



## Applied Materials Breakthrough Accelerates Chip Performance in the Big Data and AI Era

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- *First metal change to transistor contact and interconnect in 20 years removes major performance bottleneck at the 7nm foundry node and beyond*
- *Chip designers can now replace tungsten and copper with cobalt to increase performance by up to 15%*
- *Applied's unique Integrated Materials Solution combines dry clean, PVD, ALD and CVD on the Endura<sup>®</sup> platform, enabling customers to speed the adoption of cobalt*

SANTA CLARA, Calif., June 05, 2018 (GLOBE NEWSWIRE) -- Applied Materials, Inc. today announced a breakthrough in materials engineering that accelerates chip performance in the big data and AI era.

In the past, classic Moore's Law scaling of a small number of easy-to-integrate materials simultaneously improved chip performance, power and area/cost (PPAC). Today, materials such as tungsten and copper are no longer scalable beyond the 10nm foundry node because their electrical performance has reached physical limits for transistor contacts and local interconnects. This has created a major bottleneck in achieving the full performance potential of FinFET transistors. Cobalt removes this bottleneck but also requires a change in process system strategy. As the industry scales structures to extreme dimensions, the materials behave differently and must be systematically engineered at the atomic scale, often under vacuum.

To enable the use of cobalt as a new conducting material in the transistor contact and interconnect, Applied has combined several materials engineering steps – pre-clean, PVD, ALD and CVD – on the Endura<sup>®</sup> platform. Moreover, Applied has defined an [integrated cobalt suite](#) that includes anneal on the Producer<sup>®</sup> platform, planarization on the Reflexion<sup>®</sup> LK Prime CMP platform and e-beam inspection on the PROVision<sup>™</sup> platform. Customers can use this proven, Integrated Materials Solution to speed time-to-market and increase chip performance at the 7nm foundry node and beyond.

"Five years ago, Applied anticipated an inflection in the transistor contact and interconnect, and we began developing an alternative materials solution that could take us beyond the 10nm node," said Dr. Prabu Raja, senior vice president of Applied's Semiconductor Products Group. "Applied brought together its experts in chemistry, physics, engineering and data science to explore the broad portfolio of Applied's technologies and create a breakthrough Integrated Materials Solution for the industry. As we enter the big data and AI era, there will be more of these inflections, and we are excited to be having earlier and deeper collaborations with our customers to accelerate their roadmaps and enable devices we never dreamed possible."

While challenging to integrate, cobalt brings significant benefits to chips and chip making: lower resistance and variability at small dimensions; improved gapfill at very fine dimensions; and improved reliability. Applied's integrated cobalt suite is now shipping to foundry/logic customers worldwide.

Applied Materials, Inc. (Nasdaq:AMAT) is the leader in materials engineering solutions used to produce virtually every new chip and advanced display in the world. Our expertise in modifying materials at atomic levels and on an industrial scale enables customers to transform possibilities into reality. At Applied Materials, our innovations make possible the technology shaping the future. Learn more at [www.appliedmaterials.com](http://www.appliedmaterials.com).

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