(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 January 2009 (08.01.2009)

PCT

(10) International Publication Number
WO 2009/005261 A3

(51) International Patent Classification:
B82B 3/00 (2006.01)

(21) International Application Number:
PCT/KR2008/003737

(22) International Filing Date: 27 June 2008 (27.06.2008)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:

10-2007-0064993	29 June 2007 (29.06.2007)	KR
10-2007-0065030	29 June 2007 (29.06.2007)	KR
10-2008-0036360	18 April 2008 (18.04.2008)	KR

(71) Applicant *(for all designated States except US)*: **KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY** [KR/KR]; 373-1, Guseong-dong, Yuseong-gu, Daejeon 305-701 (KR).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **KIM, Bongsoo** [KR/KR]; Korea Advanced Institute of Science, and Technology, Guseong-dong, Yuseong-gu, Daejeon 305-701 (KR). **YOO, Yeongdong** [KR/KR]; Korea Advanced Institute of Science, and Technology, Guseong-dong, Yuseong-gu, Daejeon 305-701 (KR).

(74) Agents: **KWON, Oh-Sig** et al.; 4F, Jooeunleaderstel, 921 Dunsan-dong, Seo-gu, Daejeon 302-120 (KR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, 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, 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.

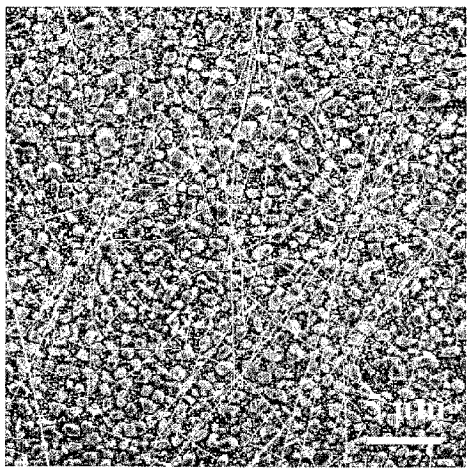
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, 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:
12 March 2009

(54) Title: NOBLE METAL SINGLE CRYSTALLINE NANOWIRE AND THE FABRICATION METHOD THEREOF

[Fig. 1]



(57) Abstract: The present invention provides a method for fabricating a single crystalline noble metal nanowire using noble metal oxide, noble metal material or noble metal halide as a precursor and a single crystalline noble metal nanowire, and more particularly a method for fabricating a single crystalline noble metal nanowire on a single crystalline substrate by heat treating a precursor located at a front portion of a furnace and a substrate located at a rear portion of the furnace in an inert flow atmosphere and a single crystalline noble metal nanowire fabricated by the fabrication method. The present invention fabricates a single crystalline noble metal nanowire by non-catalytic vapor phase transport method, the process is simple and reproducible, the fabricated nanowire is a defect free and impurity free, high quality and high purity noble metal nanowire of complete single crystal state.

WO 2009/005261 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/003737

A. CLASSIFICATION OF SUBJECT MATTER

B82B 3/00(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 B82B, C30B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS (KIPO internal)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	HONG, BYUNG HEE et al., Ultrathin Single-Crystalline Silver Nanowire Arrays Formed in an Ambient Solution Phase, Science, 12 October 2001, Vol. 294, No. 348, pp. 348-351. See abstract	17-22 1-16, 23-58
X A	RAMIN BANAN SADEGHIAN and MOJTABA KAHRIZI, 'A Low Pressure Gas Ionization Sensor Using Freestanding Gold Nanowires'. In: 2007 IEEE International Symposium on Industrial Electronics (ISIE 2007). 4-7 June 2007, pp. 1387-1390. See abstract	17, 23-24 1-16, 18-22, 25-58
X A	KIM, KYUNGTAE and CHO, SUNG M., 'Pd nanowire sensors for hydrogen detection'. In: Sensors, 2004, Proceedings of IEEE. 24-27 October 2004, Vol. 2, pp. 705-707. See abstract	17, 25-26 1-16, 18-24, 27-58
A	JP 2006-117519 A (SHARP KABUSHIKI KAISHA) 11 May 2006 See abstract, claims 1-51	1-58
A	WO 2003/068674 A1 (JAPAN SCIENCE AND TECHNOLOGY CORPORATION et al.) 21 August 2003 See abstract	1-58

☐ 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	Date of mailing of the international search report
14 JANUARY 2009 (14.01.2009)	**14 JANUARY 2009 (14.01.2009)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
Park, Jong Chul
Telephone No. 82-42-481-8306

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/003737

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2006-117519 A	11.05.2006	US 7255745 B2	14.08.2007
		US 7438759 B2	21.10.2008
		US 2006-0086314 A1	27.04.2006
		US 2006-086314 A1	27.04.2006
WO 2003-068674 A1	21.08.2003	NONE	