

## InGaAsSb/GaSb lasers and photodetectors integrated on a silicon-on-insulator waveguide circuit for spectroscopic applications

N. Hattasan<sup>1</sup>, A. Gassenq<sup>1</sup>, L. Cerutti<sup>2</sup>, J.B. Rodriguez<sup>2</sup>, E. Tournié<sup>2</sup>,  
G. Roelkens<sup>1</sup>

<sup>1</sup>Photonics Research Group-UGent/imec, Sint-Pietersnieuwstraat 41, 9000 Gent, Belgium

<sup>2</sup>Université Montpellier 2 – CNRS, UMR 5214, Place Bataillon, 34095 Montpellier, France

Email: nannicha.hattasan@intec.ugent.be

Spectroscopy is one of the most efficient techniques for the analysis of solid, liquid or gaseous samples, especially in the shortwave infrared region where water absorption is low. While conventional, bulky systems with expensive sources and detectors offer high-accuracy measurement results, compact and low-power systems are very attractive for many applications including portable gas sensors and implantable medical devices.

Silicon-On-Insulator (SOI) provides a platform for the realization of compact optical waveguide circuits with mass production capability by exploiting existing CMOS fabrication technologies. This results in low-cost integrated optical circuits. On the other hand, GaSb excels as an active component platform in the shortwave infrared wavelength range. It provides very efficient and room temperature operation lasers and detectors, making it ideal for spectroscopy [1]. Combining SOI and GaSb opto-electronic components would thus yield a compact, efficient spectroscopic detection system.

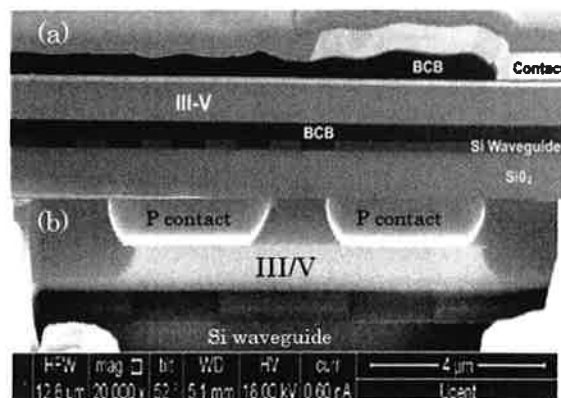


Fig. 1 SEM image of the realized components  
a) grating-assisted coupling, b) evanescent coupling



Wrocław University of Technology

Institute of Physics

Centre for Advanced Materials and Nanotechnology

Nanosystems and  
Technologies  
GmbH

**nanoplus**

Julius-Maximilians-

**UNIVERSITÄT  
WÜRZBURG**

International workshop on opportunities and challenges  
in mid-infrared laser-based gas sensing

**mirsens2**



OCTOBER 18-20 2012

Institute of Physics

Wrocław University of Technology

**Book of Abstracts**

[www.senshy.eu/mirsens2](http://www.senshy.eu/mirsens2)