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**ABDUL LATEEF,**  
CEO

 **Plasma-Therm**

PIONEERS IN WAFER-BASED  
**PLASMA PROCESSING EQUIPMENT**

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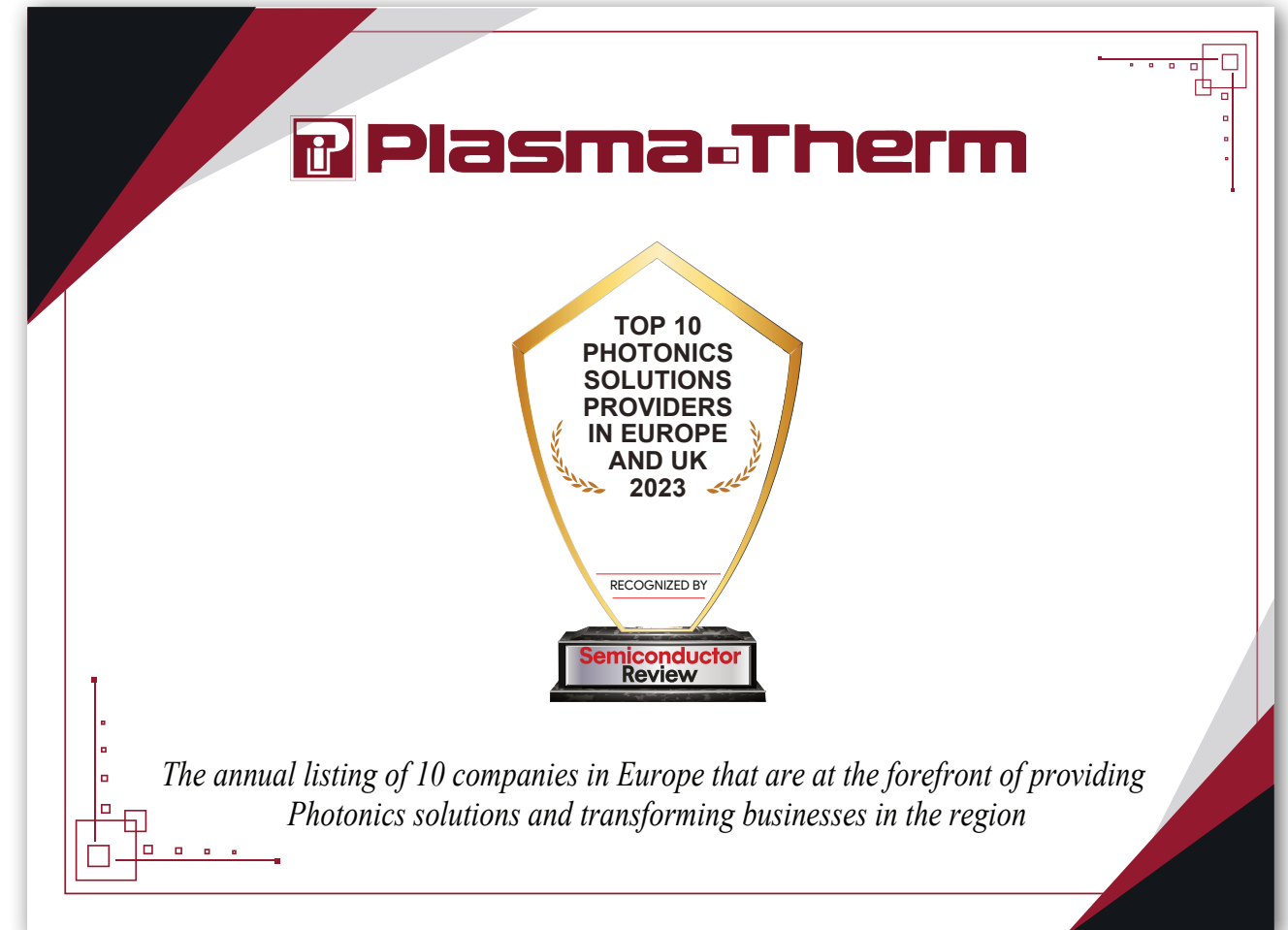


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## PIONEERS IN WAFER-BASED PLASMA PROCESSING EQUIPMENT

*By Richmond Smith*

**P**lasma processing plays a vital role in semiconductor manufacturing, especially in ultra-large-scale integrated fabrication, by providing precise control over the size, shape, and depth of features on silicon wafers. Advanced plasma processing equipment is a key component in the industry, and its continued development is essential for enabling the creation of the next generation of electronic devices.

Plasma-Therm® is an innovator in wafer-based plasma processing technology. A global manufacturer of advanced plasma processing front-end equipment, it has over five decades of operational experience and innovation excellence in the industry. Its state-of-the-art tools and processes support a large number of manufacturing needs in etching, deposition, rapid thermal processing, and plasma dicing technologies.



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CEO





The semiconductor, compound semiconductor, and nanotechnology industries can take advantage of its unrivaled expertise in developing solutions for the wireless, power device, MEMS, photonics, advanced packaging, and data storage markets. While many businesses have shifted their focus to other areas of semiconductor development, Plasma-Therm has consistently performed well in these smaller segments, developing a specialized customer base for itself across North America, Europe, and Asia-Pacific. It holds over 150 U.S. and foreign plasma processes and equipment invention patents.

“We are a leading supplier of plasma etch and deposition equipment, offering highly customized products that serve a broad spectrum of applications within a specific device

manufacturing environment,” states Abdul Lateef, CEO of Plasma-Therm.

### The Plasma-Therm Way of Excellence

Fueled by a passion for serving as a go-to equipment provider and service partner, Plasma-Therm stays flexible and adaptive in its operations to efficiently address clients’ varying manufacturing needs. It is also adept at embracing and leveraging technologies, giving it a wider understanding of the overall process integration schemes within the fab.

Besides its flexibility and innovation, material modernization is a focal point for Plasma-Therm. It works closely with R&D institutes to develop technology that effectively produces material suitable for etching and depositing. In recent years, the semiconductor industry's focus on geometric shrinking due to Moore's Law has been significant. However, geometry is not particularly dominant in many products, like an edge-emitting laser, where molecular beam epitaxy (MBE) determines performance, or in piezoelectric materials like lithium niobate. Using its expertise in material innovation, Plasma-Therm contributes to creating materials that ensure a device's optimal performance.

### Innovation and Flexibility Go Hand-in-Hand

Plasma-Therm’s products are primarily developed from two distinct perspectives; innovation and flexibility. One of the highlight technologies developed from the innovation perspective is the industry's first plasma dicing-on-tape solution, which is revolutionary in its approach. With a sizable portfolio of patents concerning plasma dicing-on-tape, the company is one of the market leaders in delivering this technology to the manufacturing industry.

As a novel approach to die separation, on-tape plasma-based die

singulation enables complete dicing of wafers of any thickness, particularly thin and ultra-thin wafers, even smaller than 10 microns, resulting in a high dye value per wafer on a routine basis. This technology is crucial for numerous companies, especially those in the power devices or photonics sector. Plasma-Therm's Singulator® platform is instrumental in reducing physical damage and offers market-leading systems for plasma dicing on tape. In addition, it accepts industry-standard dicing tapes and offers a choice between plastic or metal tape frames.

Another technology Plasma-Therm offers, from the innovation standpoint, is F.A.S.T.® or Fast Atomic Sequential Technology, which bridges the gap between atomic layer deposition (ALD) and plasma-enhanced chemical vapor deposition (PECVD). Deploying this technology, its KOBUS™ product line offers the best of both worlds by overcoming the drawbacks of ALD and



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PECVD. It is unconstrained by ALD's low deposition rate or PECVD's ineffective step coverage. At the crossroads of CVD and ALD deposition techniques, F.A.S.T.® proposes unique film properties, best-in-class solutions for thick and conformal layers, and ALD film performances at CVD speed.

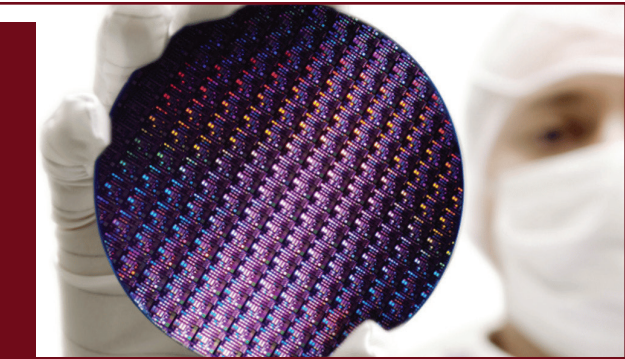
“Our plasma dicing-on-tape and F.A.S.T.® solutions are changing how we look at process technologies,” says Lateef.

In addition, Plasma-Therm designs products from a flexibility perspective, serving a wide range of silicon-related clients, including those using silicon carbide, lithium tantalate, or lithium iodate. It supports R&D and product markets with mass production offerings developed under the Plasma-Therm brand and R&D and low-volume production-focused offerings under the Corial® brand name.

Corial® brand products, including the Corial 200FA, Corial 200S, and Corial 200R, among others, offer high levels of adaptability, making them highly useful for pilot production and experimentation. Plasma-Therm’s product lines include additional technologies like plasma etching, dry release etching, and ion beam etching (IBE) in its VERSALINE® and Qazar product lines.

### An Innovator in Action

Plasma-Therm is known for its adaptability and tailoring its services according to customer demands. A prime example of this is its engagement with a client in the memory device industry. The client required an ion beam etching module to develop memory bits that are highly vulnerable to corrosion. Plasma-Therm's innovative technology effectively solved this problem. Immediately after ion beam etching, the memory bits were treated in a proprietary passivation chamber called high-density radical flux (HRDF) before passing through a PECVD chamber. In the PECVD chamber, a protective film was applied to the memory bits to safeguard them from corrosion before they left the system. This example highlights the innovative and highly versatile solutions Plasma-Therm offers to its clients.



A focus on customization and innovation gives Plasma-Therm a competitive advantage over its contemporaries. It also excels in customer service through its on-ground service teams and globally available on-call customer support. For the past 11 years, it has won the VLSI Award for being the top etching equipment supplier, which demonstrates its contribution to the industry on a global level.

Plasma-Therm strives to prolong its spirit of innovation by actively working on the atomic layer etching technology, which is expected to significantly impact the industry in the near future. In addition, its recent acquisition of OEM Group's dry process equipment business is a major step toward maintaining its leadership position in the plasma processing business. Due to this acquisition, Plasma-Therm has acquired all original OEM licenses and intellectual property rights for SFI Endeavor, AG Heatpulse, MRC Eclipse, and Tegal brand equipment.

Going above and beyond, Plasma-Therm has also redesigned the Heatpulse™ Rapid Thermal Processing (RTP) platform to meet the market demand for power devices, establish a new supply chain for faster time-to-market, and deliver improved system reliability and performance to customers.

“Innovation is a never-ending process at Plasma-Therm. Our innovation labs are always looking for new avenues of improvement, providing our customers with the latest and the best solutions to keep their business rolling,” says Lateef. 