Hybrid III-V/Silicon laser based on DVS-BCB die-to-wafer bonding

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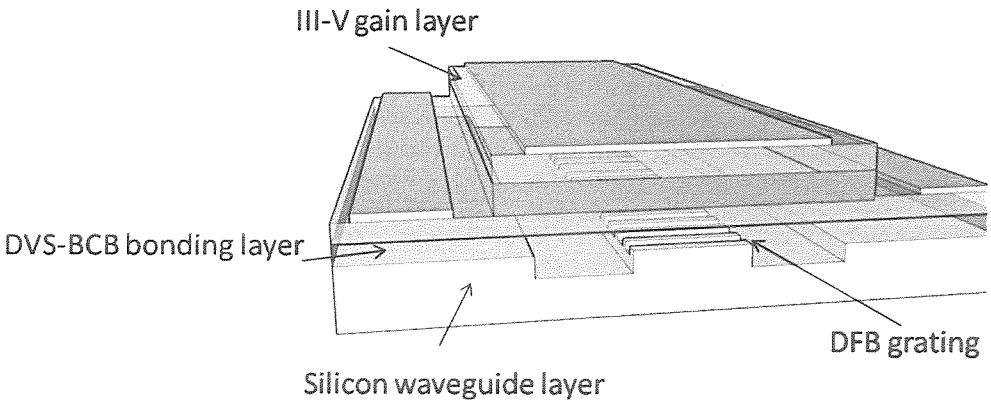
***Abstract**: Recently reported state-of-the-art hybrid III-V/Silicon laser diodes are fabricated using molecular die-to-wafer bonding, which imposes strict requirements regarding the smoothness, cleanliness and quality of the III-V surface to be bonded. By the use of an adhesive DVS-BCB intermediate layer to bond the III-V dies on top of the SOI waveguide circuits, these surface quality requirements become far less strict, providing a possibility for a fabrication procedure that can be suitable for the industrial-scale production. The aim of this work is to demonstrate a continuous wave hybrid III-V/Silicon Fabry-Perot laser diode capable of operating at elevated temperatures. Also, the additional objective of this work is to develop a multiple die-to-wafer bonding procedure, suitable for large scale industrial production, and to assess its robustness with respect to the laser parameters (threshold current, external efficiency, thermal behavior). In the end, it is our aim to design and fabricate a distributed feedback laser diode (DFB) based on the developed DVS-BCB bonding procedure in order to demonstrate suitability of this technique in the realization of an array of single wavelength lasers.*



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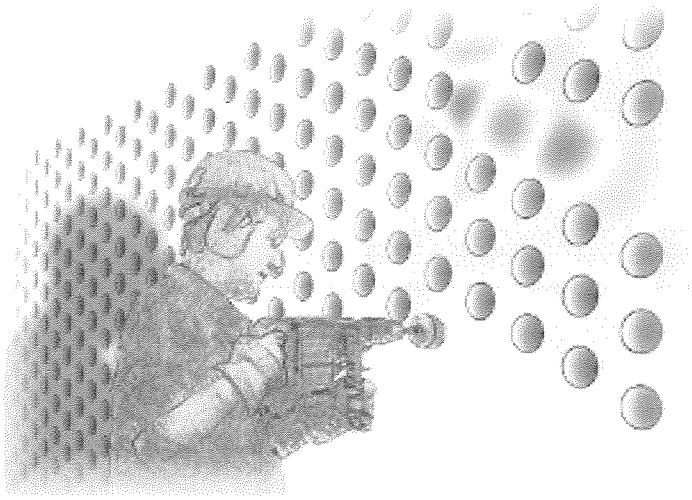

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