An ultra-efficient device for converting light into electricity has a dielectric medium, a metallic medium having an array of surface-plasmon-polariton (SPP) resonator cavities formed at nano-scale and distributed below the dielectric-metal interface, each nano-scale resonator cavity having a hollow metal cathode in which a metal anode is disposed, another metallic medium electrically coupled to the anode, and another dielectric medium insulating the anode from the cathode. The cathode is shaped and spaced from the anode so that standing waves of SPP excitations generated by the input light cause quantum field emission of electrons to be rectified as an electrical output. The SPP resonator cavities may be formed in a plurality of sizes to allow full spectrum energy conversion of light input. High energy conversion efficiencies up to a theoretical maximum of 84% can be obtained.
INTERNATIONAL SEARCH REPORT

International application No. PCT/US2011/044952

A. CLASSIFICATION OF SUBJECT MATTER

H01L 31/04(2006.01)

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 31/04; B29C 45/14; F24J 2/06; F24J 2/10; B29C 65/00; H01L 31/00; H01L 31/042

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, concentrator, nano, resonate.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>A</td>
<td>US 2009-0159126 A1 (CHAN HING WAI) 25 June 2009 See abstract, paragraphs [0022]-[0023], claim 1 and figures 1-2,7-8.</td>
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☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search 19 JANUARY 2012 (19.01.2012)

Date of mailing of the international search report 19 JANUARY 2012 (19.01.2012)

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Authorized officer

Lee, Dongyun

Telephone No. 82-42-481-8489

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