Applied Materials Demonstrates Complete Copper Interconnect on Mosel Vitelic's Wafers in Only 12 Weeks at EPIC Facility

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Company's Copper Interconnect Process Modules Enable SDRAM Chips

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Applied Materials, Inc., the world's leading supplier of equipment to the semiconductor industry, announced that it recently completed a successful demonstration of its integrated Copper Interconnect Process Modules with Mosel Vitelic, Inc. (MVI), a manufacturer of memory chips in Hsinchu, Taiwan. The demonstration, which involved the fabrication of a 2-layer copper interconnect structure on MVI's 64Mb SDRAM devices, took place at Applied Materials' Equipment and Process Integration Center (EPIC) in Santa Clara, Calif. The project was accomplished in less than 12 weeks and, according to MVI, resulted in chips functioning with a yield "comparable to aluminum."

Ching-Hwa Chen, director of MVI's Central Lab, said, "We were extremely impressed with the rapid and high-yielding results achieved by Applied Materials for this complex process. This program allowed us to quickly evaluate the process without having to characterize each individual step, saving us many months of development time. There is no doubt that this capability can offer chipmakers a way to very cost-effectively speed up their implementation of copper technology."

"In collaboration with Mosel Vitelic, this milestone achievement demonstrates a strategic shift in the semiconductor equipment business that can potentially enable our customers' products to be brought to market much faster than before," said Dr. Sass Somekh, senior vice president at Applied Materials. "As a first for our industry, Applied Materials has demonstrated a process flow, in the form of a complete, very advanced copper interconnect structure, on a customer's device wafers. In addition to buying individual systems, customers are seeing the potential to implement new technology faster and more cost-effectively by using our Process Modules."

The copper demonstration performed for MVI involved a total of 49 distinct process steps, including lithography, all of which were performed at Applied Materials' EPIC facility. For the demonstration, MVI provided wafers with a 64Mb synchronous DRAM (SDRAM) memory chip design, using 0.25 micron design rules. Although not typically considered one of the first device types to utilize copper, Mosel felt that DRAMs provided a good vehicle for testing interconnect performance and monitoring interconnect defect density.

The wafers supplied by MVI to Applied Materials included the entire SDRAM device structure fabricated up to the interconnect level. Applied Materials' EPIC facility processed two levels of copper interconnects using a dual damascene, "via first" scheme that concluded with aluminum bond pad formation and final electrical testing. Applied Materials met the expected deadline for the project, with 95 percent of the processing completed in a period of 6 weeks.

The copper interconnects were formed using Applied Materials' Copper Interconnect Process Modules, a complete set of processing systems that has been integrated, optimized, and characterized in the EPIC facility. The Process Modules include the following Applied Materials equipment: Producer(TM) system for silicon dioxide dielectric deposition; Dielectric Etch IPS(TM) Centura(R) and Super e(TM) Centura systems for "via first" dual damascene dielectric etching; Endura(R) Electra(TM) Barrier & Seed system for the tantalum nitride barrier layer and the copper seed layer; the Electra Cu(TM) ECP (electrochemical plating) system for bulk copper deposition; the Mirra(R) CMP (chemical mechanical polishing) system for copper planarization; the WF-736 system for defect detection; and the SEMVision(TM) defect review scanning electron microscope for automatic identification and classification of defects. Additional process steps such as wet cleans, lithography, resist processing and parametric testing were also performed at the EPIC.

Although a single-tool process demonstration for a customer typically takes from 2 to 4 weeks, Applied Materials combined a 49-step process demonstration into a short 12 week period, while also meeting the customers' required electrical specifications and far exceeding the projected yield. EPIC currently has a full complement of 200mm tools, and a new set of 300mm systems is being installed. Applied Materials is also incorporating low (kappa) dielectrics into the copper scheme for more advanced customer designs.

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 www.appliedmaterials.com.