Applied Materials Introduces Innovations for Building Faster DRAM Chips

July 6, 2011

- **Increasing DRAM speed to match microprocessor performance is a key challenge in 20nm era**
- **New transistor fabrication technologies help overcome "memory wall" to speed data access**

SANTA CLARA, Calif., July 6, 2011 - Applied Materials, Inc. today announced a trio of new systems designed to boost performance in the next generations of DRAM chips. These innovative systems, which overcome key challenges in fabricating the transistor and contact areas of memory chips, include: the **Applied Centura® DPN HD™** system to improve the gate insulator scaling; the **Applied Endura® HAR Cobalt PVD** system for high aspect ratio contact structures; and the **Applied Endura® Versa™ XLR W PVD** system for reduced gate stack resistance.

"New DRAM manufacturing technology is essential to helping chipmakers unleash the full potential of today's high performance mobile computing devices while reducing power consumption," said Dr. Randhir Thakur, executive vice president and general manager of the Silicon Systems Group at Applied Materials. "These systems build on Applied's leadership in gate plasma nitridation and PVD metallization technologies to enable our customers to deliver faster, lower-power memory performance."

While microprocessor speed has increased significantly over the years, DRAM chips have not kept pace - resulting in a critical performance gap. To overcome this "memory wall," the speed of the control circuitry that transfers data between the memory cell array and external data bus must be increased. DRAM chipmakers are addressing this challenge by adapting key transistor technologies from advanced logic devices to increase transistor density and make room for faster, more sophisticated, control circuitry.

"Our unmatched portfolio of transistor and contact technologies enables us to offer our customers a multifaceted approach that addresses key challenges in the DRAM manufacturing process," said Steve Ghanayem, general manager of the Front End and Metal Deposition division at Applied Materials.

The Applied Centura DPN HD system is designed to boost transistor performance by incorporating nitrogen atoms into the gate insulator to improve its electrical characteristics. The new high-dose (HD) technique builds on Applied's pioneering decoupled plasma nitridation (DPN) technology, widely used in manufacturing advanced logic and memory devices, to help chipmakers to shrink transistor dimensions while maintaining optimum transistor performance.

By replacing traditional titanium with lower-resistivity cobalt for transistor contact metallization, the new Applied Endura Cobalt PVD system offers a production-proven method to boost switching speed and lower power consumption. The system leverages Applied's decade of experience in cobalt physical vapor deposition (PVD) to deposit uniform films in high-aspect-ratio contact structures with 50% lower contact resistance than titanium.

The Applied Endura Versa XLR W PVD system extends Applied's industry-standard tungsten PVD technology to deliver up to a 20% reduction in gate stack resistivity, enabling a significant improvement in switching speed, a key requirement for gate scaling. In addition, the new system's optimized reactor design significantly improves the lifetime of critical consumable components, enabling 10% lower cost-per-wafer.

For more technical information on Applied Materials' new technologies for advanced DRAM manufacturing, visit www.becauseinnovationmatters.com.

Applied Materials, Inc. (Nasdaq: AMAT) is the global leader in providing innovative equipment, services and software to enable the manufacture of advanced semiconductor, flat panel display and solar photovoltaic products. Our technologies help make innovations like smartphones, flat screen TVs and solar panels more affordable and accessible to consumers and businesses around the world. At Applied Materials, we turn today's innovations into the industries of tomorrow. Learn more at www.appliedmaterials.com.

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Contact:
Connie Duncan (editorial/media) 408.563.6209
Michael Sullivan (financial community) 408.986.7977

The Applied Endura PVD Platform
The Applied Centura DPN HD plasma nitridation system