

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

C6 PATENT GROUP INCORPORATED, OPERATING  
AS THE "CARBON PATENT GROUP"

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Date of mailing  
(day/month/year)

18 January 2024 (18-01-2024)

Applicant's or agent's file reference

P2169PC00

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

**PCT/CA2023/051402**

International filing date (day/month/year)

20 October 2023 (20-10-2023)

Priority date (day/month/year)

20 October 2022 (20-10-2022)

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

IPC: **C08L 33/26** (2006.01), **B01D 21/01** (2006.01), **C08L 53/00** (2006.01)

CPC: **C08L 33/26** (2020.01), **B01D 21/01** (2020.01), **C08L 53/005** (2020.01)

Applicant

CARBONET NANOTECHNOLOGIES INC.

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 or 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 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/CA  
Canadian Intellectual Property Office  
Place du Portage I, C114 - 1st Floor, Box PCT  
50 Victoria Street  
Gatineau, Quebec K1A 0C9  
Facsimile No.: 001-819-953-2476

Date of completion of this opinion

29 December 2023 (29-12-2023)

Authorized officer

Reese A. Adeney (819) 639-6925

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International application No  
**PCT/CA2023/051402**

**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:
- b. ☐ furnished subsequent to the international filing date for the purposes of international search only:
- ☐ 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:

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| <b>Box No. V</b>               | <b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                                           |           |                     |                                           |           |                               |                            |           |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------|-----------|---------------------|-------------------------------------------|-----------|-------------------------------|----------------------------|-----------|
| 1. Statement                   | <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; vertical-align: top;">Novelty (N)</td> <td style="width: 40%; vertical-align: top;"> Claims 2, 11, 12<br/> Claims 1, 3-10, 13-35 </td> <td style="width: 30%; vertical-align: top; text-align: center;"> YES<br/> NO </td> </tr> <tr> <td style="vertical-align: top;">Inventive step (IS)</td> <td style="vertical-align: top;"> Claims 2, 11, 12<br/> Claims 1, 3-10, 13-35 </td> <td style="vertical-align: top; text-align: center;"> YES<br/> NO </td> </tr> <tr> <td style="vertical-align: top;">Industrial applicability (IA)</td> <td style="vertical-align: top;"> Claims 1-35<br/> Claims none </td> <td style="vertical-align: top; text-align: center;"> YES<br/> NO </td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Novelty (N) | Claims 2, 11, 12<br>Claims 1, 3-10, 13-35 | YES<br>NO | Inventive step (IS) | Claims 2, 11, 12<br>Claims 1, 3-10, 13-35 | YES<br>NO | Industrial applicability (IA) | Claims 1-35<br>Claims none | YES<br>NO |
| Novelty (N)                    | Claims 2, 11, 12<br>Claims 1, 3-10, 13-35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | YES<br>NO   |                                           |           |                     |                                           |           |                               |                            |           |
| Inventive step (IS)            | Claims 2, 11, 12<br>Claims 1, 3-10, 13-35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | YES<br>NO   |                                           |           |                     |                                           |           |                               |                            |           |
| Industrial applicability (IA)  | Claims 1-35<br>Claims none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | YES<br>NO   |                                           |           |                     |                                           |           |                               |                            |           |
| 2. Citations and explanations: | <p>D1: WO2016/051402 A1. 07 April 2016 (07-04-2016)<br/> D2: JP61200148 04 September 1986 (04-09-1986)<br/> D3 : YANG, Kaiji, CHEN, Jinghuan, LIANG, Shuaibo, et al. Preparation of super high concentration cationic polyacrylamide emulsion and its flocculation with cationic polymers. Polymers for Advanced Technologies, 2020, vol. 31, no 11, p. 2711-2721</p> <p>D1 discloses a process for treating wastewater from livestock industry, comprising subsequently admixing two different types of nitrogen-containing cationic polymers into the treated livestock industrial wastewater, wherein said polymers comprise polydiallyldimethylammonium chloride (PDAC) and cationic polyacrylamide (CPA). Specifically, a wastewater sample from a cows farm was treated by employing two polymers, comprising adding polydiallyldimethylammonium chloride (PDAC) and cationic polyacrylamide (CPA) to a concentration of 300 ppm and 25 ppm, respectively, stirring, settling or filtering, and measuring the SS, COD and BOD.</p> <p>D2 discloses a water-soluble polymer composition composed of a water-soluble cationic polymer as a reaction product between epichlorohydrin and a dialkylamine and a cationic polyacrylamide, thus being used as a coagulant for waste water from factories and suspension in sewage. Specifically, The composition was obtained by mixing (A) 100pts.wt. of a water-soluble cationic polymer, which is prepared by allowing epichlorohydrin to react with an equimolar amount of a dialkylamine such as dimethylamine in a closed reactor equipped with a stirrer in an inert gas atmosphere at 30-100 deg.C and has an intrinsic viscosity of higher than 0.15 measured in 2 molar KBr aqueous solution with (B) 0.1-500pts.wt. of a cationic polyacrylamide, which is prepared by copolymerizing (meth)acrylamide and cationic monomer such as aminoalkyl ester of (meth)acrylic acid and has more than 20,000molecular weight, e.g., by dissolving a specific amount of component B in an aqueous solution of component A or mixing individual aqueous solution of components A and B.</p> <p>D3 discloses a copolymer of acryloxyethyl trimethyl ammonium chloride and acrylamide, with the synergistic flocculation effects of CPAME-uhc respectively with polydimethyldiallylammonium chloride (PDADMAC), poly methacryloyloxyethyl trimethyl ammonium chloride (PDMC), cationic starch (CS), cationic guar gum (CHPG), cationic chitosan (CTS), and polyamine (PA) on the CPAME-uhc. The optimum cationic degree and molecular weight of CPAME-uhc were 25% and 12 million, respectively. SEM shows that the latex particles of CPAME-uhc are regular spheres with a diameter of 200 to 500 nm. When CPAME-uhc is respectively combined with five cationic polymers in a certain proportion, all of them show good synergistic flocculation to papermaking wastewater.</p> <p>Claims 2, 11, 12 are novel and therefore comply with PCT Article 33(2).</p> <p>Claims 1, 3-10, 13-35 are not novel and therefore do not comply with PCT Article 33(2). Documents D1-D3 disclose compositions comprising cationic block co-polymers and cationic polyacrylamides. The charge density is not an inventive feature. Therefore, claims 1, 3-10, 13-35 are not novel. Claims 1, 3-10, 13-35 do not involve an inventive step and therefore do not comply with PCT Article 33(3). Given the above novelty objection, claims 1, 3-10, 13-35 do not involve an inventive step.</p> |             |                                           |           |                     |                                           |           |                               |                            |           |

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International application No.

**PCT/CA2023/051402**

**Box No. VII      Certain defects in the international application**

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

The description does not comply with PCT Article 5. The description contains statements that incorporate by reference other documents that are crucial to the understanding of the invention. Such statements are found at page 52, lines 21-22 and should be removed.

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International application No.  
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**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:

Claim 15 does not comply with PCT Article 6. The claim shall be clear and concise.

An open left bracket appears prior to polyoxyethylene in the 5th line of the claim.

Claim 18 does not comply with PCT Article 6. The claim shall be clear and concise.

Use of the expression "and combinations thereof" is ambiguous and unclear.

Claims 24-26 do not comply with PCT Article 6. The claims shall be clear and concise.

The numbers with brackets used in these claims is vague and unclear.

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of: **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

It would have been obvious to a person skilled in the art to arrive at the matter defined in claims 1, 3-10, 13-35 by combining the teachings of documents D1 and D2-D3. Therefore D1-D3 therefore shows that claims 1, 3-10, 13-35 do not involve an inventive step.

Claims 2, 11, 12 involve an inventive step and therefore comply with PCT Article 33(3). It would not have been obvious to a person skilled in the art from the cited documents, when taken individually or in any combination. Claims 2, 11, 12 therefore involve an inventive step.

The subject matter of claims 1-35 is considered to be industrially applicable and thus complies with the requirements of PCT Article 33(4).