



Applied Materials Announces Breakthrough Low k Dielectric Film For High-Speed Copper Chips

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Black Diamond Film Provides Chipmakers with an Easily Integrated, Low COO Dielectric for Advanced Copper/Low k Interconnects

Applied Materials, Inc., the leading supplier of dielectric CVD (chemical vapor deposition) equipment to the semiconductor industry, introduces its breakthrough low k Black Diamond CVD dielectric film. Deposited in the company's new DLK(tm) chamber, Black Diamond is a production-worthy film for blanket applications that is easily integrated with existing process technologies to provide customers with a low risk, low cost solution to their emerging dual damascene copper/low k interconnect designs.

"Black Diamond is an example of Applied Materials' Total Solutions approach, which encompasses multiple systems and processes during product development. Derived through the collaboration of Applied Materials' product groups, Black Diamond has been extensively tested for compatibility with all steps of copper interconnect process," said Farhad Moghadam, vice president and general manager of Emerging Dielectric CVD Technologies at Applied Materials. "This film can easily be integrated into the dual damascene process flow with dielectric etch, metal deposition and chemical mechanical polishing (CMP) processes at a cost comparable to traditional TEOS or silane-based dielectric films. Black Diamond is truly an elegant yet cost-effective advance in low k dielectric technology that allows customers to integrate into the future."

Black Diamond will be introduced as a family of low k dielectric films that are expected to extend to a dielectric constant of k less than/equals to 2.4. The first product, named BD27, with a dielectric constant of 2.7, was designed for 0.18-micron technology. BD27 will be available initially on Applied Materials' Centura(R) platform in a configuration with up to four process chambers and later on the company's new Producer(tm) platform, including future versions of the systems for 300mm wafers. All Black Diamond-series films will be based on the company's DLK chamber hardware to provide multi-generation low k capability.

Orders for Black Diamond systems and chambers have been received by multiple customers in the U.S. and Asia. Dataquest, a market research firm, estimates the market for low k dielectric deposition equipment to be \$12 million in 1998 and expects it to grow to \$372 million by 2003.

"Black Diamond provides our customers with an easy migration from silicon dioxide dielectric technology, since it has many of the same beneficial characteristics, including excellent adhesion to different metal and dielectric films, and high thermal stability with little shrinkage," said David Cheung, director of Low k Products at Applied Materials. "The DLK chamber has an excellent throughput of 60-100 wafers per hour, depending on film thickness and uses non-proprietary, commodity inorganic chemicals for resultant overall low cost of ownership.

"Also important to customers are Black Diamond's exceptional environmental benefits which include effectively zero volatile organic compound (VOC), perfluorocompound (PFC) and hazardous air pollutant (HAP) emissions. "Compared to organic dielectric materials, which involve complex hazardous waste and regulatory issues, Black Diamond CVD demonstrates Applied Materials' commitment to offering environmentally-friendly, leading-edge production technology to its customers."

Black Diamond technology is available for customer demonstration at Applied Materials' Equipment and Process Integration Center (EPIC), which is the semiconductor equipment industry's first facility with a complete set of equipment and technologies for copper/low k interconnect technology integration. Within EPIC, customers can use Applied Materials' extensive process knowledge in all of the interconnect fabrication technologies to develop and evaluate a complete copper damascene process flow, as well as receive critical electrical performance data. EPIC's extensive capabilities allow customers to quickly integrate Black Diamond with the prior chemical mechanical polishing step, as well as the subsequent dielectric etch and ashing steps in a fully characterized process flow.

Applied Materials, Inc. is a Fortune 500 global growth company and the world's largest supplier of wafer fabrication systems and services to the global semiconductor industry. Applied Materials is traded on the Nasdaq National Market System under the symbol, "AMAT." Applied Materials' web site is <http://www.AppliedMaterials.com>.