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Factsheet

Coordinator
Aristotle University of Thessaloniki

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Duration : 36 months

Consortium

Aristotle University of Thessaloniki (Coordinator) (GR)
Universite de Bourgogne (F)
Swiss Federal Institute of Technology in Zurich (CH)
AMO GmbH (DE)
ams AG (A)
Micram GmbH (DE)
Saarland University (DE)
Mellanox Technologies (IL)
Phoenix BV (N)
AIT Austrian Institute of Technology GmbH (A)

The EU Framework Programme for Research and Innovation

PLASMO

A generic CMOS-compatible platform for co-integrated plasmonic/photonic/electronic PICs towards volume manufacturing of low energy, small size and high performance photonic devices

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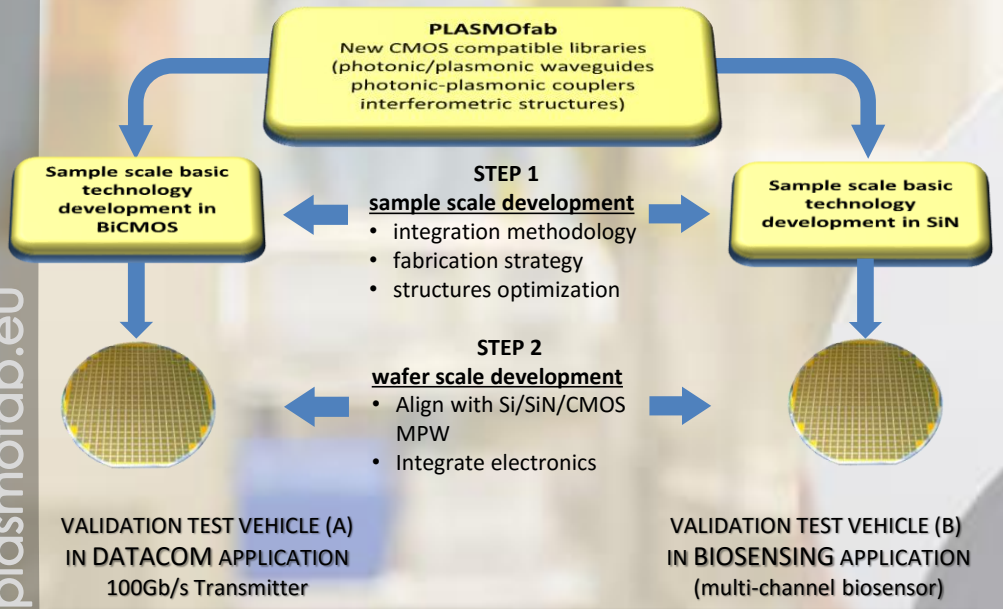
What is PLASMOFAB?

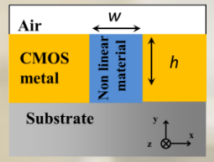
PLASMOFAB aims to develop CMOS compatible plasmonics in a generic planar integration process as the means to consolidate photonic and electronic integration. Wafer scale integration will be used by PLASMOfab to demonstrate low cost, volume manufacturing and high yield of powerful PICs. The new integration technology will unravel a series of innovations with profound benefits of enhanced high light-matter interaction enabled by plasmonics in optical transmitters and biosensors modules.



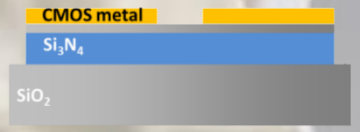
VALIDATION TEST VEHICLE (A)
IN DATACOM APPLICATION
100Gb/s Transmitter

VALIDATION TEST VEHICLE (B)
IN BIOSENSING APPLICATION
(multi-channel biosensor)

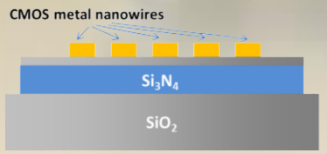
Plasmonic waveguides investigated in PLASMOFAB



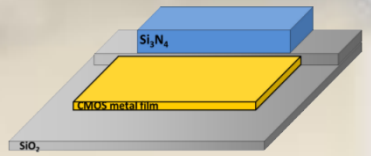
Plasmonic slot waveguide



Hybrid plasmonic/photonic slot waveguide



Hybrid plasmonic/photonic mutlislot waveguide



Thin-film waveguide

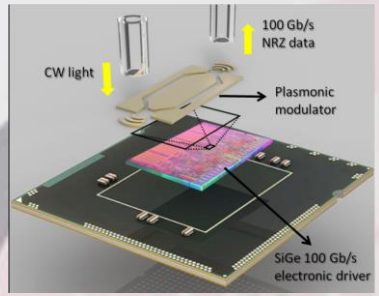
PLASMOFAB Overview

What are the Innovation challenges?

Full characterization of CMOS metals (Al, TiN, Cu) on Si, SiO2 and SiN platforms
Co-integration of CMOS-compatible metals with photonics
New CMOS-compatible planar plasmonic structures
Fully comply to CMOS fab processes (deposition temp, thickness, dimensions etc)
Blend plasmonics, photonics and microfluidics in the same platform

PLASMOFAB Demonstration Modules

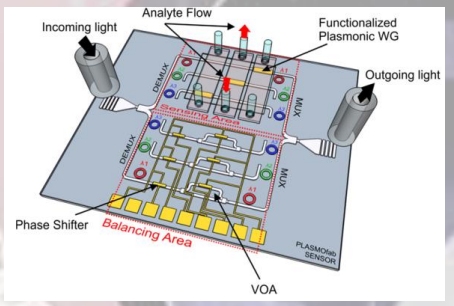
A low-power and low-insertion loss plasmonic modulator



BICMOS processes to develop and co-integrate the driver and the plasmonic modulator on a single chip

- ✓ Monolithic integration of opto-electro-plasmonic modulator
- ✓ 100 Gb/s SiGe electronic driver
- ✓ Optimized for differential NRZ modulation exceeding 100Gb/s (e.g. 112Gb/s)

An ultra-sensitive multichannel plasmonic sensor for lab-on-chip applications



Demonstrate concurrent detection of multiple inflammation biomarkers for early diagnosis and prognosis

- ✓ Ultra-sensitive multi-channel Si_3N_4-based molecular plasmonic-photonic biosensor on-chip
- ✓ Combination of sensing with high-speed surface functionalization techniques and microfluidics

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A Horizon 2020 Collaborative Project