



Applied Materials Extends Leadership in PVD With New Self-Ionized Plasma Technology

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SANTA CLARA, Calif.--(BUSINESS WIRE)--Nov. 6, 2000--

SIP(TM) PVD Provides Enabling Technology and High-Throughput,

Cost-Effective Processes for

Applied Materials, Inc., the leading supplier of metal deposition systems to the semiconductor industry, today announced its new SIP(TM) (self-ionized plasma) PVD (physical vapor deposition) technology for depositing critical barrier/seed films in copper-based interconnects and liner/barrier layers in aluminum structures. Using a new magnetron plasma source, process chamber and next-generation e-chuck design, SIP combines advanced, 0.15 micron and beyond technology with lower cost of operation while enabling throughputs of up to 70 wph (wafers per hour).

"This new SIP technology shows our ongoing commitment to providing customers with innovative PVD solutions to meet their most advanced processing requirements," said Dr. Fusen Chen, vice president and general manager of Applied Materials' Aluminum, Copper and Liner/Barrier Product Group. "SIP extends PVD technology into the 100 nanometer regime by delivering the conformal film coverage required for lining high aspect ratio interconnect structures. In addition, we've made several advancements in chamber design that significantly enhance the productivity and cost efficiency of the technology."

The SIP chamber's new magnetron source increases ionization of the metal atoms in the chamber, providing good step coverage in small geometry structures. A new generation e-chuck design with bias and low temperature capability ensures excellent thermal control and minimal film overhang.

For copper-based devices, SIP tantalum/tantalum nitride (Ta/TaN) and SIP copper seed layers are used for lining the interconnect structure to prevent contamination and enhance subsequent bulk copper fill. This completely integrated sequence, preceded by a reactive pre-clean, operates under high vacuum, providing excellent film adhesion and oxide-free interfaces for maximum device speed and high film reliability.

For aluminum-based interconnect applications, SIP technology is used to deposit titanium (Ti) as an underlayer in an advanced aluminum slab/interconnect stack structure. This layer provides exceptional electromigration resistance for high reliability. In addition, SIP is used to deposit Ti and titanium nitride (TiN) liner/barrier films in contact and via structures for subsequent bulk tungsten fill. Both processes are performed using a single SIP chamber, enabling simplified operation and increased user flexibility.

SIP technology is available on Applied Materials' Endura(R) platform, as well as the company's new generation Endura SL(TM) system, which features dual-blade robots for faster handling and accommodates up to six process chambers.

Commitments for the SIP system have been received from customers in the U.S., Taiwan and Japan. The SIP technology is also retrofittable to existing Endura PVD "widebody" chambers, enabling customers to cost-effectively extend their installed base of systems to meet the

requirements of several more device generations.

The market for PVD systems totaled \$1.24 billion in 1999, according to Dataquest, a market research firm, and is projected to grow to \$3.09 billion by 2002. In a report recently released from Dataquest, Applied Materials was ranked the global market share leader in PVD for 1999.

Applied Materials (Nasdaq:AMAT) is a leader of the Information Age and the world's largest supplier of products and services to the global semiconductor industry. Applied Materials' web site is <http://www.appliedmaterials.com>.

Note to Editors: In the sub-headline, the symbol in front of "0.15 Micron Copper" is a "less than" symbol. This symbol might not appear properly in all systems.

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