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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:

3 December 2009

(54) Title: FUNCTIONALIZED POLYMERS AND INITIATORS FOR MAKING SAME

(57) Abstract: A polymer includes at a terminus a cyclic amine radical bonded to the polymer through a ring nitrogen atom. The polymer can be provided by using a lithiated version of the cyclic amine to initiate polymerization of one or more ethylenically unsaturated monomers. The polymer can be used in the production in a variety of vulcanizates.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/037211**A. CLASSIFICATION OF SUBJECT MATTER***C08K 5/34(2006.01)i, C08K 5/3442(2006.01)i, C08K 5/544(2006.01)i, C08K 5/57(2006.01)i, C08L 53/02(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 : C08K 5/34, C08K 5/3442, C08K 5/544, C08K 5/57, C08L 53/02

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) & keywords: diene, piperazine, terminal, initiator

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0600208 B1 (Bridgestone Corporation) 29 Dec. 1997 See page 6 lines 51-58; and the claims.	1-10
X A	EP 0693505 A1 (Bridgestone Corporation) 24 Jan. 1996 See the abstract; and the claims.	4-10 1-3
A	US 5,866,650 A (David F. Lawson et al.) 02 Feb. 1999 See the abstract; and the claims.	1-10
A	US 2002/0173607 A1 (Thorsten Werner Brockmann) 21 Nov. 2002 See the abstract; and the claims.	1-10
A	US 6,977,281 B1 (Yoichi Ozawa et al.) 20 Dec. 2005 See the abstract; and the claims.	1-10

 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

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/037211**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.: 11,12
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/US2009/037211

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0600208 B1	29. 12. 1997	CA 2102035 C	19. 12. 2006
		CA 2102035 A1	01. 05. 1994
		DE 69315965 T2	16. 04. 1998
		DE 69315965 D1	05. 02. 1998
		EP 0600208 A1	08. 06. 1994
		EP 0741148 A1	06. 11. 1996
		ES 2110557 T3	16. 02. 1998
		JP 06-211915 A	02. 08. 1994
		JP 08-311118 A	26. 11. 1996
		US 05578542 A	26. 11. 1996
		US 05643848 A	01. 07. 1997
		US 05723533 A	03. 03. 1998
		US 05959048 A	28. 09. 1999
		EP 0693505 A1	24. 01. 1996
DE 69509448 D1	10. 06. 1999		
DE 69509448 T2	02. 09. 1999		
EP 0693505 B1	06. 05. 1999		
ES 2132467 T3	16. 08. 1999		
JP 08-048707 A	20. 02. 1996		
US 05866650 A	02. 02. 1999	EP 0890586 A1	13. 01. 1999
		EP 0890586 B1	15. 09. 2004
		JP 2008-260952 A	30. 10. 2008
		JP 11-124475 A	11. 05. 1999
US 2002-173607 A1	21. 11. 2002	US 06943250 B2	13. 09. 2005
US 06977281 B1	20. 12. 2005	EP 1237935 A1	11. 09. 2002
		EP 1237935 B1	24. 01. 2007
		JP 2003-514079 A	15. 04. 2003
		US 2006-025539 A1	02. 02. 2006
		WO 2001-034659 A1	17. 05. 2001