

NOVELLUS INTRODUCES FAMILY OF CONFORMAL FILMS FOR SUB-2X NM LOGIC AND MEMORY APPLICATIONS

Novel dielectric materials deposited on the highly-productive VECTOR® platform exhibit ALD-like step coverage and furnace-quality film properties

San Jose, Calif., - July 11, 2011 - Novellus Systems (NASDAQ: NVLS) today announced the VECTOR CFD[®] family of films for the company's VECTOR Express, VECTOR Extreme and VECTOR Excel plasma-enhanced chemical vapor deposition (PECVD) systems. The Conformal Film Deposition (CFD) suite of dielectric films consists of oxide, doped oxide and nitride films that are deposited at temperatures ranging from 50 degrees to 450 degrees Celsius. These films provide solutions for emerging sub-2X nm logic and memory applications, including front-end-of-line (FEOL) liners and spacers used in tri-gate transistors and FinFETs, bitline spacers, etch stop layers, resistor protect layers, double patterning spacers using amorphous carbon or photoresist cores, and through silicon via (TSV) dielectric liners.

Novellus' CFD films are deposited using an innovative version of VECTOR's patented multi-station sequential processing (MSSP) architecture. The system has been optimized to meet the demanding technical requirements for conformality while also minimizing chemical consumption. In comparison to single wafer deposition systems, MSSP results in superior film uniformity and repeatability with significantly higher productivity.

Figure 1 shows CFD oxide and nitride films with 100 percent step coverage that have been deposited at temperatures less than 450 degrees Celsius. Temperatures in this range are compatible with FEOL implant processes and ensure consistent shallow junction depths and doping profiles.

These CFD films show no pattern dependency across a die, resulting in consistent sidewall profiles in the transistor, memory and peripheral areas of devices. VECTOR CFD films can also be deposited at temperatures below 80 degrees Celsius, making them the perfect candidate for deposition directly onto photoresists. This integration sequence can be used to enable a simplified, spacer-based double patterning scheme, where photoresist is used as the patterning core. Adoption of this approach yields significant cost benefits for the customer by eliminating one etch and one lithography step as compared to conventional double patterning schemes.

Finally, Figure 2 shows a conformal oxide film being used as a TSV liner where 100 percent step coverage can be maintained on vias with aspect ratios in excess of 20:1. This exceptional step coverage allows customers to reduce the overall field thickness of the dielectric, which in turn translates into reduced oxide CMP costs.

"Novellus is excited to introduce this new class of conformal films for a wide variety of applications," said Sesha Varadarajan, senior vice president of Novellus' PECVD Business Unit. "In an era of shrinking dimensions and with the advent of 3D transistors, the industry demand for these films is expected to significantly expand. Novellus' innovative CFD technology allows us to achieve exceptional step coverage, excellent electrical characteristics, and the extendibility to address the emerging needs of next generation devices. Depositing CFD films on the production-proven VECTOR platform ensures superior within-wafer and wafer-to-wafer repeatability with significantly higher throughput and lower chemical costs."

For more information about conformal films deposition (CFD) technology, please visit www.novellustechnews.com.

About Novellus' PECVD Technology:

The multi-station sequential processing (MSSP) architecture of Novellus' VECTOR platform allows for independent temperature and flow control to its deposition stations, critical in meeting the integration needs of sub-3x nm technology nodes. More than 1,000 VECTOR systems have been installed in logic, memory, and foundry fabs around the world.

About Novellus:

Novellus Systems, Inc. (NASDAQ: NVLS) is a leading provider of advanced process equipment for the global semiconductor industry. The company's products deliver value to customers by providing innovative technology backed by trusted productivity. An S&P 500 company, Novellus is headquartered in San Jose, Calif. with subsidiary offices across the globe. For more information, please visit www.novellus.com.

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