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

(19) World Intellectual Property Organization

International Bureau

(43) International Publication Date 27 January 2011 (27.01.2011)



(10) International Publication Number WO 2011/011348 A3

(51) International Patent Classification: H01L 31/042 (2006.01) H01L 31/18 (2006.01)

(21) International Application Number:

PCT/US2010/042503

(22) International Filing Date:

20 July 2010 (20.07.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/508,835

24 July 2009 (24.07.2009)

US

- (71) Applicant (for all designated States except US): OVSHINSKY INNOVATION, LLC [US/US]; 1050 E. Square Lake Road, Bloomfield Hills, Michigan 48304 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): OVSHINSKY, Stanford [US/US]; Ovshinsky Innovation, LLC, 1050 E. Square Lake Road, Bloomfield Hills, Michigan 48304 (US).
- (74) Agent: BRAY, Kevin; Ovshinsky Innovation, LLC, 1050 E. Square Lake Road, Bloomfield Hills, Michigan 48304 (US).
- (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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

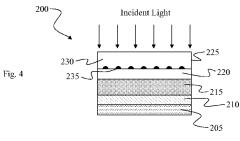
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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))
- (88) Date of publication of the international search report:

28 April 2011

(54) Title: METHOD OF MANUFACTURING A PHOTOVOLTAIC DEVICE



(57) Abstract: A photovoltaic device including a current collection element and a method of making same. The photovoltaic device includes a substrate, a conductive layer, an active photovoltaic material, a transparent electrode and a current collection element. The current collection element includes a transparent support and one or more conductive wires integrated therewith. The conductive wires are in electrical communication with the transparent electrode. Current generated by the active photovoltaic material passes to the transparent electrode. The current collection element facilitates delivery of current passing through the transparent electrode to leads that deliver the current to an external load. The method includes placing a pre-fabricated current collection element in direct contact with the transparent electrode of the photovoltaic device. The time and expense of assembling the conductive wires during fabrication of the photovoltaic device is thereby avoided and higher manufacturing speeds are achieved.





International application No. PCT/US2010/042503

A. CLASSIFICATION OF SUBJECT MATTER

H01L 31/042(2006.01)i, H01L 31/18(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)

H01L 31/042; H01L 31/06; H01L 31/04; H01L 31/00

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

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: current collection element, transparent support, conductive wire, photovoltaic, transparent conductor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 06-204529 A (CANON INC.) 22 July 1994 See abstract, paragraphs [0011],[0017]-[0023], figure 1.	1-24 25-38
A	US 4419533 A1 (WOLODYMYR CZUBATYJ et al.) 06 December 1983 See abstract, column 11 line 45 - column 14 line 32, figures 4 and 5.	1-38
A	US 7560641 B2 (MENEZES SHALINI) 14 July 2009 See abstract, column 5 line 5 - line 54, figure 2.	1-38
A	JP 10-233519 A (CANON INC.) 02 September 1998 See abstract, paragraphs [0010]-[0013], figure 2.	1–38

-		Further documents are	e listed in tl	he continuation o	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
- "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 mailing of the international search report

Date of the actual completion of the international search

15 FEBRUARY 2011 (15.02.2011)

18 FEBRUARY 2011 (18.02.2011)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seogu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

OH, Je Uk

Telephone No. 82-42-481-8222



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

Information of	PCT/U	PCT/US2010/042503	
Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 06-204529 A	22.07.1994	None	
US 4419533 A1	06.12.1983	KR 10-1984-0004309 A	10. 10. 1984
US 7560641 B2	14.07.2009	US 2003-0230338 A1 US 2003-0231842 A1 US 6897485 B2	18.12.2003 18.12.2003 24.05.2005
JP 10-233519 A	02.09.1998	CN 1099136 C CN 1168541 A CN 1168541 CO EP 0784348 A2 EP 0784348 A3 EP 0784348 B1 KR 10-0288861 B1 US 6191353 B1	15.01.2003 24.12.1997 24.12.1997 16.07.1997 14.10.1998 25.06.2003 01.06.2001 20.02.2001