

SILICON NITRIDE PHOTONIC INTEGRATED CIRCUIT PROTOTYPING AND SMALL VOLUME PRODUCTION

Harness the full potential of visible and near-infrared light on integrated circuits with imec's silicon nitride (SiN) photonics platform. The platform can be accessed for both photonic integrated circuit (PIC) prototyping and small volume production.

LOW-COST MPW AND DEDICATED MASK RUNS

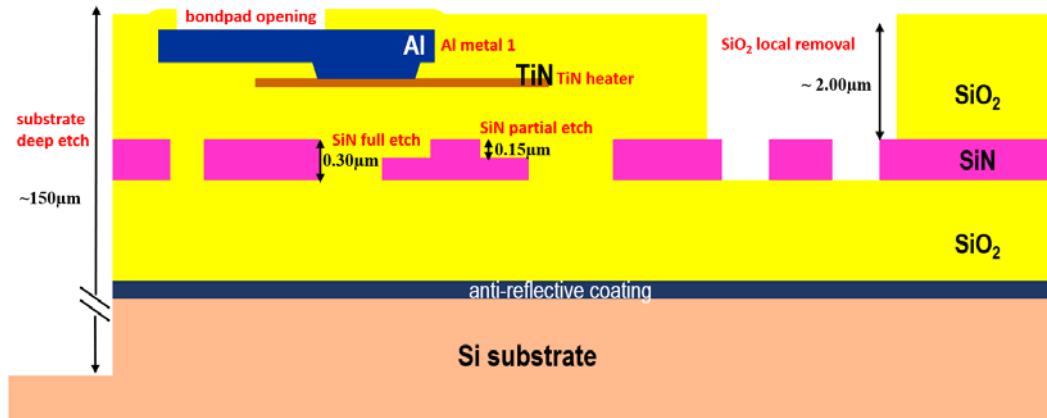
Based on 180nm process technology on 200mm wafers, imec's SiN photonics platform offers highly reproducible and CMOS compatible fabrication. Depending on the requirement, the platform is accessible through regularly scheduled low-cost multi-project-wafer (MPW) runs, which yield 20 – 40 dies, and dedicated mask runs, which yields 15 full wafers.

SILICON NITRIDE PHOTONICS TECHNOLOGY PLATFORM

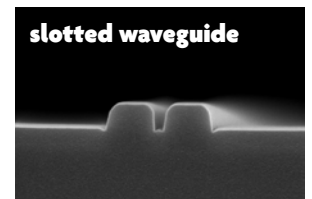
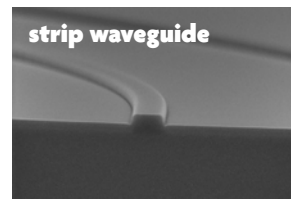
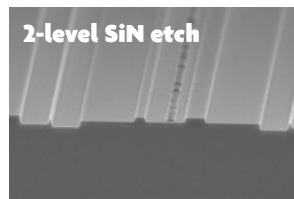
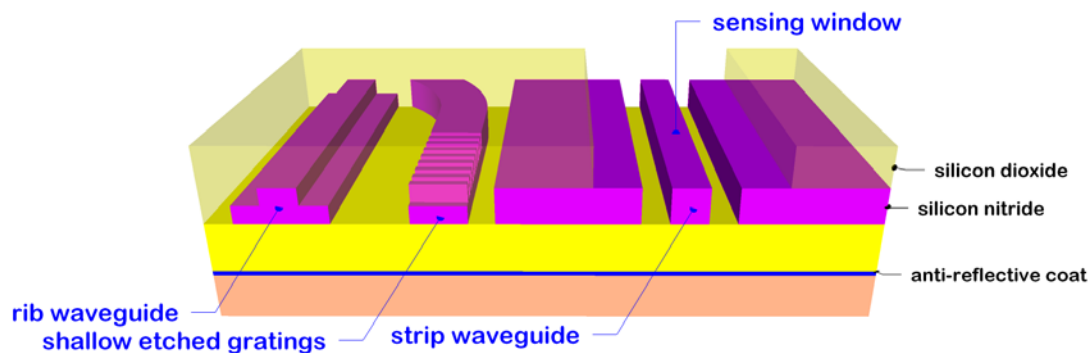
SiN, deposited through a low temperature PECVD method, forms the core waveguiding layer on which the photonics platform is based. The platform is optimized for the applications in the wavelength range covering the visible and near-infrared spectrum, such as on-chip implementation of tomography, microscopy, spectrometry, beam steering, point-of-care diagnostics, optical sensing, etc.

Modules	Description		Enabled devices
2 SiN thickness flavors	SiN waveguide layers in 2 stacks		2 flavors optimized for wavelengths 300 – 1000nm
	300nm (BioPIX300)	150nm (BioPIX150)	
2 SiN patterning steps each	2 etch depths for each flavor		strip/rib waveguides, shallow/deep gratings
	150 & 300 nm	90 & 150 nm	
Clad oxide removal	Exposure of waveguides for sensing by removing local clad SiO ₂		micro-channels for evanescent sensing
Metal heater	TiN metal lines for resistive heating		thermo-optic tuners/modulators
Metal interconnect	Al metal lines and pads for interconnects		interconnects, probe/bond pads
Deep trench	Deep trench to expose edge coupler facets		edge couplers

FULL MATERIAL STACK FOR BIOPIX300



WAVEGUIDE BASED DEVICES ON BIOPIX300



PROCESS DESIGN KIT & COMPONENT LIBRARY

The core SiN photonics platform (referred to as the BioPIX platform), has been validated through 6 MPW runs under EU project PIX4life – the European SiN photonics pilot line for life science applications in the visible range. As part of the project, a component library of basic building blocks has been designed and validated.

The library contains a large number of basic building block components to realize waveguide-based devices optimized for different wavelengths, including multiple waveguide geometries, grating couplers, multi-mode interferometers, and directional couplers.

The Process Design Kit (PDK) includes technology details, design and layout rules, and a library of building block components. The PDK for photonic circuit designing and layouts are available for the photonics design software of **Synopsys** and **Luceda Photonics**.

For the latest MPW schedule and pricing, please check Europractice-IC website.

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