

(19) World Intellectual Property
Organization
International Bureau



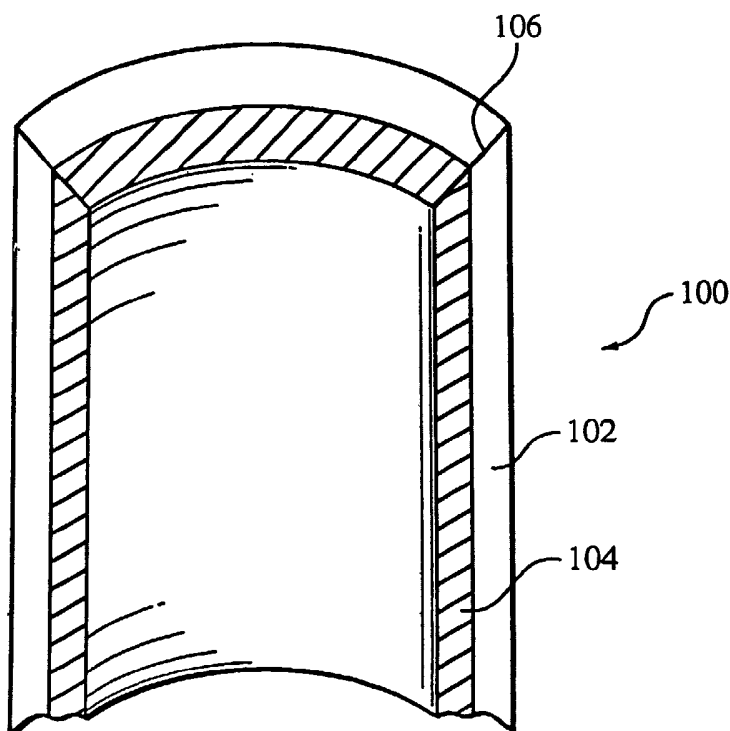
(43) International Publication Date
4 March 2004 (04.03.2004)

PCT

(10) International Publication Number
WO 2004/018990 A3

- (51) International Patent Classification⁷: **B01D 15/08** (74) Agent: **BOOTH, William, E.**; Fish & Richardson P.C.,
225 Franklin Street, Boston, MA 02110-2804 (US).
- (21) International Application Number:
PCT/US2003/025387 (81) Designated States (*national*): CA, JP.
- (22) International Filing Date: 14 August 2003 (14.08.2003) (84) Designated States (*regional*): European patent (AT, BE,
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
(25) Filing Language: English IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).
- (26) Publication Language: English Published:
— with international search report
— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments
- (30) Priority Data:
10/226,530 23 August 2002 (23.08.2002) US
- (71) Applicant: **BIOTAGE, INC.** [US/US]; 2900 Crystal
Drive, Arlington, VA 22202-3513 (US). (88) Date of publication of the international search report:
8 April 2004
- (72) Inventors: **HORSMAN, Jeffrey, A.**; 1033 Wintergreen
Lane, Charlottesville, VA 22903 (US). **VAN DAVELAAR,**
Peter, C.; 315 Pleasant Place, Charlottesville, VA 22911
(US). For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: COMPOSITE CHROMATOGRAPHY COLUMN



(57) Abstract: Apparatus for chromatography, featuring a composite chromatography column (100) including a tubular member having an inlet end and an outlet end, where the tubular member includes an innermost first layer (104) comprised of a first material and a second layer (102) comprised of a second material. The chromatography apparatus can also include a first intermediate layer formed from a third material, where at least a portion of the first intermediate layer is disposed between the innermost first layer and the second layer. A second intermediate layer formed from a fourth material, can further be included in the chromatography apparatus, where at least a portion of the second intermediate layer is disposed between the innermost first layer (104) and the second layer (102). A portion of the second intermediate layer can be disposed between the second layer (104) and the first intermediate layer.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25387

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01D 15/08

US CL : 210/198.2, 541, 656

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)

U.S. : 210/198.2, 541, 656

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim(s)
Y, P	US 6,565,745 B2 (HODGIN et al) 20 May 2003 (20.05.2003), column 6, lines 24-26.	1-110
Y	US 6,029,498 A (WALTERS et al.) 29 February 2000 (29.02.2000), column 14, lines 49-51.	1-110

☐ 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 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

29 January 2004 (29.01.2004)

Date of mailing of the international search report

19 FEB 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Ernest G. Therkorn

Telephone No. (703) 308-0661