SECTION NEWS

Cubiciotti Award Winner

ERIC GUYER was presented with the 2004 Cubicciotti Student Award on May 18, at the San Francisco Section Student Night Meeting in Berkeley, California.

Eric Guyer, a native of Hancock, Iowa, earned his BS degree in chemical engineering from Iowa State University in 2000, his MS degree in materials science and engineering from Stanford in 2003, and is expected to receive his PhD from Stanford University in materials science and engineering in December 2004.

Guyer's research demonstrates the important effect of solution chemistry on the rate of chemically assisted crack growth in low dielectric constant (LKD) materials. Generally, crack growth rates are inhibited by acidic environments and exacerbated in basic environments. However, anomalously high crack growth rates have been observed in weakly acidic hydrogen peroxide solutions, where, at significantly reduced applied loads, crack growth rates were accelerated well beyond those expected for equivalent pH solutions. The implications of this finding are extremely important as the results emphasize the need for an advanced understanding of the effect of the individual chemical constituents present in solution and that failure criteria cannot simply be based on a far field measurement of the solution pH.

Recently, Guyer won the Intel Foundation Fellowship, and is a past winner of the Materials Research Society Outstanding Poster Award (2004), the Silver Graduate Student Award (2004), the Omega Chi Epsilon Outstanding Senior Award (2000), Honor Society (1999), and the Maurice and Ruth Larson Scholarship. When not in the laboratory, he enjoys weightlifting, golfing, running, fishing, and spending time with his wife, Sara. ■

San Francisco

The San Francisco Section held a joint meeting with the American Electroplaters and Surface Finishers Society (AESF) this past September. Dr. Nirmalya Maity, manager for ALD Barrier Metal Technologies at Applied Materials, spoke on "Atomic Layer Deposition Barrier Metal Technology and Applications." The surface of a semiconductor wafer is coated by ALD and then is exposed to two reagent gases in alternating order. One reagent is absorbed as a monolayer. The other reagent reacts with it to form a monolayer of the desired coating. This process is repeated until the desired thickness is achieved. Compared to chemical vapor deposition (CVD), ALD is less sensitive to substrate temperature. Thickness variation is only a few angstroms over the entire wafer. Compared to physical vapor deposition (PVD), ALD is less sensitive to surface orientation, and can be applied to high aspect ratio trenches.

The second part of the lecture focused on ADL tantalum nitride Ta3N. In comparison with CVD Ta3N5, ALD Ta3N5 is amorphous and is a better copper barrier. CVD Ta3N5 is crystalline and Cu can diffuse through grain boundaries. ALD Ta3N5 is also superior in pore-sealing on porous low-k dielectrics because ALD is enhanced on pore edges. ALD is somewhat dependent on the hydrophobicity of the substrate. Various surface treatments can be applied to achieve additional control of ALD on various substrates.

The third part focused on Cu-platable ALD barriers. Techniques such as alloy seed and argon ion treatment on tantalum nitride have been investigated. But the most successful approach is ALD ruthenium barrier.

Gwendolyn B. Wood Section Excellence Award

The SAN FRANCISCO SECTION received the Gwendolyn B. Wood Section Excellence Award. Thomas Dinan (pictured at right), past chair of the Section, received the award from ECS President Robin Susko. The purpose of the award is to honor Sections whose level of activity serves to strengthen the Society and the award encourages and rewards the good management and operations of the Section.