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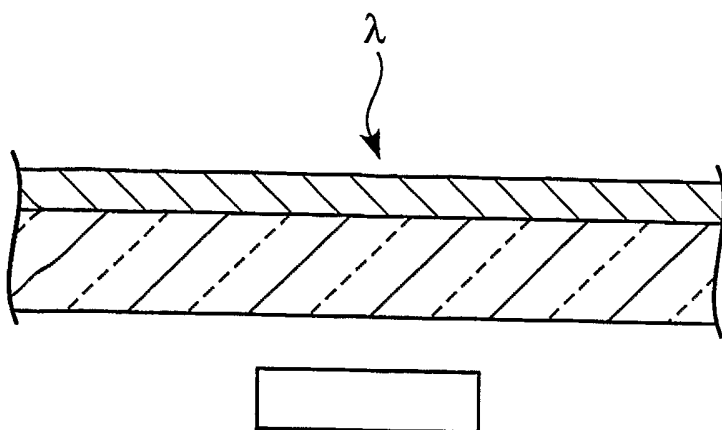
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(54) Title: OPTICAL LIMITER HAVING TRIMETALLIC NITRIDE ENDOHEDRAL METALLOFULLERENE FILMS



(57) Abstract: An exemplary optical limiter device ( 100 ) has an optically transmissive substrate ( 102 ) and a layer ( 104 ) on a first surface ( 106 ) of the substrate, the layer having a trimetallic nitride endohedral metallofullerene. The layer can be a thin film of the trimetallic nitride endohedral metallofullerene, a layer material with a cavity containing a solution with the trimetallic nitride endohedral metallofullerene, a sol-gel with a trimetallic nitride endohedral metallofullerene, and a self assembled monolayer with a trimetallic nitride endohedral metallofullerene. The layers of trimetallic nitride endohedral metallofullerenes can be vapor deposited, solution deposited and/or self assembled onto

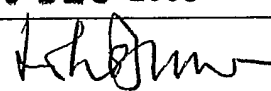
optical components. The third-order nonlinear properties of these films provide desired transmission characteristics.

WO 2005/096726 A3

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US05/10216

<p>A. CLASSIFICATION OF SUBJECT MATTER                  IPC(7) : G02F 1/03, 1/00; G02B 5/22; C07F 5/00; C01B 31/00                  US CL : 359/241, 244, 321, 855; 534/11, 15; 423/445B; 556/1, 28; 428/408; 502/416                  According to International Patent Classification (IPC) or to both national classification and IPC</p>																						
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols)                  U.S. : 359/241, 244, 321, 855; 534/11, 15, 10; 423/445B; 556/1, 28; 428/408; 502/416; 427/249.1; 250/216; 252/183.14</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched                  NONE</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                  Please See Continuation Sheet</p>																						
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 6,303,760 A (DORN et al) 16 October 2001 (16.10.2001), column 1, line 55 to column 11, line 47.</td> <td>1-11, 15-28</td> </tr> <tr> <td>A</td> <td>US 6,815,067 A (ATA et al) 09 November 2004 (09.11.2004), column 5, line 16 to column 19, line 12.</td> <td>1-3,10,12,13,15,16</td> </tr> <tr> <td>A</td> <td>US 5,453,413 A (EKLUND) 26 September 1995 (26.09.1995), column 1, line 9 to column 11, line 15.</td> <td>1,15</td> </tr> <tr> <td>A</td> <td>US 5,805,326 A (SNOW et al) 08 September 1998 (08.09.1998), column 2, line 18 to column 8, line 41.</td> <td>1-3,10,12,13</td> </tr> <tr> <td>A</td> <td>US 5,172,278 A (TUTT) 15 December 1992 (15.12.1992), column 1, line 59 to column 4, line 60.</td> <td>1-3,10,12,13</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 6,303,760 A (DORN et al) 16 October 2001 (16.10.2001), column 1, line 55 to column 11, line 47.	1-11, 15-28	A	US 6,815,067 A (ATA et al) 09 November 2004 (09.11.2004), column 5, line 16 to column 19, line 12.	1-3,10,12,13,15,16	A	US 5,453,413 A (EKLUND) 26 September 1995 (26.09.1995), column 1, line 9 to column 11, line 15.	1,15	A	US 5,805,326 A (SNOW et al) 08 September 1998 (08.09.1998), column 2, line 18 to column 8, line 41.	1-3,10,12,13	A	US 5,172,278 A (TUTT) 15 December 1992 (15.12.1992), column 1, line 59 to column 4, line 60.	1-3,10,12,13		
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C.      <input type="checkbox"/> See patent family annex.</p>																						
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>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</td> </tr> <tr> <td>"E"</td> <td>earlier application or patent published on or after the international filing date</td> <td>"X"</td> <td>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</td> </tr> <tr> <td>"L"</td> <td>document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>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</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&amp;"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"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	"E"	earlier application or patent published on or after the international filing date	"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	"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
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"P"	document published prior to the international filing date but later than the priority date claimed																					
<p>Date of the actual completion of the international search                  13 August 2005 (13.08.2005)</p>		<p>Date of mailing of the international search report  <b>30 DEC 2005</b></p>																				
<p>Name and mailing address of the ISA/US                  Mail Stop PCT, Attn: ISA/US                  Commissioner for Patents                  P.O. Box 1450                  Alexandria, Virginia 22313-1450                  Facsimile No. (703) 305-3230</p>		<p>Authorized officer                  LOHA BEN                   Telephone No. (571) 272-2323</p>																				

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US05/10216

Continuation of B. FIELDS SEARCHED Item 3:

WEST: (1)- (substrate\$1 or base\$1 or area\$1 or surface\$1 or support\$3) SAME transmi\$5 SAME trimetal\$3 or metal\$3) SAME fullerene\$1

(2)- (substrate\$1 or base\$1 or area\$1 or surface\$1 or support\$3) SAME transmi\$5 SAME trimetal\$3 or metal\$3) SAME metallofullerene\$1

(3)- (substrate\$1 or base\$1 or area\$1 or surface\$1 or support\$3) SAME transmi\$5 SAME trimetal\$3 or metal\$3) SAME nitride\$1 SAME endohedral

EAST: (1)- 359/241,244,321,885.CCLS. and (limit\$3 or block\$3 or filter\$3 or scatter\$3) and metallofullerene\$1

(2)- 534/10,11,15.CCLS. and 556/1,28.CCLS. and 423/445B.CCLS. and (trimetallic or metallofullerene\$1)