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(54) **Title:** COMPOSITIONALLY GRADED DILUTE GROUP III-V NITRIDE CELL WITH BLOCKING LAYERS FOR MULTIJUNCTION SOLAR CELL

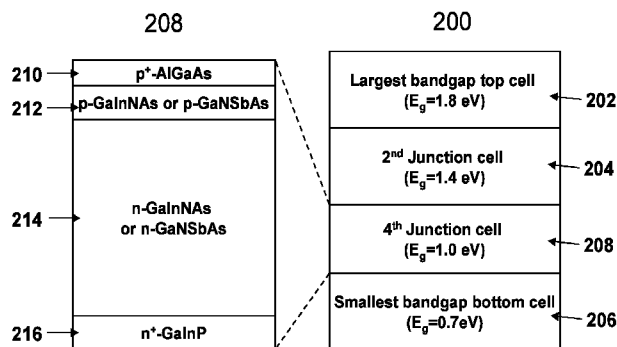


FIG. 2

(57) **Abstract:** A dilute Group III-V nitride solar cell is provided for use in a multijunction solar cell having a p-n junction formed by p-type and n-type layers of dilute Group III-V nitride material, such as GaNAs. Blocking layers of a group III-V ternary alloy are formed on opposing surfaces of the p-n junction to improve the electron and hole collection efficiency of the p-n junction by preventing the flow of electrons and holes, respectively, into the adjacent layers of the multijunction solar cell in certain directions. The III-V nitride solar cell is current matched to other solar cells of the multijunction solar cell. The III-V nitride solar cell may possess a bandgap of approximately 1.0 eV to serve as one junction of the multijunction solar cell. The p-type and n-type layers may further have compositionally graded nitrogen concentrations to provide an electric field for more efficient charge collection.

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A. CLASSIFICATION OF SUBJECT MATTER***H01L 31/0735(2012.01)i, H01L 31/0725(2012.01)i, H01L 31/042(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 31/0735; H01L 31/0304; H01L 31/06; H01L 31/052; H01L 27/14; 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: solar, photovoltaic, multijunction, Group III-V, contact blocking layer

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010-0175751 A1 (WLADYSLAW WALUKIEWICZ et al.) 15 July 2010	1-8, 12-18, 20
A	See paragraphs [0010], [0024], [0027], [0029]-[0033]; claims 5-8, 12-14, 17, 18, 21; and figure 1.	9-11, 19
A	US 2010-0282307 A1 (PAUL SHARPS et al.) 11 November 2010	1-20
A	See paragraphs [0026]-[0033]; claims 1, 10; and figures 2, 3.	
A	US 2003-0136442 A1 (TATSUYA TAKAMOTO) 24 July 2003	1-20
A	See paragraphs [0007]-[0011]; and figures 3, 6-8.	
A	US 5217539 A (LEWIS M. FRAAS et al.) 08 June 1993	1-20
A	See column 2, line 3 - column 3, line 11; and claims 1-62.	
A	US 4631352 A (TAHER DAUD et al.) 23 December 1986	1-20
A	See column 2, line 21 - column 4, line 15; and claim 1.	

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0175751 A1	15.07.2010	CN 102576775 A US 8232470 B2 WO 2011-031683 A2 WO 2011-031683 A3	11.07.2012 31.07.2012 17.03.2011 21.07.2011
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US 4631352 A	23.12.1986	None	