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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))*

— *of inventorship (Rule 4.17(iv))*

Published:

— *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))*

(88) Date of publication of the international search report:
25 March 2010

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(54) Title: THERMOPLASTIC ELASTOMERS EXHIBITING SUPERIOR ABRASION RESISTANCE PROPERTIES

(57) Abstract: A blend of thermoplastic polyester elastomer, hydrogenated styrenic block copolymer, and high styrene content styrenic block copolymer is disclosed which has good processability and more effective abrasion resistance than the blend using polystyrene in place of the high styrene content styrenic block copolymer.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/047538

A. CLASSIFICATION OF SUBJECT MATTER

C08L 25/08(2006.01)i, C08L 67/00(2006.01)i, C08L 91/00(2006.01)i, C08K 3/00(2006.01)i, C08K 5/00(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)

IPC : C08L

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)

eKOMPASS(KIPO INTERNAL), Google & keyward : polyester elastomer, hydrogenated styrene block copolymer, high styrene

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,149,589 A (NARITOMI, MASANORI. et al.) 22 Sep. 1992. See abstract; column 4, lines 34-56.	1-3
Y	KURIAKOSE, BABY. et al. Scanning electron microscopy studies on tensile, tear and abrasion failure of thermoplastic elastomers, JOURNAL OF MAERIALS SCIENCE. 1985, Vol. 20, No. 5, pages 1864-1872, ISSN 0022-2461. See abstract; table 1 and 2; column 10, lines 5-16.	1-3
Y	MAYUMI, JUNJI. et al. Material Design and Manufacture of a New Thermoplastic Polyester Elastomer, Polymer Journal. Published 20 November 2007, Vol. 40, No. 1, pages 1-9, ISSN 0032-3896. See abstract; column 3, lines 32-39; Fig. 2 and 3.	2
A	US 5,550,190 A (HASEGAWA, KO. et al.) 27 Aug. 1996. See the whole document	1-3

☐ 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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of 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
26 JANUARY 2010 (26.01.2010)	**26 JANUARY 2010 (26.01.2010)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

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Telephone No. 82-42-481-5538

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/047538

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.: 4-8
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 addtional 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/US2009/047538

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 05149589 A	22.09.1992	JP 2888305 B2	10.05.1999
		JP 02-888305 B2	19.02.1999
		JP 03-100045 A	25.04.1991
US 05550190 A	27.08.1996	EP 0506465 A3	24.02.1993
		EP 0506465 A2	30.09.1992
		EP 0506465 B1	30.09.1998
		JP 3118306 B2	18.12.2000
		JP 05-125263 A	21.05.1993
		JP 03-118306 B2	06.10.2000
		KR 10-0137753 B1	01.05.1998