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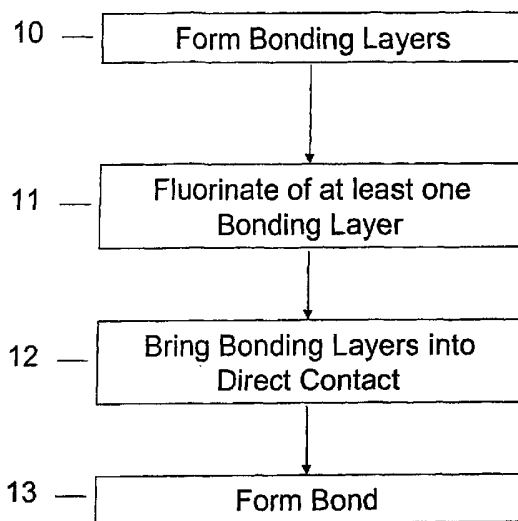
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(54) Title: METHOD OF ROOM TEMPERATURE COVALENT BONDING



(57) Abstract: A method of bonding includes using a bonding layer having a fluorinated oxide. Fluorine may be introduced into the bonding layer by exposure to a fluorine-containing solution, vapor or gas or by implantation. The bonding layer may also be formed using a method where fluorine is introduced into the layer during its formation. The surface of the bonding layer is terminated with a desired species, preferably an NH₂ species. This may be accomplished by exposing the bonding layer to an NH₄OH solution. High bonding strength is obtained at room temperature. The method may also include bonding two bonding layers together and creating a fluorine distribution having a peak in the vicinity of the interface between the bonding layers. One of the bonding layers may include two oxide layers formed on each other. The fluorine concentration may also have a second peak at the interface between the two oxide layers.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/13306

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : H01L 21/30,29/04 US CL : 438/455; 257/49 According to International Patent Classification (IPC) or to both national classification and IPC</p>													
<p>B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 438/455; 257/49 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST</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>X</td> <td>WO 01/61743 A1(Tong) 23 August 2001 (23.08.2001), page 3, line 8 through page 5, line 25, page 11, line 26 through page 12, line 30, figure 8.</td> <td>1-11, 13-48</td> </tr> <tr> <td>A</td> <td>US 6,080,487 (Coggio et al.) 21 June 2000 (27.06.2000)</td> <td>1-48</td> </tr> <tr> <td>A</td> <td>US 6,440,878 (Yang et al.) 27 August 2002 (27.08.2002)</td> <td>1-48</td> </tr> </tbody> </table>		Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	WO 01/61743 A1(Tong) 23 August 2001 (23.08.2001), page 3, line 8 through page 5, line 25, page 11, line 26 through page 12, line 30, figure 8.	1-11, 13-48	A	US 6,080,487 (Coggio et al.) 21 June 2000 (27.06.2000)	1-48	A	US 6,440,878 (Yang et al.) 27 August 2002 (27.08.2002)	1-48
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<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent published on or after the international filing date</td> <td>"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</td> </tr> <tr> <td>"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)</td> <td>"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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</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>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 <i>David Nelms</i> David Nelms Telephone No. 571-272-1797</p>												