

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 February 2004 (26.02.2004)

PCT

(10) International Publication Number
WO 2004/016343 A3

- (51) International Patent Classification⁷: **C08K 5/01**, (74) Agents: **ALEXANDER, David, J.** et al.; Fina Technology, Inc., P.O. Box 674412, Houston, TX 77267-4412 (US).
C08L 23/00, 23/04, 91/08, 95/00
- (21) International Application Number: PCT/US2003/024754
- (22) International Filing Date: 7 August 2003 (07.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/222,551 15 August 2002 (15.08.2002) US
- (71) Applicant: **FINA TECHNOLOGY, INC.** [US/US]; P.O. Box 674412, Houston, TX 77267-4412 (US).
- (72) Inventors: **KELLY, LuAnn**; 16018 Leigh Canyon Drive, Friendswood, Texas 77546 (US). **SCHARDL, Joseph, M.**; 18114 Delta Estates Court, Cypress, Texas 77529 (US). **MILLER, Mark, B.**; 1906 Walnut Green, Houston, Texas 77062 (US). **BARRE, Vincent**; 1921 Harbour Cove, Seabrook, Texas 77586 (US). **LUMUS, Layne**; 3833 Hansen, Dickenson, Texas 77539 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).
- Published:
— with international search report
- (88) Date of publication of the international search report:
10 June 2004
- 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: MODIFICATION OF SYNDIOTACTIC POLYPROPYLENE WITH MINERAL OIL

(57) Abstract: Syndiotactic polypropylene blends having a unique set of mechanical properties may be prepared by blending syndiotactic polypropylene with a high molecular weight mineral oil, an ultra low density polyethylene, or both. The syndiotactic polypropylene blends of the present invention have been found to have reduced flexural modulus, reduced haze, improved impact strength and shorter injection molding cycle times. It has been determined that the addition of about 5 to about 10 percent high molecular weight mineral oil to a syndiotactic polypropylene can decrease flexural modulus values by about 25 to about 30 percent. Moreover, the addition of up to about 10 percent mineral oil to the syndiotactic polypropylene material does not show signs of bleeding or impair clarity, in fact, percent haze values are slightly improved with the addition of mineral oil. Additionally, injection molding cycle time optimization shows an improvement of about 12 seconds in overall cycle time utilizing a syndiotactic polypropylene blend with 5% mineral oil in comparison to a syndiotactic polypropylene without mineral oil. The syndiotactic polypropylene blends according to the present invention may be further processed according to accepted practices to make cast films, blown films, injection molded parts, blow molded containers, and other articles using basic plastics fabrication techniques as known in the art.

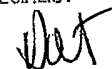


WO 2004/016343 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/24754

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : C08K 5/01; C08L 23/00, 23/04, 91/08, 95/00 US CL : 524/59, 62, 515; 525/240; 264/211 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. : 524/59, 62, 515; 525/240; 264/211 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 <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X, P — Y, P</td> <td>US 6,642,290 B1 (DOTSON) 04 November 2003 (04.11.03), see column 7, line 39, to column 8, line 2.</td> <td>1-6, 9, 16-20 ----- 7, 8, 10-15</td> </tr> <tr> <td>X — Y</td> <td>US 6,166,153 (SHAMSHOUM et al) 26 December 2000 (26.12.2000), see column 2, lines 18-29.</td> <td>1-6, 9, 16-20 ----- 7, 8, 10-15</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X, P — Y, P	US 6,642,290 B1 (DOTSON) 04 November 2003 (04.11.03), see column 7, line 39, to column 8, line 2.	1-6, 9, 16-20 ----- 7, 8, 10-15	X — Y	US 6,166,153 (SHAMSHOUM et al) 26 December 2000 (26.12.2000), see column 2, lines 18-29.	1-6, 9, 16-20 ----- 7, 8, 10-15
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.									
X, P — Y, P	US 6,642,290 B1 (DOTSON) 04 November 2003 (04.11.03), see column 7, line 39, to column 8, line 2.	1-6, 9, 16-20 ----- 7, 8, 10-15									
X — Y	US 6,166,153 (SHAMSHOUM et al) 26 December 2000 (26.12.2000), see column 2, lines 18-29.	1-6, 9, 16-20 ----- 7, 8, 10-15									
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.											
<table border="0"> <tr> <td colspan="2"> * 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 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 </td> <td> "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 </td> </tr> </table>			* 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 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						
* 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 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 28 January 2004 (28.01.2004)		Date of mailing of the international search report 09 MAR 2004									
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. (703) 305-3230		Authorized officer Nathan M. Nutter Telephone No. 703-308-0661 DEBORAH THOMAS PARALEGAL SPECIALIST 									

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/24754

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

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

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation 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 fee, this Authority did not invite payment of any additional fee.
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.

No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-6 and 9, drawn to a thermoplastic polymer composition.

Group II, claims 7, 8 and 10-15, drawn to a thermoplastic polymer blend composition.

Group III, claims 16 and 18-20, drawn to a method for making a thermoplastic polymer composition.

Group IV, claim 17, drawn to a method for making a thermoplastic blend composition.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the inventions of Group I and Group II require different combinations of constituents, which would materially affect the final product. Group III and Group IV produce compositions that differ in scope, and have different characteristics and produce different effects. Groups I and III would be properly examined together. Groups II and IV would be properly examined together.