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

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(54) Title: SOFT THERMOPLASTIC ELASTOMER COMPOSITION

(57) Abstract: The present invention relates to a soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) a hydrophobic polyol or polyamine, (2) a polyisocyanate or an aromatic dicarboxylic acid, and (3) a chain extender containing 2 to 20 carbon atoms, or the reaction product of (1) a hydrophobic polyol or polyamine, and (2) a carboxyl terminated telechelic polyamine sequence; wherein the hydrophobic polyol or polyamine has a number average molecular weight in the range of from 1,000 to 4,000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight in the range of 50,000 to 1,000,000 Daltons; and (II) from 1 to 80 weight percent of a mineral oil, wherein the soft, semicrystalline, thermoplastic elastomer composition has a Shore A hardness which is within the range of 20 to 80.



WO 2009/094332 A3

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. C08G18/66 C08G18/76 C08L75/04

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)

C09D C08G 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 practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Week 199707 Thomson Scientific, London, GB; AN 1997-073188 XP002530051 & JP 08 319416 A (KURARAY CO LTD) 3 December 1996 (1996-12-03)	1-43
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X	KR 2004 0066524 A (SUHHAEE IND CO LTD) 27 July 2004 (2004-07-27) abstract	1-43
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☒ 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.

Z document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 942 044 A (KURARAY CO [JP]) 15 September 1999 (1999-09-15) paragraphs [0059] - [0063]; claims 1,3-6; table 2	1-43
X	----- DATABASE WPI Week 199943 Thomson Scientific, London, GB; AN 1999-510987 XP002554882 & JP 11 189780 A (NIPPON SEIKO KK) 13 July 1999 (1999-07-13)	1,11-14, 16-23
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/031435

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.:
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:

see additional 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 fees, this Authority did not invite payment of additional fees.
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims:

1(part),2-6,7(part)-14(part),15,
16(part)-22(part),23(part),24-43

A soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) at least one hydrophobic polyol, (2) a polyisocyanate and (3) at least one chain extender containing 2 to 20 carbon atoms; wherein the hydrophobic polyol has a number average molecular weight which is within the range of about 1000 to about 4000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight which is within the range of 50000 to 1000000 Daltons; (II) a from 1 weight percent to about 80 weight percent of a mineral oil.

Also are claimed: a semicrystalline thermoplastic polyurethane (claim 24), an article of manufacture which is comprised of a soft thermoplastic polyurethane (claims 23,41) and a compatibilized blend of thermoplastic elastomer and a polyolefin (claim 42).

2. claims: 1(part),11(part)-14(part),16(part)-22(part),23(part)

A soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) at least one hydrophobic polyamine, (2) a polyisocyanate and (3) at least one chain extender containing 2 to 20 carbon atoms; wherein the hydrophobic polyamine has a number average molecular weight which is within the range of about 1000 to about 4000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight which is within the range of 50000 to 1000000 Daltons; (II) a from 1 weight percent to about 80 weight percent of a mineral oil.

Also is claimed an article of manufacture which is comprised of a soft thermoplastic elastomer (claim 23)

3. claims: 1(part),7(part)-11(part),16(part)-22(part),23(part)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) at least one hydrophobic polyol, (2) an aromatic dicarboxylic acid and (3) at least one chain extender containing 2 to 20 carbon atoms; wherein the hydrophobic polyol has a number average molecular weight which is within the range of about 1000 to about 4000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight which is within the range of 50000 to 1000000 Daltons; (II) a from 1 weight percent to about 80 weight percent of a mineral oil.

Also is claimed an article of manufacture which is comprised of a soft thermoplastic elastomer (claim 23)

4. claims: 1(part),11(part),16(part)-22(part),23(part)

A soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) at least one hydrophobic polyamine, (2) an aromatic dicarboxylic acid and (3) at least one chain extender containing 2 to 20 carbon atoms; wherein the hydrophobic polyamine has a number average molecular weight which is within the range of about 1000 to about 4000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight which is within the range of 50000 to 1000000 Daltons; (II) a from 1 weight percent to about 80 weight percent of a mineral oil.

Also is claimed an article of manufacture which is comprised of a soft thermoplastic elastomer (claim 23)

5. claims: 1(part),7(part)-11(part),16(part)-22(part),23(part)

A soft, semicrystalline, thermoplastic elastomer composition which is comprised of (I) a hydrophobic thermoplastic block copolymer which is comprised of (I) the reaction product of (1) at least one hydrophobic polyol or polyamine, (2) a carboxyl terminated telechelic polyamide sequence; wherein the hydrophobic polyol or polyamine has a number average molecular weight which is within the range of about 1000 to about 4000 Daltons; wherein the hydrophobic thermoplastic block copolymer has a weight average molecular weight which is within the range of 50000 to 1000000 Daltons; (II) a from 1 weight percent to about 80 weight percent of a mineral oil.

Also is claimed an article of manufacture which is comprised of a soft thermoplastic elastomer (claim 23)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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