



(51) International Patent Classification:

D01D 5/08 (2006.01) D01F 6/92 (2006.01)  
D01D 5/098 (2006.01) D01F 8/14 (2006.01)

(21) International Application Number:

PCT/US2007/087339

(22) International Filing Date:

13 December 2007 (13.12.2007)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant (for all designated States except US): **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 401 North Lake Street, Neenah, WI 54956 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HE, Aimin** [CN/US]; N99 W14127 Seven Pines Way, Germantown, WI 53022 (US). **TOPOLKARAEV, Vasily, A.** [RU/US]; 1730 S. Lee Street, Appleton, WI 54915 (US).

(74) Agents: **JOHNSTON, Jason, W.** et al.; Dority & Manning, P.A., P.O. Box 1449, Greenville, SC 29602-1449 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, 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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: BIODEGRADABLE FIBERS FORMED FROM A THERMOPLASTIC COMPOSITION CONTAINING POLYLACTIC ACID AND A POLYETHER COPOLYMER

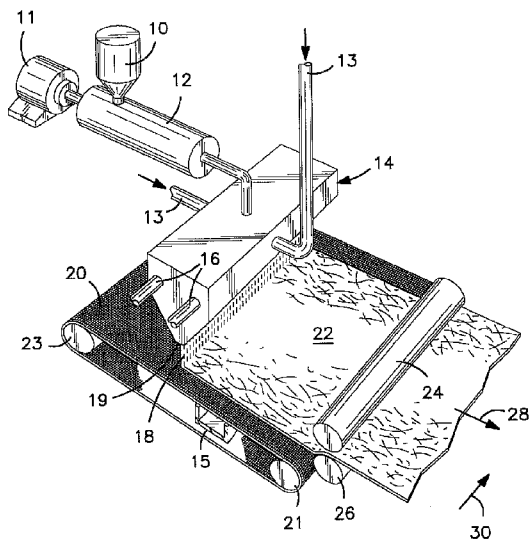
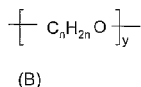
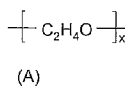


FIG. 1

(57) Abstract: A biodegradable fiber for use in forming a nonwoven web is provided. The fiber is formed from a thermoplastic composition comprising at least one polylactic acid in an amount from about 75 wt. % to about 99 wt.% and at least one polyether copolymer in an amount from about 1 wt.% to about 25 wt.%, wherein the polyether copolymer contains from about 40 mol.% to about 95 mol.% of a repeating unit (A) having the following formula. wherein, x is an integer from 1 to 250, the polyether copolymer further containing from about 5 mol.% to about 60mol.% of a repeating unit (B) having the following formula. wherein, n is an integer from 3 to 20; and y is an integer from 1 to 150. Such polyether copolymers have been found to improve a variety of characteristics of the resulting thermoplastic composition, including its ability to be melt processed into fibers and webs, as well as its sensitivity to moisture.





**Published:**

**(88) Date of publication of the international search report:**

29 October 2009

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/087339

## A. CLASSIFICATION OF SUBJECT MATTER

INV. D01D5/08 D01D5/098 D01F6/92 D01F8/14

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)  
D01F

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

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

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/14621 A (KIMBERLY CLARK CO [US]) 1 March 2001 (2001-03-01) page 1, line 12 - page 38, line 4; claims 1-55; examples 1,2	1-25
Y	US 6 197 237 B1 (TSAI FU-JYA DANIEL [US] ET AL) 6 March 2001 (2001-03-06) column 7, line 25 - column 8, line 52; claims 1-20; examples 1,3	1-25
Y	DATABASE WPI Week 200382 Thomson Scientific, London, GB; AN 2003-882424 XP002541954 & JP 2003 183934 A (YUNICHIKA FIBER KK) 3 July 2003 (2003-07-03) abstract	1-24
	----- -/--	

 Further documents are listed in the continuation of Box C. 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 document 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

19 August 2009

Date of mailing of the international search report

08/09/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040,  
Fax: (+31-70) 340-3016

Authorized officer

Barker, Stephan

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/087339

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 42 00 320 A1 (BAYER AG [DE]) 15 July 1993 (1993-07-15) page 2, lines 55-58; claim 2 & DATABASE WPI Week 199329 Thomson Scientific, London, GB; AN 1993-228103 & DE 42 00 320 A1 (BAYER AG) 15 July 1993 (1993-07-15) abstract	1-25
Y	DATABASE WPI Week 198733 Thomson Scientific, London, GB; AN 1987-232406 XP002541955 & JP 62 156995 A (RICOH KK) 11 July 1987 (1987-07-11) abstract	1-25
Y	US 4 596 660 A (HOU KENNETH C [US]) 24 June 1986 (1986-06-24) column 6, line 57 - column 7, line 35	1-25
A	US 6 207 617 B1 (GILLESPIE JANE L [US]) 27 March 2001 (2001-03-27) see formulae I and II column 4, lines 24-54 column 12, lines 50-62	1-25
A	US 5 593 778 A (KONDO YOSHIKAZU [JP] ET AL) 14 January 1997 (1997-01-14) claims 1-24	1-25

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/087339
---

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0114621	A	01-03-2001	AU 772567 B2 29-04-2004
			AU 7760100 A 19-03-2001
			BR 0013573 A 16-07-2002
			CN 1382234 A 27-11-2002
			EP 1218575 A1 03-07-2002
			JP 2003507596 T 25-02-2003
			MX PA02001354 A 22-07-2002
US 6197237	B1	06-03-2001	NONE
JP 2003183934	A	03-07-2003	NONE
DE 4200320	A1	15-07-1993	NONE
JP 62156995	A	11-07-1987	NONE
US 4596660	A	24-06-1986	NONE
US 6207617	B1	27-03-2001	NONE
US 5593778	A	14-01-1997	NONE