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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: PROCESS FOR THE PREPARATION OF A BLOCK COPOLYMER

(57) Abstract: The invention relates to a process for the preparation of a block copolymer, the process being carried out in the presence of a multifunctional initiator and comprising at least one enzymatically catalyzed homo- or copolymerization reaction and at least one non-enzymatically catalyzed controlled homo- or copolymerization reaction, wherein the non-enzymatically catalyzed controlled homo- or copolymerization reaction is chosen from the group comprising a free radical polymerization reaction, an ionic polymerization reaction, a polycondensation reaction, and a ring opening polymerization (ROP) reaction. The invention also relates to a chiral block copolymer wherein at least one block comprises at least one substituted ϵ -caprolactone derivative.



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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/00515

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C08F283/02

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 7 C08F C08G

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, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	URSULA MEYER, ANJA PALMANS, TON LOONTJENS, ANDERAS HEISE: "Enzymatic Ring Opening Polymerization and Atom transfer Radical Polymerization from a Bifunctional Initiator" MACROMOLECULES, vol. 35, 3 June 2002 (2002-06-03), pages 2873-2875, XP009004224 cited in the application page 2873, column 1, line 9 - line 14 page 2873, column 2, line 55 -page 2874, column 1, line 1 page 2875, column 1, line 15 - line 25 * scheme 1 * --- -/--	1,3-5,7, 8,10

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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.

"&" document member of the same patent family

Date of the actual completion of the international search

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20.01.04

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INTERNATIONAL SEARCH REPORT

Internati Application No
PCT/ 03/00515

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SHIRO KOBAYASHI, HIROSHI UYAMA, SHUNSAKU KIMURA: "Enzymatic Polymerization" CHEMICAL REVIEW, vol. 101, 7 November 2001 (2001-11-07), pages 3793-3818, XP002228563 cited in the application page 3807, column 1, line 7 -page 3810, column 2, line 7 ---	1-11
A	CRAIG HAWKER, ANTON BOSMAN, EVA HARTH: "New Polymer Synthesis by Nitroxide Mediated Living Radical Polymerizations" CHEMICAL REVIEW, vol. 101, 25 October 2001 (2001-10-25), pages 3661-3688, XP002228564 cited in the application page 3674, column 1, line 9 -page 3678, column 1, line 46 ---	1-11
X	TROLLSAS M ET AL: "HIGHLY BRANCHED BLOCK COPOLYMERS: DESIGN, SYNTHESIS, AND MORPHOLOGY" MACROMOLECULES, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 32, no. 15, 27 July 1999 (1999-07-27), pages 4917-4924, XP000845936 ISSN: 0024-9297 cited in the application page 4918, column 1, line 33 -column 2, line 6 page 4919, column 2, line 19 - line 21 table 1 ---	12,13
X	US 6 114 458 A (HAWKER CRAIG JON ET AL) 5 September 2000 (2000-09-05) claim 1; table 3 column 9; table 4 ---	12,13
A	US 5 439 985 A (GROSS RICHARD A ET AL) 8 August 1995 (1995-08-08) table 1 ---	12,13
A	KONDAVETI L ET AL: "Lipase-catalyzed solvent-free kinetic resolution of substituted racemic epsilon-caprolactones" TETRAHEDRON: ASYMMETRY, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 13, no. 2, 28 February 2002 (2002-02-28), pages 129-135, XP004345183 ISSN: 0957-4166 * the whole document * -----	12,13

INTERNATIONAL SEARCH REPORT

Inter national application No.
T/NL 03/00515

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 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:

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 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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. Claims: 1-11

Process for the preparation of a multiblock copolymer, comprising at least one enzymatically catalyzed homo- or copolymerization reaction and at least one non-enzymatically catalyzed homo- or copolymerization reaction

2. Claims: 12-13

Chiral block copolymer wherein at least one block comprises at least one substituted epsilon-caprolactone derivative

INTERNATIONAL SEARCH REPORT

International Application No

PCT/ITL 03/00515

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6114458	A	05-09-2000	NONE
US 5439985	A	08-08-1995	NONE