

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
17 January 2008 (17.01.2008)

PCT

(10) International Publication Number
WO 2008/008917 A3

(51) International Patent Classification:

A61L 27/54 (2006.01) A61F 2/28 (2006.01)
A61L 27/56 (2006.01)

(21) International Application Number:

PCT/US2007/073397

(22) International Filing Date: 12 July 2007 (12.07.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/830,433 12 July 2006 (12.07.2006) US

(71) Applicant (for all designated States except US): **MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH** [US/US]; 200 First Street S.W., Rochester, Minnesota 55905 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **RUSSELL, Stephen J.** [GB/US]; 2701 Salem Road SW, Rochester, Minnesota 55902 (US). **PENG, Kah-why** [SG/US]; 3226 Lakeridge Drive NW, Rochester, Minnesota 55901 (US). **ONG, Hooi Tin** [MY/US]; 625 - 3rd Street SW #7, Rochester, Minnesota 55902 (US).

(74) Agents: **KUBE, D. Marie** et al.; Fish & Richardson, P.O. Box 1022, Minneapolis, MN 55440-1022 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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

(88) Date of publication of the international search report:
6 March 2008

(54) Title: HYDROXYAPATITE PARTICLES

(57) Abstract: This document provides methods and materials related to hydroxyapatite particles. For example, hydroxyapatite particles, methods for making hydroxyapatite particles, and methods for using hydroxyapatite particles are provided herein.



WO 2008/008917 A3

A. CLASSIFICATION OF SUBJECT MATTER*A61L 27/54(2006.01)i, A61L 27/56(2006.01)i, A61F 2/28(2006.01)i*

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 8 A61L 27/54, A61L 27/56, A61F 2/28, A61K 51/00, C07F 9/38

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)
eKIPASS (KIPO internal), NCBI "PubMed" & keyword: radionuclide, biphosphonate, hydroxyapatite and nanoparticle.**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	OGAWA, K. et al., Nuclear Medicine and Biology. May 2006, Vol. 33, No. 4, pp. 513-520. See abstract; p. 515, c. 2, l. 32 - p. 116, c. 1, l. 5.	1-4, 10-13
A		5-9, 14-18
Y	THORWARTH, M. et al., Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons. November 2005, Vol. 63, No. 11, pp. 1626-1633. See p. 1627, c. 1, l. 49 - c. 2, l. 9.	1-4, 10-13
A		5-9, 14-18
Y	NEVES, M. et al., Nuclear Medicine and Biology. April 2002, Vol. 29, No. 3, pp. 329-338. See abstract; p. 333, c. 2, l. 14 - l. 30.	1-4, 10-13
A		5-9, 14-18
A	US6896871 B2 (KARPEISKY, M. et al.) 24 May 2005 See the whole document.	1-18
A	US6869593 B2 (FRANGIONI, J. V.) 22 March 2005 See the whole document.	1-18



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 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 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

14 JANUARY 2008 (14.01.2008)

Date of mailing of the international search report

14 JANUARY 2008 (14.01.2008)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM Sang Woo

Telephone No. 82-42-481-8384



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2007/073397**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.: 19-29
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 19-26 and 27-29 pertain to methods for treatment of human or animal body by therapy, thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.
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 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 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

Information on patent family members

International application No.

PCT/US2007/073397

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US6896871 B2	24.05.2005	US20020142994 A1	03.10.2002
US6869593 B2	22.03.2005	US20040028611 A1	12.02.2004
		US2006002857 AA	05.01.2006
		US2007036724 A1	15.02.2007