Applied Materials Unveils Breakthrough E-Beam Metrology Tool for FinFET Transistors and 3D NAND Devices

February 23, 2015

- *New VeritySEM® 5i is the industry's first in-line 3D CD SEM metrology system for volume production of advanced 3D devices*
- *Proprietary electron-filtering technology for high-aspect-ratio imaging, coupled with high resolution and tilted electron beam enable in-line 3D metrology*

SANTA CLARA, Calif., February 23, 2015 - At the SPIE* Advanced Lithography conference in San Jose, Calif., Applied Materials, Inc., today announced the industry's first in-line 3D CD SEM* metrology tool for solving the challenges of measuring the high aspect ratio and complex features of 3D NAND and FinFET devices. The new Applied VeritySEM® 5i system offers state-of-the-art high-resolution imaging and backscattered electron (BSE) technology that enable exceptional CD control in-line. Using the VeritySEM 5i system can speed up chipmakers' process development and production ramp, and improve device performance and yield in high-volume production.

"Complex 3D structures require new measurement dimensions, increasing the demands placed on metrology technologies," said Itai Rosenfeld, corporate vice president and general manager of Applied's Process Diagnostics and Control group. "Continuing to rely on traditional CD SEM techniques to measure 3D devices is virtually impossible. Offering imaging innovations based on Applied's expertise in advanced e-beam technology and image processing for fast, accurate on-device CD SEM metrology, allows our customers to see, measure and control their 3D device during R&D, ramp and volume production. Multiple customers using the tool are already benefiting from better yields with these new 3D devices. This system should continue to set the benchmark for the industry as chipmakers require new precision materials engineering capabilities to transition to 3D architectures and scale beyond the 10nm node."

Innovations in metrology precision are needed to improve device performance, reduce variability and boost yields of increasingly intricate high-performance, high-density 3D devices. An advanced high-resolution SEM column, tilted beam and BSE imaging give the VeritySEM 5i system its unique 3D metrology capability to measure and monitor the most vital and challenging FinFET and 3D NAND structures in-line. Specifically, BSE imaging for via-in-trench bottom CD enables chipmakers to ensure connectivity between underlying and overlaying metal layers. For controlling FinFET sidewall, as well as gate and fin height, where the smallest variation impacts device performance and yield, the VeritySEM 5i tool's tilt-beam provides exact, repeatable in-line measurements. High-resolution BSE imaging enables continued vertical scaling through enhanced sensitivity for measuring the asymmetrical sidewall and bottom CDs of 3D NAND devices with very high aspect ratios reaching up to 60:1 and beyond.

Applied Materials, Inc. (Nasdaq:AMAT) is the global leader in precision materials engineering solutions for the semiconductor, flat panel display and solar photovoltaic industries. Our technologies help make innovations like smartphones, flat screen TVs and solar panels more affordable and accessible to consumers and businesses around the world. Learn more at www.appliedmaterials.com.

*SPIE = International Society for Optics and Photonics; CD SEM = critical dimension scanning electron microscope

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PHOTO: Applied Materials VeritySEM® 5i system

HUG#1896291