 30 October 1984 (30-10-1984) | NONE | |