



Applied Materials Develops Advanced Patterning Solution for Memory Devices

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- *Unique Saphira(TM) APF(TM) CVD hardmask process enables advanced memory devices*
- *OMNIS(TM) Asher system from PSK removes Saphira APF hardmask while preserving high aspect ratio features*
- *The combined systems provide an efficient, readily integrated, comprehensive solution*

SANTA CLARA, Calif., Nov. 10, 2014 - Applied Materials, Inc. today announced it collaborated with Samsung Electronics Co., Ltd. and PSK Inc., a Korea-based leader in photoresist removal, to develop an advanced patterning solution for the manufacture of future generations of NAND and DRAM device designs. The new solution, available now, consists of the unique Saphira(TM) APF* hardmask deposited on the industry-leading [Applied Producer® XP Precision\(TM\) CVD*](#) system, and the Saphira removal process supported on the PSK OMNIS(TM) Asher tool. This comprehensive solution represents a breakthrough in precision materials engineering for complex patterning applications.

"This collaboration allows us to demonstrate and enhance the Saphira film's deposition qualities and removal process," said Dr. Mukund Srinivasan, vice president and general manager of the Dielectric Systems and Modules Group at Applied Materials. "A new superior class of hardmask films, such as the Saphira APF, is needed as the extendibility of traditional films to support high aspect ratio patterning is a major barrier to NAND and DRAM scaling. Teaming with industry experts on this new hardmask solution gives Applied a strong advantage to set the pace for advanced memory manufacturing."

"We are very pleased to work with Applied Materials on developing a highly productive, enabling technology that helps solve tomorrow's patterning challenges," said JJ Lee, SVP and chief marketing officer of PSK. "With the unprecedented complexities in patterning future device designs, we believe it is through cooperative efforts that the industry can achieve novel solutions to meet customer requirements. The combination of systems from Applied and PSK provide the industry with an efficient, readily integrated, comprehensive solution."

The Saphira APF deposition and PSK OMNIS Asher systems resolve major issues to improve patterning of more complex device structures at advanced technology nodes. For emerging high aspect ratio and dense patterning requirements, the Saphira APF process introduces new film properties that include greater selectivity and transparency. The high-productivity PSK OMNIS Asher system is capable of completely removing the Saphira hardmask layer while preserving the patterned shapes and underlying materials. Together, these leading-edge processes have demonstrated the capabilities to meet the patterning demands of next-generation devices.

Applied has exclusively licensed its proprietary removal process for the Saphira APF hardmask to PSK.

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.

*APF = advanced patterning film; CVD = chemical vapor deposition

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