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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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16 October 2008

(54) Title: POLYMERIC FILM OR COATING COMPRISING HEMICELLULOSE

(57) Abstract: A film forming composition and a polymeric film or coating comprising hemicellulose and at least one component selected from the group consisting of plasticizers, cellulose, and an oligomer or polymer, is disclosed, said polymeric film or coating further comprising at least one additive/reactant increasing the liquid/moisture resistance and mixed with and/or reacting with the hemicellulose and said at least one component before or in conjunction with the forming of the film or coating. The use of said film or coating is also disclosed. Further, a method for the manufacture of said polymeric film or coating is disclosed, as well as a method for improving the liquid/moisture resistance of hemicellulose. Said at least one additive/reactant increasing the liquid/moisture resistance is either a cross-linking agent or a hydrophobizing agent. In another preferred embodiment the additive is a 2: 1 layered phyllosilicate. The additive forms a nanocomposite with the hemicellulose as a matrix. The hemicellulose/phyllosilicate nanocomposite reinforced material provides excellent liquid/moisture resistance. Heat treatment of all of the films increases their liquid/moisture resistance and reduces their oxygen permeability.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2008/050191

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
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: C09D, C08K, C08J, C08L

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HARTMAN JONAS ET AL, "Surface- and bulk-modified galactoglucomannan hemicellulose films and film laminates for versatile oxygen barriers", Biomacromolecules 2006, Vol. 7, p. 1983-1989, table 1, abstract ---	1-5,14-18, 21-23
X	ALBERTSSON, ANN-CHRISTINE ET AL, "Utilization of hemicelluloses from forestry residual streams as barrier film and hydrogel materials", 229th ACS national meeting, American Chemical Society, 2005: March, San Diego, CA. Abstracts of papers, Paper 67. ---	1-4,14-18, 21,23

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" 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)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" 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
"X" 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
"Y" 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	Date of mailing of the international search report
13 August 2008	15 -08- 2008
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Monika Bohlin/EÖ Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2008/050191

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See separate sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2008/050191

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3832313 A (REINTJES, MARTEN ET AL), 27 August 1974 (27.08.1974), column 1, line 15 - line 44; column 1, line 72 - column 2, line 8, claims 1-6, abstract, example 1	1-4,14-18, 21,23
X	JP 5230101 A, FUJI OIL CO LTD, 1993-09-07: (abstract) Retrieved from: WPI database, WEEK 199340, AN 1993-317491	1-4,14-18, 21,23
X	EP 1095977 A1 (UCB, S.A.), 2 May 2001 (02.05.2001), abstract, paragraphs [0019], [0021], [0026]	1-4,14-18, 21,23
A	WO 2004083286 A1 (GATENHOLM, PAUL ET AL), 30 Sept 2004 (30.09.2004), claims 1-21, abstract	1-5,14-18, 21-23
A	US 20050037064 A1 (BASQUIN, SERGE ET AL), 17 February 2005 (17.02.2005), abstract, paragraph [0133]	1-3,17-18,23
A	DE 4331925 A1 (WINDI WINDERLICH GMBH), 16 March 1995 (16.03.1995), column 1, line 7 - line 8; column 2, line 3 - line 44; column 4, line 51 - line 53, abstract	1-5,14-18, 21-23
A	DE 19518247 A1 (DEUTSCHE GELATINE-FABRIKEN STOESS AG), 21 November 1996 (21.11.1996), page 2, line 3 - line 23; page 6, line 50 - line 68; page 7, line 10 - line 58, page 9, line 48 - page 10, line 39; pag 11, line 12 - line 14; page 11, line 45 - page 12, line 68; page 13, line 43 - line 55, abstract, claims 1-4	1-5,14-18, 21-23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2008/050191

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5358559 A (FITT, LARRY E. ET AL), 25 October 1994 (25.10.1994), column 6, line 34 - column 7, line 33; column 8, line 50 - column 9, line 14, claims 1-18, abstract	1-5,14-18, 21-23
A	EP 0612789 A1 (SORGHO AGRO-INDUSTRIEL ET PAPETIER S.A.I.S. SOCIETE ANONYME), 31 August 1994 (31.08.1994), column 2, line 9 - line 52; column 3, line 10 - line 30, claims 1-13, abstract	1-5,14-18, 21-23
A	US 6004616 A (MAEDA, HIROKAZU ET AL), 21 December 1999 (21.12.1999), column 3, line 53 - line 60; column 4, line 4 - line 29; column 8, line 49 - line 63, column 14, line 19 - line 34, abstract	1-4,14, 17-18,23
A	GRÖNDAHL MARIA ET AL, "Material properties of plasticized hardwood xylans for potential application as oxygen barrier films", Biomacromolecules 2004, Vol. 5, p. 1528-1535	1-5,14-15, 21-23
A	FREDON E. ET AL, "Hydrophonbic films from maize bran hemicelluloses", Carbohydrate Polymers 2002, Vol. 49 p. 1-12	1-5,14-18, 21-23
A	GRÖNDAHL MARIA ET AL, "Gas-phase surface fluorination of arabinoxylan films", Macromolecules 2006, Vol. 39, p. 2718-2721	1-5,14-18, 21-23
A	HEINZE THOMAS ET AL, International Symposium on Xylans, Mannans and Other Hemicelluloses (1st:2002: Orlando,Fla.) Washington, D.C. American Chemical Society;[Oxford]:Distributed by Oxford University Press, c2004, p. 312-325	1-5,14-18, 21-23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2008/050191

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MOINE CHARLOTTE ET AL, "Chemical valorization of forest and agricultural by-products. Obtention, chemical characteristics, and mechanical behavior of a novel family of hydrophobic films", 2004, Vol. B39, No. 4, p. 627-640 --	1-5,14-18, 21-23
E	HANSEN NATANYA M.L. ET AL, "Sustainable films and coatings from hemicelluloses: a review", Biomacromolecules, 2008, Vol. 9, No. 6, p. 1493-1505 -- --------	1-5,14-18, 21-23

The following separate inventions were identified:

1: Claims 1-4, 14-18 and 21-23 directed to a film forming composition, a polymeric film and/or a coating comprising hemicellulose and at least one additive or reagent for increasing the liquid and moisture resistance; the additive or reagent being a cross-linking agent.

2: Claims 1-3, 5, 14-18 and 21-23 directed to a film forming composition, a polymeric film and/or a coating comprising hemicellulose and at least one additive or reagent for increasing the liquid and moisture resistance; the additive or reagent being a hydrophobizing agent.

3: Claims 1, 6-17, 19-20 and 22-23 directed to a film forming composition, a polymeric film and/or a coating comprising hemicellulose and at least one additive or reagent for increasing the liquid and moisture resistance; the additive or reagent being a 2:1 layered phyllosilicate.

International patent classification (IPC)
C09D 105/14 (2006.01)
C08K 3/34 (2006.01)
C08K 5/00 (2006.01)
C08L 5/14 (2006.01)
C08J 5/18 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT
Information on patent family members

28/06/2008

International application No.
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