Applied Materials Unveils Deposition and Selective Etch Systems to Advance 3D Chip Scaling

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- *New systems enable precision materials engineering in high-aspect-ratio 3D logic and memory chip structures*
- *Centris™ Spectral™ SiN ALD leverages innovative microwave plasma technology to deliver uniform silicon nitride deposition in challenging 3D structures*
- *Producer™ Selectra™ Mo Etch selectively removes molybdenum for wordline separation to enable 3D NAND scaling*
- *The new systems are being used by leading logic and memory chipmakers for advanced node manufacturing*

SANTA CLARA, Calif., June 15, 2026 (GLOBE NEWSWIRE) -- Applied Materials, Inc., the leader in materials engineering for the semiconductor industry, today introduced two new chipmaking systems designed to solve an emerging challenge in leading-edge semiconductor manufacturing: achieving precision processing in increasingly deep and narrow 3D structures. The new deposition and etch systems help chipmakers extend scaling in logic and memory to deliver higher performance, improved energy efficiency, and better manufacturing yield for next-generation AI chips.

The surge in AI compute is accelerating the industry's transition to advanced 3D device architectures, including gate-all-around (GAA) transistors and high-layer-count 3D NAND. As features become deeper and narrower in these vertical structures, conventional deposition and etch processes struggle to distribute materials uniformly from top to bottom, creating variability that can degrade electrical performance and reduce yield.

To help address this challenge, Applied is introducing Centris™ Spectral™ SiN ALD* and Producer™ Selectra™ Mo Etch. Together, they provi chipmakers with precise control over both dielectric film deposition and metal removal in high-aspect-ratio structures. The result is more uniform materials engineering at advanced nodes, enabling continued 3D scaling with better device performance, tighter process control and improved manufacturability across logic and memory applications.

"As the industry pushes the limits of AI computing, the biggest opportunities are increasingly found in materials engineering," said Dr. Prabu Raja, President of the Semiconductor Products Group at Applied Materials. "From transistor structures to memory stacks, chipmakers need new ways to precisely deposit and selectively remove materials in extremely complex 3D architectures. With our latest deposition and selective etch systems, we are delivering differentiated capabilities that help customers overcome critical scaling barriers and accelerate the next wave of innovation in logic and memory."

Centris Spectral SiN ALD Delivers Uniform Deposition in Challenging 3D Structures

Silicon nitride (SiN) is a foundational material for a variety of steps in the chipmaking process, including surface passivation, dielectric isolation and the creation of patterning spacers. These films must be deposited at low temperature to protect neighboring features, and they must be chemically robust to withstand aggressive downstream processing steps.

Conventional plasma-enhanced deposition is not able to uniformly treat the high-aspect-ratio structures in advanced 3D chip architectures, leading to poor-quality SiN films. Centris Spectral SiN ALD solves this issue with an innovative, high-density microwave plasma technology that deposits high-quality SiN within the tall, narrow structures – eliminating the tradeoff between plasma density and ion-induced damage seen in conventional approaches. The system enables dense, uniform SiN deposition at low temperatures, even in challenging 3D structures.

The system has multiple applications that enable continued scaling in both DRAM and logic devices. For example, in GAA transistors, the system can be used to form high-quality liners for transistor contacts that reduce resistance and capacitance at critical interfaces, enabling faster device performance.

Centris Spectral SiN ALD is the latest system based on Applied's new Spectral ALD platform, a series of ALD tools that feature state-of-the-art quad reactor design with precision chemical delivery, a variety of plasma and thermal processing capabilities, and specialized hardware for both temporal and spatial ALD operation – providing the ability to create a breadth of advanced films to power advanced AI chips.

The Spectral SiN ALD system is being adopted by leading chipmakers. An animation of the system's capabilities can be viewed here.

Producer Selectra Mo Etch Enables 3D NAND Scaling with Selective Metal Removal

As 3D NAND scales to higher layer counts, new metal integration steps are pushing conventional patterning methods beyond their limits. Low-resistance metals such as molybdenum (Mo) are being adopted for wordline metallization, which requires precise isolation between individual wordlines to prevent electrical shorts and reduce unwanted capacitance. Traditionally, wet etch has been used to separate wordlines, but in today's tall 3D stacks, liquid chemistries have trouble reaching the full depth of high-aspect-ratio features. This results in top-heavy etch profiles that limit device performance, yield and scalability.

Producer Selectra Mo Etch introduces a new capability for highly selective metal removal, enabling precise, uniform wordline separation across the full stack. Using engineered process control and advanced gas delivery, the system overcomes wet etch limitations to deliver superior top-to-bottom uniformity and tight profile precision in deep features.

By reducing cell-to-cell variability in the 3D NAND stack, the system helps lower leakage and improve data retention. Already validated in high-volume manufacturing, Selectra Mo Etch sets a new benchmark for selective metal etch and enables the transition away from legacy wet processes for

continued scaling of next-generation 3D NAND. The new system expands the Selectra portfolio beyond dielectric and silicon applications into advanced metal integration, with new opportunities across NAND, DRAM and foundry-logic.

New Systems To Be Featured at the 2026 VLSI Symposium

Applied is highlighting these innovations in conjunction with the 2026 IEEE Symposium on VLSI Technology & Circuits, where the industry is gathering to discuss advances shaping the future of AI-driven semiconductor innovation. During the conference, Applied is also hosting a panel discussion on June 16 examining how system architectures, logic and memory technologies, advanced packaging, and manufacturing must evolve and co-optimize to enable the next wave of AI-driven compute.

*ALD = Atomic Layer Deposition

About Applied Materials
Applied Materials, Inc. (Nasdaq: AMAT) is the leader in materials engineering solutions that are at the foundation of virtually every new semiconductor and advanced display in the world. The technology we create is essential to advancing AI and accelerating the commercialization of next-generation chips. At Applied, we push the boundaries of science and engineering to deliver material innovation that changes the world. Learn more at www.appliedmaterials.com.

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