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WO 2003/039615 A3

(54) Title: POROUS POLYMERIC PROSTHESES AND METHODS FOR MAKING SAME

(57) Abstract: Porous polymers having a plurality of openings or chambers that are highly convoluted, with each chamber being defined by multiple, thin, flat partitions are produced by a new gel enhanced phase separation technique. In a preferred embodiment, a second solvent is added to a polymer solution, the second solvent causing the solution to gel. The gel can then be shaped as needed. Subsequent solvent extraction leaves the porous polymeric body of defined shape. The porous polymers have utility as medical prostheses, the porosity permitting ingrowth of neighboring tissue. The present technique also enhances shape-making capability, for example, of bifurcated vascular grafts, which feature a common entrance region but two or more exit regions.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 02/35848

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61L27/56 A61L27/14 C08J9/00

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 A61L C08J

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, COMPENDEX, MEDLINE, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 553 008 A (REISCHL ARTUR ET AL) 5 January 1971 (1971-01-05) column 1, line 45 -column 2, line 3; claim 1; tables 1,2	1-25
X	DATABASE WPI Section Ch, Week 197632 Derwent Publications Ltd., London, GB; Class A25, AN 1976-60950X XP002231746 & JP 51 074058 A (MITSUBISHI RAYON CO LTD) , 26 June 1976 (1976-06-26) abstract	1-25

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.
- *G* document member of the same patent family

Date of the actual completion of the international search

28 July 2003

Date of mailing of the international search report

11.09.03

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/US 02/35848

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>DATABASE WPI Section Ch, Week 200109 Derwent Publications Ltd., London, GB; Class A18, AN 2001-075349 XP002231747 & JP 2000 319434 A (NITTO DENKO CORP), 21 November 2000 (2000-11-21) abstract</p> <p style="text-align: center;">---</p>	1-25
X	<p>US 3 492 154 A (EINSTMAN ROBERT V) 27 January 1970 (1970-01-27) column 5, line 23 - line 65</p> <p style="text-align: center;">---</p>	1-25
X	<p>US 3 527 653 A (GERLACH KLAUS ET AL) 8 September 1970 (1970-09-08) column 5, line 28 - line 56 column 6, line 62 - line 66</p> <p style="text-align: center;">---</p>	1-25
X	<p>US 5 229 045 A (SOLDANI GIORGIO) 20 July 1993 (1993-07-20) column 4, line 35 -column 6, line 31</p> <p style="text-align: center;">---</p>	1-63
X	<p>WO 00 55300 A (KOREA INST SCIENCE TECHNOLOGY ;NAM YOON SUNG (KR); PARK TAE GWAN () 21 September 2000 (2000-09-21) page 4, line 27 -page 5, line 8</p> <p style="text-align: center;">---</p>	1-25
X	<p>DATABASE WPI Section Ch, Week 197547 Derwent Publications Ltd., London, GB; Class A82, AN 1975-77632W XP002249146 & JP 50 042004 A (KURARAY CO LTD), 16 April 1975 (1975-04-16) abstract</p> <p style="text-align: center;">---</p>	1-25
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X	<p>EP 0 382 356 A (ICI PLC) 16 August 1990 (1990-08-16) page 3, line 38 -page 4, line 2</p> <p style="text-align: center;">---</p>	1-25
X	<p>EP 0 396 809 A (A J N COLLAGEN FORSCHUNGS UND) 14 November 1990 (1990-11-14) abstract</p> <p style="text-align: center;">---</p>	26-63
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INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/US 02/35848

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 0 216 149 A (KANEGAFUCHI CHEMICAL IND) 1 April 1987 (1987-04-01) abstract ---	26-63
X	US 4 355 426 A (MACGREGOR DAVID C) 26 October 1982 (1982-10-26) abstract ---	26-63
X	WO 96 37165 A (BSI CORP) 28 November 1996 (1996-11-28) page 7, line 30 -page 9, line 2 ---	26-63
X	US 4 657 544 A (PINCHUK LEONARD) 14 April 1987 (1987-04-14) abstract ---	26-63
X	EP 0 308 102 A (UBE INDUSTRIES) 22 March 1989 (1989-03-22) abstract -----	26-63

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/35848

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.: 26-63 (part)
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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

Continuation of Box I.2

Claims Nos.: 26-63 (part)

The definition in Claims 26, 44, 53 and 57 of a "gel enhanced phase separation technique" is unclear since the essential steps of this technique are not defined. Thus, it is unclear what restriction this fabrication technique places upon the prostheses defined in these claims. Consequently, Claims 26, 44, 53 and 57 appear to essentially define porous (vascular) prostheses irrespective of the method used to manufacture them.

The initial phase of the search revealed a very large number of documents relevant to the issue of novelty. So many documents were retrieved that it is impossible to determine which parts of the claim(s) may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search over the whole breadth of Claims 26 to 63 is impossible. Consequently, the documents cited in respect of Claims 26 to 63 are merely a random sample of the many documents found. It is possible that a further search will be necessary, if and when the essential features of prostheses are clarified.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. Claims: 1-25

processes of producing a porous polymeric body or composite porous polymeric body

2. Claims: 26-63

prostheses comprising a porous polymer

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/35848

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International Application No

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