Applied Materials Unveils Transistor and Wiring Innovations for Faster AI Chips

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- *New chipmaking systems boost the energy-efficient performance of Gate-All-Around transistors and wiring at 2nm and beyond*
- *Viva™ pure radical treatment smoothens GAA silicon nanosheets with atomic-level precision to increase transistor performance*
- *Sym3™ Z Magnum™ conductor etch system delivers angstrom-level 3D trench profile control to increase silicon nanoshee uniformity and performance*
- *Spectral™ atomic layer deposition system replaces today's tungsten transistor contacts with molybdenum, a new contact metal that lowers electrical resistance at the critical link between transistors and the copper wiring network*
- *The new systems are now being used by multiple leading foundry-logic manufacturers*

SANTA CLARA, Calif., Feb. 10, 2026 (GLOBE NEWSWIRE) -- Applied Materials, Inc., the leader in materials engineering for the semiconductor industry, today introduced new deposition, etch and materials modification systems that boost the performance of leading-edge logic chips at 2nm and beyond. The technologies supercharge AI compute through atomic-scale improvements to the most fundamental electronic building block – the transistor.

The transition to Gate-All-Around (GAA) transistors is a major industry inflection and a critical enabler of the energy-efficient computing needed to deliver more powerful AI chips. As 2nm-class GAA chips ramp to volume production this year, Applied is introducing new material innovations to enhance next-generation GAA transistors for angstrom nodes. The combined impact of the new chipmaking systems contributes a significant portion of the total energy-efficient performance gains of GAA process node transitions.

"The rapid progress of AI is pushing compute performance to the limit, and breakthroughs in computing begin with the transistor," said Dr. Prabu Raja, President of the Semiconductor Products Group at Applied Materials. "To keep pace in the angstrom era, Applied is delivering materials engineering breakthroughs that improve energy-efficient compute. Together, these new systems extend Applied's longstanding leadership in driving major transistor and wiring inflections, while helping customers accelerate their chip roadmaps to keep up with the blistering pace of AI."

New Viva™ Radical Treatment System Enables Precision Engineering of GAA Transistor Nanosheets

At the heart of GAA transistors are horizontal stacks of current-carrying "nanosheets." Made of ultra-thin silicon just a few nanometers wide, the physical features of these nanosheets must be exceptionally well defined to ensure that each one acts as an efficient conducting path for charge carriers. Of crucial importance is the surface condition of these nanosheets, as even atomic-scale roughness or contamination can significantly impact their electrical properties and, ultimately, the overall chip performance. A pristine, highly uniform nanosheet surface dramatically enhances the channel's electron mobility, which plays a central role in determining how fast transistors can switch on and off, resulting in faster, more energy-efficient transistors engineered to meet the demands of next-generation AI chips.

The Applied Producer™ Viva™ radical treatment system delivers angstrom-level precision engineering of these nanosheet surfaces. At the core of Viva is a patented delivery architecture that generates ultra-pure radical species. The technique combines Applied's remote plasma source with other hardware innovations to filter out high-energy charged ions that can damage the surface structure. The concentrated neutral radicals create a more gentle, damage-free treatment environment, enabling uniform surface treatments in deeply buried transistor structures.

The Viva system is being adopted by leading logic chipmakers for advanced channel engineering at 2nm and beyond process nodes.

The new Viva system has additional applications across both logic and memory. When combined with the Applied Producer Pyra™ thermal annealing process, the supplemental radical treatment further reduces the resistance of conducting copper wires, promising to extend the use of copper in the lower metal layers of the most advanced nodes.

New Sym3™ Z Magnum™ Etch System Creates Angstrom-Level 3D Trenches with Enhanced Plasma Control

The vertical 3D architecture of GAA transistors requires chipmakers to carve deep, narrow trenches with exceptional precision. These features must maintain uniform depth, straight sidewalls, and flat, rectangular bottoms, since even small variations can impact transistor speed, power efficiency and overall performance. As nodes shrink, this precision has made advanced plasma etch indispensable.

Today Applied is introducing the Centris™ Sym3™ Z Magnum™ etch system, the newest member of the Sym3 Z family. The Sym3 Z platform brought pulsed voltage technology (PVT) into high-volume production, using microsecond-scale ion control to create the high-aspect-ratio features in GAA transistors. It has achieved broad adoption, with tool-of-record status in 2nm logic manufacturing and more than 250 chambers in the field.

To extend scaling, Sym3 Z Magnum debuts a breakthrough second-generation pulsed voltage technology (PVT2). PVT2 not only eliminates the traditional tradeoff between ion directionality and near-wafer plasma control, it also enables independent ion-angle and ion-energy tuning. These capabilities deliver far more defined ion trajectories directly to the wafer surface. By pairing PVT2 with the system's new source technology, Sym3 Z Magnum produces clean, precise trenches that enable uniform nanosheets, faster switching, and higher-quality epitaxy – boosting transistor speed

and overall chip performance.

Beyond angstrom-class logic, Sym3 Z Magnum advances DRAM and high-bandwidth memory (HBM) technologies by delivering the precise profiles needed for denser arrays and taller stacks. Its broad applications drive rapid adoption among leading chipmakers and strengthen Applied's leadership in advanced etch.

New Spectral™ ALD System Lowers Contact Resistance with Selective Deposition of Molybdenum

Delivering more powerful AI requires innovation beyond the transistor device. As scaling continues below 2nm, the tiny metal contacts that link each transistor to the wiring network become ever thinner, contributing significantly to the chip's total resistance and creating a bottleneck to performance and energy efficiency. At these nanoscale dimensions, traditional tungsten contacts face challenges in their ability to efficiently conduct electrons. Molybdenum – a metal that can be made thinner while preserving efficient electron flow – has emerged as a promising alternative for next-generation contacts at angstrom nodes.

The Applied Centris™ Spectral™ Molybdenum ALD* system selectively deposits monocrystalline molybdenum, reducing critical contact resistance by as much as 15 percent beyond today's industry benchmark – the Applied Endura™ Volta™ Selective Tungsten system. Since these contacts form the smallest connections between interconnects and transistors, maintaining low resistance is critical to ensure maximum chip performance and energy efficiency.

Spectral represents a new 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 system is being adopted by leading logic chipmakers at 2nm and below process nodes. An animation of the system's capabilities can be viewed here.

A media kit with additional information on the Viva, Sym3 Z and Spectral systems is available on the Applied Materials website.

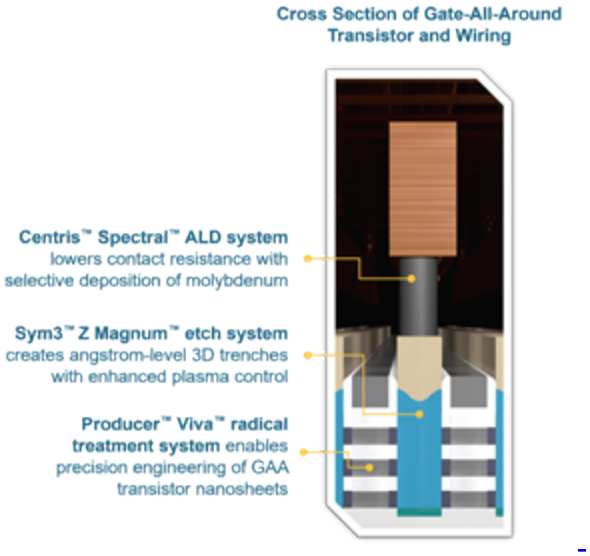
*ALD = Atomic Layer Deposition

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.

Contact:
Ricky Gradwohl (Media) 408.235.4676
Mike Sullivan (Financial Community) 408.986.7977

A photo accompanying this announcement is available at https://www.globenewswire.com/NewsRoom/AttachmentNg/50ebed0d-d115-420d-a789-f7f1d4261cdd

Cross Section of Gate-All-Around Transistor and Wiring



Applied Materials introduced three new chipmaking systems that boost the energy-efficient performance of leading-edge logic chips. The technologies supercharge AI compute through atomic-scale improvements to Gate-All-Around transistors and wiring for angstrom nodes.

Source: Applied Materials, Inc.