

Synopsys and Photonics Industry Leaders Partner to Advance PIC Technology with Plasmonics

EU Project PLASMOfab Successfully Completed

MOUNTAIN VIEW, Calif., May 1, 2019 /PRNewswire/ -- [Synopsys, Inc.](#) (Nasdaq: SNPS) today announced that [PLASMOfab](#), a research project funded by the EU innovation program [Horizon 2020](#), has been successfully completed to enable mass manufacturing of high-performance plasmo-photonic components. Launched in 2016, the project has brought together leading industrial partners and top-ranked academic and research institutes in the photonic integrated circuit (PIC) and opto-electronics value chain, including Phoenix Software, now part of [Synopsys' Photonic Solutions](#).

The three-year research project has significantly advanced the state of the art in PICs and CMOS-compatible plasmonics for optical data communications and biosensing for point-of-care applications. PLASMOfab has developed CMOS-compatible plasmonics to consolidate advanced PICs with electronic ICs in volume manufacturing. The project focused on CMOS-compatible metals and photonic structures that are harmonically co-integrated with electronics using standardized CMOS processes. As part of project validation, the PIC platform was used along with advanced peripherals to develop predominant functional modules with unprecedented performance.

A key project achievement was the development of a groundbreaking ultra-compact plasmonic transmitter, which has a footprint of $90 \times 5.5 \mu\text{m}^2$ to transmit 0.8 TBit/s (800Gbit/s) through 4 individual 0.2 TBit/s transmitters. The project also demonstrated CMOS-compatible plasmonic waveguides with the lowest possible losses, as described in [Nature's Scientific Reports in September 2018](#).

"PLASMOfab's main goal has been to address the ever increasing needs for low energy, small size, high complexity and high performance mass manufactured PICs," said Nikos Pleros, assistant professor at the Aristotle University of Thessaloniki, Greece. "We have achieved this by developing a revolutionary yet CMOS-compatible fabrication platform for seamless co-integration of active plasmonics with photonic and electronic components."

As a result of the PLASMOfab research, two new companies have been launched to commercialize the new technologies:

- bialoom Ltd will further explore plasmo-photonic biosensors in multichannel and high-sensitivity point-of-care diagnostics by combining plasmonic sensors with integrated Si₃N₄ photonic functionalities, electrical controls, biofunctionalization techniques, and microfluidics.
- Polariton Technologies Ltd. specializes in new photonic and electronic technologies for the testing, sensing, and telecommunications market. Their energy efficient and low-footprint plasmonic modulator will convert microwave signals to optical signals.

"We expect that further development of CMOS-compatible plasmonic components with CMOS fabrication processes and photonics technologies will demonstrate plasmonics' clear advantages in PICs," said Dr. Dimitris Tsiokos, principal researcher at the Aristotle University of Thessaloniki. "When the best of all three worlds of plasmonics, photonics, and electronics converge in a single integration platform, PICs with unprecedented performance and functionality will be realized, targeting a diverse set of applications and industrial needs while meeting mass production requirements."

"We are pleased to have been working closely with the partners in this project and especially with AMO and ams to develop R&D PDKs for the new PLASMOfab integration technology," said Twan Korthorst, director of Synopsys' Photonic Solutions. "The PDKs are supported by our PIC design platform, which provides the industry's only full design flow from photonic device level to PIC to system levels."

About PLASMOfab

PLASMOfab was a three-year collaborative project on CMOS-compatible photonic, plasmonic and electronic integration that brought together ten leading academic and research institutes and companies including the Aristotle University of Thessaloniki (Coordinator) (Greece), ams (Austria), AMO (Germany), Phoenix Software, now part of Synopsys (Netherlands), ETHZ (Switzerland), Micram (Germany), University of Saarland (Germany), Austrian Institute of Technology (Austria), University of Burgundy (France) and Mellanox (Israel). The project was launched in January 2016 and it was funded by the European Union's Horizon 2020 ICT research and innovation programme under grant agreement No 688166. To learn more about the results of PLASMOfab visit <http://www.plasmofab.eu/>.

About Synopsys' Photonic Solutions

Synopsys is driving the PIC revolution with design automation solutions for a wide range of application requirements, from data communications to sensors and biomedical devices. Synopsys' PIC Design Suite, which comprises the OptSim™ Circuit and OptoDesigner tools, offers a seamless PIC design flow from concept to manufacturable design, as well as access to a single, world-class support channel. Learn more at <https://www.synopsys.com/photonic-solutions.html>.

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the Silicon to Software™ partner for innovative companies developing the electronic products and software applications we rely on every day. As the world's 15th largest software company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and is also growing its leadership in software security and quality solutions. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing applications that require the highest security and quality, Synopsys has the solutions needed to deliver innovative, high-quality, secure products. Learn more at www.synopsys.com.

Editorial Contact:

James Watts
Synopsys, Inc.
650-584-1625
jwatts@synopsys.com

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