Sematech, Novellus to Develop Ultra Low-k Deposition and UVTP Curing Technology

June 8 2005

Novellus Systems, Inc. and global technology research consortium Sematech today announced that they are partnering to develop and evaluate low-k dielectric films with k-values of less than 2.2, and explore the limits of ultra low-k integration. As part of the joint development agreement, SEMATECH will purchase a VECTOR PECVD system for depositing ultra low-k films and a novel UVTP (ultraviolet thermal processing) system for post-deposition film curing. Both systems will be delivered to Sematech in October of 2005. Novellus will provide bulk film development and support, while Sematech will contribute its technical expertise in the integration of porous low-k films.

In the BEOL (back-end-of-line) process sequence, integrating porous low-k materials with reliable performance has presented a significant challenge for the industry. Although providing good bulk film mechanical and electrical performance is a requirement, avoiding film damage during further processing steps such as etch, strip, and CMP is critical. The combination of Novellus' ULK deposition and UVTPTM cure processes provides a film with a unique â€œclosed poreâ€? structure that optimizes mechanical and electrical properties as well as stability during integration. The film also demonstrates good compatibility with advanced ultra-thin barrier deposition processes such as ion induced ALD (iALDTM).

â€œNovellus has been leading the industry in the development of ultraviolet thermal processing technology, so we are pleased to be partnering with SEMATECH on this program,â€? said Ming Xi, vice

president and general manager of Novellus' PECVD business unit. â€œUnlike e-beam curing technology, UV curing does not damage underlying film layers, and UV energy can be easily tuned to achieve the best porogen removal and hardening results. We believe that our ULK deposition and UVTP technology will meet the critical requirements for successful copper/ULK interconnect integration beyond 45nm.â€?

SEMATECH has designated low-k dielectrics and process compatibility as one of its top challenges for 2005 and 2006, as part of its exploration of the limits of integrating porous low-k materials. In addition to identifying and evaluating ultra low-k materials, the consortium's engineers also are working to ensure that low-k structures reflect a k-effective value of 2.5 for the 45 nm technology node.

â€œWe're pleased to be working with a willing partner whose aggressive roadmap matches ours,â€? said Klaus Pfeifer, program manager of copper low-k module integration at SEMATECH. â€œThrough this project on low-k deposition and curing technologies, we will aim to help our member companies understand and resolve integration issues for porous dielectrics and accelerate the implementation of ultra low-k films into volume production.â€?

The Novellus ultra low-k dielectric films are deposited in the 300-mm VECTOR system which incorporates the company's multistation sequential deposition (MSSD) architecture, combining high throughput with wafer-to-wafer and within-wafer uniformity. This multistation sequential architecture is also incorporated into the post-deposition UVTP cure tool, providing the capability to individually control cure intensity and temperature in each of the four cure stations.

PHYS.ORG

(2005, June 8) retrieved 24 April 2024 from https://phys.org/news/2005-06-sematech-novellus-ultra-low-k-deposition.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.