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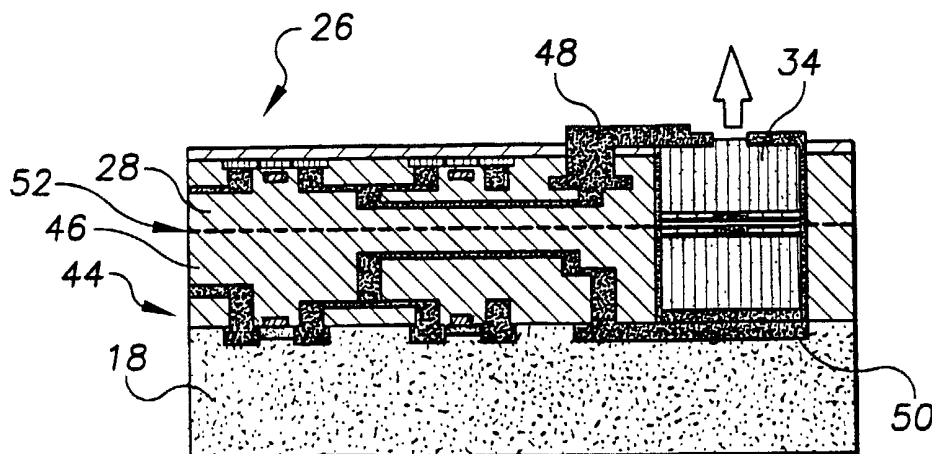
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21/20, 21/762, 21/8258
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- (71) Applicant: MASSACHUSETTS INSTITUTE OF TECHNOLOGY [US/US]; 77 Massachusetts Avenue, Cambridge, MA 02139 (US). (88) Date of publication of the international search report:
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- (72) Inventors: FONSTAD, Clifton, G., Jr.; 61 Brantwood Road, Arlington, MA 02476 (US). LONDON, Joanna, M.; 13603 Marina Point Dr., Apt. B416, Marina Del Rey, CA 90292 (US).
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SILICON ON III-V SEMICONDUCTOR BONDING FOR MONOLITHIC OPTOELECTRONIC INTEGRATION



(57) Abstract: In a method for bonding a silicon substrate to a III-V material substrate, a silicon substrate is contacted together with a III-V material substrate and the contacted substrates are annealed at a first temperature that is above ambient temperature, e.g. at a temperature of between about 150 °C and about 350 °C. The silicon substrate is then thinned. This bonding process enables the fabrication of thick, strain-sensitive and defect-sensitive optoelectronic devices on the optimum substrate for such, namely, a thick III-V material substrate, while enabling the fabrication of silicon electronic devices in a thin silicon layer, resulting from the thinned Si substrate, that is sufficient for such fabrication but which has been thinned to eliminate thermally-induced stress in both the Si and III-V materials. The III-V material substrate thickness thereby provides the physical strength of the composite substrate structure, while the thinned silicon substrate minimizes stress in the composite structure.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L21/18 H01L21/20 H01L21/762 H01L21/8258

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 7 H01L

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 346 848 A (GRUPEN-SHEMANSKY MELISSA E ET AL) 13 September 1994 (1994-09-13) abstract; claims; figures column 1, line 66 -column 2, line 58	1,2,11, 13,14, 24,27
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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