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(71) Applicant (for all designated States except US): **SMITH & NEPHEW, INC.** [US/US]; Attn: David Chambers, 1450 Brooks Road, Memphis, TN 38116 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MORRISON, Mark, L.** [US/US]; 1450 Brooks Road, Memphis, TN 38116 (US). **PAWAR, Vivek, D.** [IN/US]; 9008 Arden Meadows Drive, Germantown, TN 38139 (US). **BRUNNER, Lorenz** [CH/CH]; Spyrstresse 34, CH-8044 Zurich (CH). **JANI, Shilesh, C.** [TZ/US]; 6657 Vinings Creek Cv, Memphis, TN 38119 (US).

(74) Agents: **FOX, David, L.** et al.; c/o Smith & Nephew, Inc, Attn: David Chambers, 1450 Brooks Road, Memphis, TN 38116 (US).

(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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD,

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(54) Title: SYNERGISTIC EFFECTS OF BLENDING MULTIPLE ADDITIVES IN UHMWPE

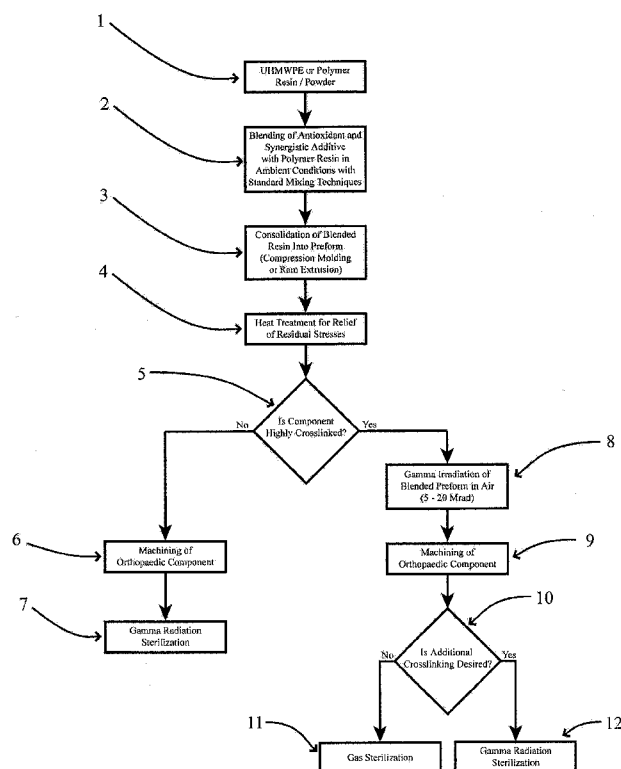


FIG. 1

(57) Abstract: Oxidation resistant crosslinked ultrahigh molecular weight polyethylene (UHMWPE) is described, wherein at least two different additives in the manufacture synergistically increase the oxidation resistance of crosslinked UHMWPE. This allows the manufacture of oxidation resistant crosslinked UHMWPE using lower levels of additives and/or lower levels of crosslinking irradiation or chemicals. The lower levels of additives and/or crosslinking produce crosslinked UHMWPE having desired physical properties not possible without the synergistic interaction of the additives. This crosslinked UHMWPE may be used in medical prostheses such as in bearing components having desired physical properties such as wear resistance and oxidation resistance not possible without the synergistic interaction of the additives.



SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
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31 March 2011

A. CLASSIFICATION OF SUBJECT MATTER*A61L 27/14(2006.01)i, C08F 10/02(2006.01)i, A61F 2/30(2006.01)i, A61F 2/32(2006.01)i, A61F 2/38(2006.01)i*

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)

A61L 27/14; A61F 2/28; A61F 2/02; A61F 2/30; C08J 5/10; A61F 2/00; C08F 8/00; B29C 35/08

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: UHMWPE,ultrahigh molecular, polyethylene, crosslink,oxidation, resistant

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008-113388 A1 (PLUS ORTHOPEDICS AG et al.) 25 September 2008 See claims 1, 3, 5, 7, 9, 11, 20, 21, 26, 28; page 1, lines 1-2; page 8, lines 22-24.	1,3-16,21-26
X	WO 2008-006890 A2 (CONTEDECA, FABIO et al.) 17 January 2008 See claims 1, 3, 7-10; page 1, lines 16-17; page 7, last two line ~ page 8, lines 10-12; page 8, examples.	1,3-16,21-26
Y		2
Y	WO 2008-101134 A1 21 August 2008 See claims 1-11, 16, 18-21; page 14, detailed description; page 32, lines 9-22.	2
A		1,3-28
A	US 6277390 B1 (SCHAFFNER; SILVIO) 21 August 2001 See claims 1-3.	1-28
A	US 2007-0059334 A1 15 March 2007 See claims 1, 10.	1-28
A	US 2009-0030524 A1 (SCHROEDER DAVID W. et al.) 29 January 2009 See claims 1, 3-5.	1-28



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 application or patent but published on or after the international filing date

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"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

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Name and mailing address of the ISA/KR

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Authorized officer

KOH, TAE WOOG

Telephone No. 82-42-481-8655



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2010/033494**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.: 29-36
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 29-36 pertain to methods for treatment of the human body by surgery or therapy as well as diagnostic methods, and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.
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:

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 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

Information on patent family members

International application No.

PCT/US2010/033494

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 2009-0030524 A1	29.01.2009	None	