

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
21 October 2004 (21.10.2004)

PCT

(10) International Publication Number
WO 2004/089287 A3(51) International Patent Classification:
B29B 9/00 (2006.01) **A61K 9/14** (2006.01)(21) International Application Number:
PCT/US2004/010086

(22) International Filing Date: 2 April 2004 (02.04.2004)

(25) Filing Language: English

(26) Publication Language: English

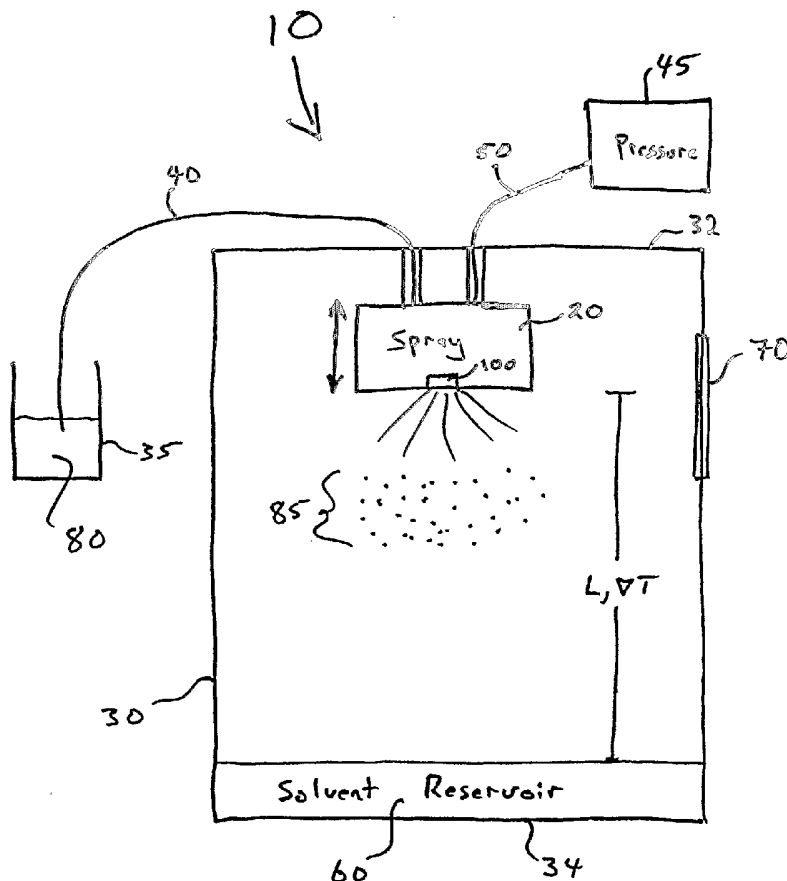
(30) Priority Data:
60/460,267 4 April 2003 (04.04.2003) US
10/806,896 22 March 2004 (22.03.2004) US(71) Applicant (for all designated States except US): **GEN-
TERIC INC.** [US/US]; 1650 Harbor Bay Parkway,
Alameda, CA 94502 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHEU, Eric, Y.**
[US/US]; 7 Olde Creek Place, Lafayette, CA 94549 (US).
LIU, Yadong [CA/US]; 43555 Grimmer Blvd., #C323,
Fremont, CA 94538 (US). **NIEDZINSKI, Edmund, J.**
[US/US]; 483 Aberdeen Way, Vacaville, CA 95687 (US).(74) Agents: **GRAY, Gerald, T.** et al.; Townsend and
Townsend and Crew LLP, Two Embarcadero Center,
Eighth Floor, San Francisco, CA 94111-3834 (US).(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,

[Continued on next page]

(54) Title: SPRAY DRY COACERVATION SYSTEMS AND METHODS



(57) Abstract: A microparticle formation system and methods that combine aspects of spray drying and coacervation into a single process. A temperature controllable spray head mounted on a movable stage within spray chamber produces droplets of solution having controlled size and temperature. The solution can include one or more solvents, components and active agents such as APIs. A wet sample-receiving reservoir at the bottom of the chamber holds a desired receiving solvent or solvents. The system is configurable such that the droplets do not have to be fully dry before reaching the reservoir. The first solvent may be miscible with a reservoir solvent such that conservation occurs, resulting in the formation of microparticles. Microparticles formed in this manner have a well-defined or controlled size of low polydispersity.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
16 November 2006

Published:

— with international search report

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.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10086

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **B29B 9/00**(2006.01);**A61K 9/14**(2006.01)

USPC: 264/5;425/6;424/489

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. : 264/5; 425/6; 424/489

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 No.
X	US 6,153,129 A (HERBERT et al) 28 Nov 2000 (28.11.2000), Abstract, Figure 1, col. 1, lines 35-44; col. 2, lines 39-67; col. 3, lines 20-34; col. 4, line 55- col. 5, line50; col. 6, lines 18-30; col. 10, line 60- col. 11, line 5; col. 11, lines 35-41; col. 12, lines 5-13 and 48-51	1-33, 38, 39, 56, 57
X	U.S. 2003/0017113 A1 (CHEN et al.) 23 January 2003 (23.01.2003), Abstract, paragraphs [0017-0021, 0044-0047, 0053-0056, 0061-0063, 0077	1, 2, 4-16, 17-19, 21-23, 26-33, 38, 39, 56, 57
X	US 6,465,425 B1 (TRACY et al.) 15 October 2002 (15.10.2002), Abstract, col. 2, lines 3-13, col. 5, lines 8-18, col. 6, lines 18-21, col. 7, lines 35-55, col. 8, lines 1-57, col. 10, lines	1, 8-16, 17-19, 23, 30-33, 38, 39, 54-57
A	WO 01/58428 (WARD et al) 16 August 2001 (16.08.2001), entire document	1-33, 38, 39, 54-57
A	US 5,589,167 A (CLELAND et al.) 31 December 1996 (31.12.1996), col. 15, line 30 - col. 18, line 67	1-33, 38, 39, 54-57

☐ 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

02 August 2006 (02.08.2006)

Date of mailing of the international search report

01 SEP 2006

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. (571) 273-3201

Authorized officer

Jeff Wollschlager

Telephone No. 571-272-8937

Jean Proctor
Patrol: 1000-1000

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/10086

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:

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 additional fees, this Authority did not invite payment of any 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.: 1-33,38,39 and 54-57
- 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.