A Hybrid Silicon Laser-Quantum Well Intermixing Wafer Bonded Integration Platform

Tech ID: 27644 / UC Case 2007-591-0

BRIEF DESCRIPTION

An approach for integrating InP-based photonic devices together with low loss silicon photonics and complementary metal-oxide-semiconductor (CMOS) electronics.

BACKGROUND

The integration of grating sections, optical gain regions, amplifiers, and photodetectors with electroabsorption gives rise to a variety of photonic integrated circuits such as tunable lasers, wavelength converters, pre-amplified photodectectors, and more. However, previous attempts at combining external modulation with silicon photonics have required time-consuming processes and/or multiple growth steps that result in higher product costs and poor device yield.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed an approach for integrating InP-based photonic devices together with low loss silicon photonics and complementary metal-oxide-semiconductor (CMOS) electronics. This method requires only standard lithography techniques and requires no discrete laser placement or metal-organic chemical vapor deposition (MOCVD), allowing for quicker fabrication with higher device yield.

ADVANTAGES

- Enables a wide range of InP-based functionalities to be performed on silicon on insulator (SOI)-based platforms
- Requires no discrete laser placement or MOCVD growth
- Quicker device fabrication
- Higher device yield

APPLICATIONS

- Modulators
- Tunable lasers
- Amplifiers
- Photodetectors

PATENT STATUS

Country	Type	Number	Dated	Case

CONTACT

Pasquale S. Ferrari

ferrari@tia.ucsb.edu

tel: .

INVENTORS

- Bowers, John E.
- Fang, Alexander W.
- Park, Hyundai
- Sysak, Matthew N.

OTHER INFORMATION

KEYWORDS

InP, Hybrid Silicon Laser-Quantum Well Intermixing, SL-QWI, Photonics, Electroabsorption modulators, Wafer-bonded integration platforms, Lasers, Photodetectors, Amplifiers, CMOS, indmicroelec

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Communications**
  - Other
- **Nanotechnology**
  - Electronics
- **Semiconductors**
  - Design and Fabrication
- **Sensors & Instrumentation**

United States Of America	Issued Patent	8,559,478	10/15/2013	2007-591	▶ Other

RELATED CASES

2007-591-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Bonding of Heterogeneous Material for Improved Yield and Performance of Photonic Integrated Circuits
- ▶ Epitaxial Laser Integration on Silicon Based Substrates
- ▶ Integrated Reconfigurable Circulator
- ▶ Magneto-Optic Modulator
- ▶ Quantum Dot Photonic Integrated Circuits
- ▶ Ring Resonator-Based Optical Isolator and Circulator
- ▶ Integrated Dielectric Waveguide and Semiconductor Layer
- ▶ Orthogonal Mode Laser Gyro
- ▶ Loss Modulated Silicon Evanescent Lasers
- ▶ Monolithically Integrated Laser-Nonlinear Photonic Devices
- ▶ Misfit Dislocation Free Quantum Dot Lasers

University of California, Santa Barbara
Office of Technology & Industry Alliances
342 Lagoon Road, ,Santa Barbara,CA 93106-2055 |
www.tia.ucsb.edu
Tel: 805-893-2073 | Fax: 805.893.5236 | padilla@tia.ucsb.edu