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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

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))

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(54) Title: ENGINEERED AEROSOL PARTICLES, AND ASSOCIATED METHODS

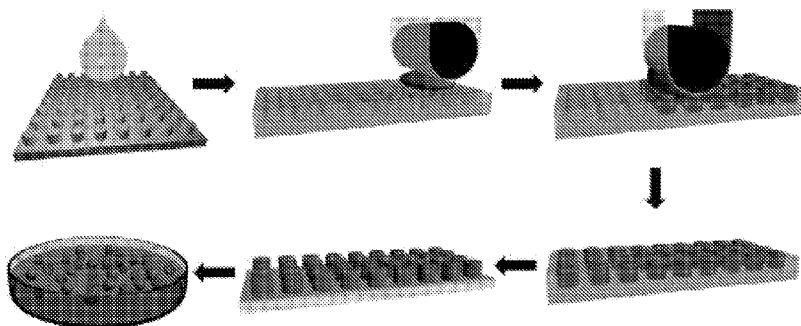


FIG. 1

(57) Abstract: An engineered aerosol particle for use in aerosol applications is provided. The engineered aerosol particle comprises a fabricated nanoparticle body member being non-spherical. The fabricated nanoparticle body member is configured to provide at least one of auto-rotation, tumbling, or lift when entrained in an airstream to thereby increase settling time of the fabricated nanoparticle body member. An associated method is also provided.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2010/041797

A. CLASSIFICATION OF SUBJECT MATTER
INV. B01J2/22
ADD.

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)
B01J

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008/027571 A2 (LIQUIDIA TECHNOLOGIES INC [US]; DESIMONE JOSEPH M [US]; HENN ROBERT L) 6 March 2008 (2008-03-06) abstract; figures 1, 15 page 2, paragraph 6 page 7, paragraph 44 page 9, paragraph 47 - page 11, paragraph 54	1,3-6, 24,29
X	WO 2007/094829 A2 (UNIV NORTH CAROLINA [US]; UNIV NORTH CAROLINA [US]; DESIMONE JOSEPH M) 23 August 2007 (2007-08-23) page 65, lines 12-27; figures 5A, 11-16, 50; example 8 page 85, lines 4-7 page 108, line 15 page 160, lines 4, 31-33	1,8-14, 23,29
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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 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

1 April 2011

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29/04/2011

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/041797

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.: 2, 7, 15-22(completely); 1, 13, 26, 29(partially)
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 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:

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 fees, this Authority did not invite payment of 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.:
1-24, 26, 29

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

International application No

PCT/US2010/041797

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/030698 A2 (UNIV NORTH CAROLINA [US]; UNIV NORTH CAROLINA [US]; DESIMONE JOSEPH M) 15 March 2007 (2007-03-15) abstract page 9, lines 18-30 -----	1,26,29
X A	WO 2008/011051 A1 (LIQUIDIA TECHNOLOGIES INC [US]; ROTHROCK GINGER D [US]; MAYNOR BENJAMI) 24 January 2008 (2008-01-24) abstract page 11, paragraph 30 -----	1,29 13,14
X	ROLLAND JASON P ET AL: "Direct fabrication and harvesting of monodisperse, shape-specific nanobiomaterials", JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, US, vol. 127, no. 28, 20 July 2005 (2005-07-20), pages 10096-10100, XP002495804, ISSN: 0002-7863, DOI: DOI:10.1021/JA051977C [retrieved on 2005-06-21] abstract; figures 1, 3-4 -----	1,12-14, 29
X,P	ZHANG H ET AL: "Fabrication of multiphase and regio-specifically functionalized PRINTA™ particles of controlled size and shape", NEW JOURNAL OF PHYSICS, INSTITUTE OF PHYSICS PUBLISHING, BRISTOL, GB, vol. 11, no. 7, 31 July 2009 (2009-07-31), page 75018, XP020161607, ISSN: 1367-2630 abstract; figures 1-2, 4 page 13, paragraph 1 -----	1,8,9, 11,12,29
A	WO 2005/054119 A2 (UNIV ILLINOIS [US]; ROGERS JOHN A [US]; JEON SEOKWOO [US]; PARK JANGUN) 16 June 2005 (2005-06-16) abstract -----	1,3,4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2010/041797

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008027571 A2	06-03-2008	US 2010055459 A1	04-03-2010
WO 2007094829 A2	23-08-2007	EP 1951202 A2	06-08-2008
WO 2007030698 A2	15-03-2007	NONE	
WO 2008011051 A1	24-01-2008	US 2008181958 A1	31-07-2008
WO 2005054119 A2	16-06-2005	EP 1700161 A2	13-09-2006
		JP 2007523468 T	16-08-2007
		KR 20060109477 A	20-10-2006

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

1. claims: 1-24, 26, 29

an engineered non-spherical nano-particle and its
fabrication method

1.1. claims: 1-24, 29

an engineered non-spherical nano-particle

1.2. claim: 26

method of fabricating a non-spherical particle

2. claim: 25

method of delivering an engineered aerosol

3. claim: 27

method of delivering a therapeutic agent

Continuation of Box II.2

Claims Nos.: 2, 7, 15-22(completely); 1, 13, 26, 29(partially)

No meaningful search could be carried out in part or full of the following claims due to the reasons explained:

1. Claims 1, 2, 13, 15-21, 26 and 29 do not meet the requirements of Article 6 PCT because the matter for which protection is sought is not clearly defined, e.g.: - ...configured to provide at least one of auto-rotation, tumbling, or lift when entrained in an airstream to thereby increase settling time of the fabricated nanoparticle body member. -...configured to settle between about 27-59% slower than an equivalent sphere of comparable volume. -...configured to carry a cargo therewith for delivering the cargo to a delivery site. -...configured to provide: autorotation..., tumbling..., lift..., autorotation or tumbling and lift..., autorotation and tumbling..., autorotation, tumbling, and lift..., lift through creation of a leading edge vortex. These claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. The non-compliance with the substantive provisions is to such an extent that no meaningful search of said claims (in part or full) could be carried out at all (Article 17(2) PCT). 2. The term "central axis" used in claim 7 is not clearly defined and supported in the description, e.g. how would one draw the central axis in Figures 3I, 3M and 24. This lack of support renders said claim 7 unclear and cannot be searched, Article 6, PCT. 3. There is no definition of a "lift-generating edge" in the description which renders claim 22 unclear, Article 6, PCT. No meaningful search of said claim could be carried out at all.

The applicant's attention is drawn to the fact that 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. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.