

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

To:
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Date of mailing
(day/month/year) 29-05-2018

Applicant's or agent's file reference 015-3216		FOR FURTHER ACTION See paragraph 2 below
International application No. PCT/IB2018/051462	International filing date (day/month/year) 07-03-2018	Priority date (day/month/year) 30-07-2017
International Patent Classification (IPC) or both national classification and IPC C08B37/00 Version=2018.01		
Applicant SHALBAFAN, ALI		

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 43*bis*.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 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 66.1*bis*(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/ Indian Patent Office Plot No. 32, Sector 14, Dwarka, New Delhi-110075 Facsimile No.	Date of completion of this opinion 29-05-2018	Authorized officer Atul Kumar Verma Telephone No. +91-1125300200
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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IB2018/051462

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

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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

1. Statement

Novelty (N)	Claims	<u>1-20</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-20</u>	NO
Industrial applicability (IA)	Claims	<u>1-20</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations:

Reference is made to the following documents:

D1: US20080286472 A1, GEORGIA-PACIFIC CHEMICALS LLC. 20 November 2008 (2008-11-20)

D2: US4501628 A, WEYERHAEUSER CO. 26 February 1985 (1985-02-26)

D3: Dutkiewicz, Jacek. "Preparation of cured urea-formaldehyde resins of low formaldehyde emission." Journal of applied polymer science 29.1 (1984): 45-55.

<https://doi.org/10.1002/app.1984.070290105>

The present application relates to an adhesive composition that includes an aldehyde-based resin selected from the group consisting of urea-formaldehyde resins, melamine-formaldehyde resins, melamine-urea-formaldehyde resins, phenol-containing resins, and mixtures, combinations, and sub-combinations thereof, and a formaldehyde scavenger selected from the group consisting of chitosan, nano-chitosan, functionalized chitosan, and mixtures, combinations, and sub-combinations thereof.

Novelty under Article 33(2) of PCT:

The present application meets the criteria of Article 33(2) PCT because none of the above-cited documents D1-D3 discloses an adhesive composition includes an aldehyde-based resin and a formaldehyde scavenger selected from the group consisting of chitosan, nano-chitosan, functionalized chitosan, and mixtures, combinations, and sub-combinations thereof. Hence, the subject matter of the claims 1-20 is considered to be novel.

Inventive step under article 33(3) PCT:

The subject matter of claims 1-20 of present application does not meet the criteria of Article 33(3) PCT in view of cited documents D1-D3.

D1, which is considered to be the closest state of the art, teaches a method for reducing formaldehyde emissions from articles

Supplemental Box

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

Continuation of:

Continuation of Citation and Explanation(Box5)

(i.e wood-based panels) and aldehyde-based resin urea-formaldehyde resins, melamine-formaldehyde resins, melamine-urea-formaldehyde resins and, formaldehyde scavenger selected from the group consisting of chitosan.

Further, It relates to an aminopolysaccharide, such as chitosan forming an adhesive composition, by operations including mixing an aldehyde-based resin and a formaldehyde scavenger.(see abstract, page 1, paragraph [0003], [0020], [0045], [0067], [0074], [0077], claims11-14 of D1).

D2 discloses a method of reducing formaldehyde emission from wood-based composite boards bonded with aminoplast resins (see abstract, paragraph [0020],[0031], Claim 9, examples 1 and 2 of D2).

D1 and D2 differ from the present application in that D1-D2 both, does not disclose the amount of chitosan used for the preparation of wood panel.

Apart from that D2 discloses an approximately same method of reducing formaldehyde emission from wood-based composite (similar to D1), as mentioned in the present disclosure.

However, D3 discloses the preparation of cured urea-formaldehyde resin of low formaldehyde emission with chitosan. (see abstract, page 1, page 2 line 4-6; table 1 of D3).

Moreover, document D3 teaches process parameter for the processing of urea-formaldehyde resin composition with the use of the different amount of chitosan and urea-formaldehyde resin and also discloses the pH value of chitosan. That is always, known in general or obvious for processing of polymer in industry.

The subject matter of claims 1-13 does not contain any sort of technical feature likewise, reducing formaldehyde emissions from wood-based panels which affect the pH values of chitosan, in view of cited documents D1-D3. Hence the said claims are obvious in view of D1-D3, therefore not inventive.

The subject matter of claims 14-20 of present application contains a method for reducing formaldehyde emissions from wood-based panels, and use of chitosan with limited pH values of chitosan, which is always, known in general or obvious for processing of polymer. In addition, there is nothing sort of technological

advancement which enhance the feature of claim 1 or make it easy or economically more effective, for that reason not inventive.

Thus in the light of the above-cited documents D1-D3, it is obvious for a person skilled in the art to use chitosan of D3 in the process of D1-D2 without any technical advancement to arrive at the present application. Thus an inventive step cannot be acknowledged.

Hence, the subject matter of claims 1-13 and 14-20 of present application does not comply with the criteria of inventive step set forth in PCT Article 33(3).

Industrial applicability under article 33(4) PCT:

The subject matter of claims 1-20 appears to comply with the requirements of PCT Article 33(4) with regard to the industrial applicability of the present application.