

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
26 May 2006 (26.05.2006)

PCT

(10) International Publication Number
WO 2006/055330 A3

- (51) International Patent Classification:
C08G 18/08 (2006.01) C08G 18/32 (2006.01)
C08G 18/18 (2006.01)
- (21) International Application Number:
PCT/US2005/040352
- (22) International Filing Date:
7 November 2005 (07.11.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/992,907 18 November 2004 (18.11.2004) US
- (71) Applicant (for all designated States except US): **PRIPRO POLYMERS, INC.** [US/US]; 3746 Saddle Drive, Carlsbad, CA 92008 (US).

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **DEWANJEE, Pi-jush** [US/US]; 3746 Saddle Drive, Carlsbad, CA 92008 (US). **GUARD, John** [US/US]; 2913 Cottingham Street, Oceanside, CA 92054 (US).
- (74) Agent: **SAKAGUCHI, James**; 2040 Main Street, Irvine, CA 92614 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

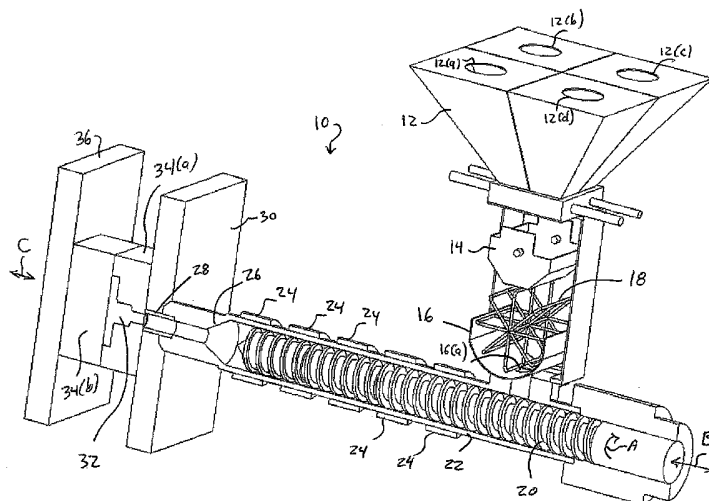
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, 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).

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
14 September 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CROSS-LINKED THERMOPLASTIC POLYURETHANE/POLYUREA AND METHOD OF MAKING SAME



(57) Abstract: A cross-linked thermoplastic polyurea is formed by heating a mixture containing a thermoplastic urethane base material, a monomeric and/or polymeric di-isocyanate comprising between 1 to 10% of the total weight of the mixture, and a diamine comprising between 1 to 10% of the total weight of the mixture. A thermoplastic polyurethane may be formed by substituting hydroquinone for the diamine. The mixture is heated to a temperature within the range of 250 °F to 550 °F. The heated mixture, which is flowable, is then injected into an injection molding device. The mixture is then cured at a temperature between 150 °F to 250 °F for a period of time between 2 and 36 hours. The cross-linked thermoplastic polyurethane/polyurea retains the excellent flowability characteristics of a thermoplastic urethane while the same time exhibits good abrasion, tensile strength, rebound, and compression set characteristics which are similar to those found in thermoset urethanes.

WO 2006/055330 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/40352

A. CLASSIFICATION OF SUBJECT MATTER IPC: C08G 18/08(2006.01),18/18(2006.01),18/32(2006.01) USPC: 525/457;528/59 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) U.S. : 525/457;528/59; 428/423.1 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 practicable, search terms used)														
C. DOCUMENTS CONSIDERED TO BE RELEVANT														
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	US 6,190,268 B1 (DEWANJEE) 20 February 2001 (20.02.2001), column 8, lines 14-44; column 9, lines 9-67; column 10, lines 3-65; column 11, lines 3-24; column 11, line 65 to column 12, line 35; claims 1-3.	1-8 and 10-14												
Y	US 2004/0181014 A1 (KIM ET AL.) 16 September 2004 (16.09.2004), page 3, paragraphs #16-22; page 4, paragraphs #24-26, 28-30; page 5, paragraph #32-34 and 37; page 6, paragraph #38; page 8, paragraphs #46-48; claims 1-9, 14-22, 32-40, 44-52.	1-6, 8-11, 13												
Y	US 5,028,685 A (HO et al.) 2 July 1991 (02.07.1991), column 2, lines 31-45; column 3, lines 1-31; column 3, line 59 to column 4, line 2; column 5, line 54 to column 6, line 30; column 8, line 52 to column 10, line 17; Examples 1-3 and 5; Figures 1-3.	1-6												
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> * Special categories of cited documents: </td> <td style="width: 50%; border: none;"> "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 </td> </tr> <tr> <td style="border: none;"> "A" document defining the general state of the art which is not considered to be of particular relevance </td> <td style="border: none;"> "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 </td> </tr> <tr> <td style="border: none;"> "E" earlier application or patent published on or after the international filing date </td> <td style="border: none;"> "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 </td> </tr> <tr> <td style="border: none;"> "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) </td> <td style="border: none;"> "&" document member of the same patent family </td> </tr> <tr> <td style="border: none;"> "O" document referring to an oral disclosure, use, exhibition or other means </td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;"> "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="border: none;"></td> </tr> </table>			* Special categories of cited documents:	"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	"A" document defining the general state of the art which is not considered to be of particular relevance	"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	"E" earlier application or patent published on or after the international filing date	"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	"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)	"&" document member of the same patent family	"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	
* Special categories of cited documents:	"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													
"A" document defining the general state of the art which is not considered to be of particular relevance	"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													
"E" earlier application or patent published on or after the international filing date	"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													
"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)	"&" document member of the same patent family													
"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														
Date of the actual completion of the international search 30 June 2006 (30.06.2006)		Date of mailing of the international search report 24 JUL 2006												
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Randy Gulakowski Telephone No. (571) 272-1100 <div style="text-align: right;"> Jean Proctor Paralegal Specialist </div>												

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/40352

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,801,674 A (SCOTT JR. et al.) 31 January 1989 (31.01.1989), column 4, lines 5-45; column 5, lines 39-65; column 7, lines 27-66; column 9, line 30 to column 10, line 51; Table 5.	1-6, 8-11, 13
Y	US 3,845,021 A (DUKES et al.) 29 October 1974 (29.10.1974), column 2, line 45 to column 4, line 59; column 5, line 42 to column 6, line 17; Example 1.	1-6, 8-11, 13
X	US 5,670,601 (ALLEN et al.) 23 September 1997 (23.09.1997), column 5, lines 31 to column 6, line 20; column 7, line 45 to column 8, line 9; column 9, line 14 to col. 10, line 33;	14
---	column 13, line 62 to col. 14, line 46.	-----
Y		1-13
Y	US 3,499,852 A (SCHROEDER et al.) 10 March 1970 (10.03.1970), column 2, lines 7-63; column 3, lines 3-75; 5, lines 3-19.	7, 12, 14
Y	US 4,107,101 A (KUBENS) 15 August 1978 (15.08.1978), column 2, lines 3-36; column 3, lines 17 to column 4, line 7; Examples 1-5.	7, 12, 14
Y	US 3,542,718 A (DAVIS et al.) 24 November 1970 (24.11.1970), column 2, line 16 to column 3, line 12; column 3, lines 34-47; column 4, lines 1-22.	7, 12, 14
Y	US 3,084,004 A (HENLEY) 2 April 1963 (02.04.1963), column 2, lines 11-67; column 3, lines 27-74; Example 1.	7, 12, 14
Y	US 3,218,215 A (ACHTERHOF et al.) 16 November 1965 (16.11.1965), column 3, line 45 to column 5, line 70.	7, 12, 14