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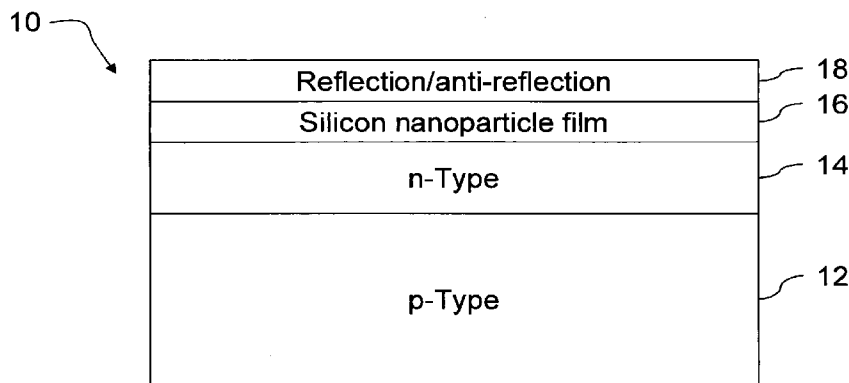
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(54) Title: SILICON NANOPARTICLE PHOTOVOLTAIC DEVICES



(57) Abstract: A photovoltaic device for converting light into electrical power includes a film (16, 26, 36) of silicon nanoparticles. The silicon nanoparticle film, which can be a multilayer film, has a photoluminescence response and couples light and or electricity into semiconductor layers. A particular example photovoltaic device of the invention include a solar cell that accepts and converts light of a predetermined wavelength range into electrical power. A film containing luminescent silicon nanoparticles is optically coupled to the solar cell. The film has a predetermined thickness. The film responds to incident radiation and produces light or electron response in the predetermined wavelength range that is optically coupled into the solar cell. In preferred embodiments, the film is additionally or alternatively electrically coupled to the solar cell, which produces charge response that is electrically coupled into the solar cell.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - B05D 5/12 (2008.04)

USPC - 427/74

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): B05D 5/12 (2008.04)

USPC: 427/74

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 257/E31.001; 427/75,76; 428/403,405,407; 430/270.1,281.1; 977/857 (Keywords limited -See list for keywords)

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

PubWEST(USPT,PGPB,EPAB,JPAB); DialogPRO(Chemistry); Google Scholar

Search Terms: Silicon, nanoparticle\$2, photovoltaic, device\$2, solar, cell, wavelength\$2, luminescent, optically, coupled, conductive, film\$2, conductive, nano\$9, nitride, amorphous, layer, glass, flexible, transparent, substrate, light, conducting, electric\$

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004/0109666 A1 (Kim) 10 June 2004 (10.06.2004), especially, para [0020], [0021], [0024], [0025], [0030], [0032], [0064], [0065], [0087] and [0104].	1-17
Y	US 2004/0229447 A1 (Swihart et al.) 18 November 2004 (18.11.2004), especially, claim 13, para [0002] and [0071].	1-17
Y	US 5,211,761 A (Noguchi et al.) 18 May 1993 (18.05.1993), especially, (col 3, ln 28-29) and (col 5, ln 20-21).	9-11, 17

 Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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

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"&" document member of the same patent family

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