



**SOI & ADVANCED SUBSTRATES NEWS**  
ACCELERATING INDUSTRY GROWTH | Bi-Weekly Newsletter

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**SEMI COMPOUND SEMICONDUCTORS UPDATE**

by Basak Ulutas Ozturkler and Kevin Nguyen

The SEMI Standards Compound Semiconductor Materials (CSM) Technical Committee has initiated new standards development activities across its 13 Task Forces. These activities aim to address key industry challenges and establish comprehensive standards for the compound semiconductor sector. Among the Task Forces, these are currently working on new standards listed below:

- GaN Task Force
- Silicon Carbide Substrate Task Force
- SiC Epi Defects Task Force
- Silicon Carbide Engineered Substrate Task Force

Download a [comprehensive list](#) of the current Compound Semiconductor Materials standards activities.

Join the [SEMI International Standards Program](#) or contact your [local SEMI Standards staff](#).

**FEATURED IN THIS EDITION**

**PROCESS CHALLENGES OF THE STRASS TECHNIQUE TO INCREASE THE ELECTRON MOBILITY IN ADVANCED FD-SOI NMOSFETS**

This paper focuses on the STRASS (Strained Silicon by Top Recrystallization of Amorphized SiGe on SOI) process for introducing tensile stress into the silicon channel of the next-generation n-type Fully Depleted Silicon-On-Insulator (FD-SOI) devices.

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**SUB-5 NM SILICON NANOPORE SENSORS: SCALABLE FABRICATION VIA SELF-LIMITING METAL-ASSISTED CHEMICAL ETCHING**

This study presented a previously unreported self-limiting effect that enables sub-5 nm nanopore formation from both 10 and 40 nm nanoparticles in the 12 nm thick monocrystalline device layer of a silicon-on-insulator (SOI) substrate.

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**SLOW-LIGHT ENHANCED SILICON PHOTONIC CRYSTAL PHASE TUNER ACTUATED BY ELECTROSTATIC COMB DRIVES**

This paper presents the design, fabrication, and experimental demonstration of a silicon photonic phase tuner that leverages slow-light effects in a suspended photonic crystal slot waveguide. The device is fabricated on a 140 nm silicon-on-insulator (SOI) process.

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**WIDELY TUNABLE PHOTONIC FILTER BASED ON EQUIVALENT CHIRPED FOUR-PHASE-SHIFTED SAMPLED BRAGG GRATINGS**

In this study, researchers designed and fabricated a tunable dual-passband photonic filter on a silicon-on-insulator (SOI) platform, enabling independent tuning of two passbands on a single grating waveguide.

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**SOI ECOSYSTEM NEWS**

**INFINEON OPTIMIZES AND DIVERSIFIES ITS MANUFACTURING FOOTPRINT WITH NEW BACKEND FAB IN THAILAND**

Infineon will support developing a robust semiconductor ecosystem in Thailand, centrally located in Southeast Asia, covering key components and materials in the supply chain. Through close collaboration with universities and local entrepreneurs, Infineon helps to grow a talent pool of highly skilled engineers with expertise in advanced semiconductors.

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**IQE AND QUINTESSENT PARTNER ON QUANTUM DOT FOR AI**

IQE has strengthened its partnership with Quintessent to establish the world's first large-scale quantum dot laser (QDL) and semiconductor optical amplifier (SOA) epitaxial wafer supply chain. This milestone is backed by an initial purchase order of \$0.5m for delivery of production wafers to Quintessent through 2025.

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**FABRICATION OF LOW-LOSS LITHIUM NIOBATE ON INSULATOR WAVEGUIDES ON THE WAFER SCALE**

Here reports on the wafer scale fabrication of single-mode low-loss lithium niobate on insulator waveguides utilizing a chemically amplified resist and an optimized dry etching method. This work holds promise for advancing integrated photonics and optical communication technologies.

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**ENHANCEMENT OF THE THERMO-OPTIC PHASE MODULATION EFFICIENCY IN SILICON NITRIDE WAVEGUIDES BY INCORPORATING AN EMBEDDED STRIP WITHIN A PLANAR POLYMER WAVEGUIDE**

This study proposed a novel approach to enhance the thermo-optic (TO) effect of silicon nitride (SiN) waveguides by incorporating polymer planar waveguides with superior TO properties. This method simplifies fabrication, requiring only a single stepper lithography process without precise alignment between layers.

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**COMPOUND SEMICONDUCTOR**

**GAN ADOPTION AT TIPPING POINT, SAYS INFINEON**

In its 2025 predictions, Infineon says GaN will be a game-changing material across consumer, mobility, residential solar, telecommunication, and AI data centre industries, enabling more efficient performance, smaller size, lighter weight, and lower overall cost.

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**EU TO INVEST €3M IN GESI QUANTUM PROJECT**

It is reported that the European Commission is investing in a groundbreaking quantum chip that will use Germanium-Silicon (GeSi) to combine light and electronics, promising faster, more efficient quantum computers.

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**CHINA'S FIRST DOMESTICALLY BUILT HIGH-VOLTAGE RADIATION-RESISTANT SILICON CARBIDE POWER DEVICE COMPLETES SPACE VALIDATION**

The SiC payload, jointly developed by the Institute of Microelectronics of the Chinese Academy of Sciences (CAS) and the Technology and Engineering Center for Space Utilization of the CAS, was launched aboard the Tianzhou-8 cargo spacecraft, beginning its in-orbit scientific experiment journey in the China Space Station.

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**HETEROGENEOUS INTEGRATION OF AMORPHOUS SILICON CARBIDE ON THIN FILM LITHIUM NIOBATE**

This recent research shows that amorphous silicon carbide (a-SiC), deposited using inductively coupled plasma enhanced chemical vapor deposition at low temperatures, can be conveniently integrated with LiNbO3 and processed to form high-performance photonics.

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**SEMI BLOG**

**DRIVING SEMICONDUCTOR INNOVATION: RAPHAEL HARDEGGER'S JOURNEY TO SUCCESS**

Starting his career in 2009 as a design engineer apprentice at VAT, Raphael has since gained diverse experience, including entrepreneurial ventures and a role in MedTech. Today, he focuses on shaping product strategy, aligning solutions with customer needs, and driving impactful advancements in the semiconductor industry.

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**SEMI NEWS HIGHLIGHT**

**SUNNY STALNAKER OF ASML TO RECEIVE SEMI SALES AND MARKETING EXCELLENCE AWARD**

As the 23rd recipient, Stalnakar will be honored for her role in facilitating the landmark 2012 extreme ultraviolet lithography (EUV) Customer Co-Investment Program between ASML, TSMC, Intel, and Samsung that funded the commercialization of the technology. The award will be presented during SEMICON Korea 2025, taking place February 19-21 at COEX in Seoul.

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**EVENTS**



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