CHARACTERIZATION OF 'IN-PROCESS' DEGRADATION OF POLYURETHANE CMP PADS

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Over the past few years we have systematically characterized the 'in-process' degradation of polyurethane CMP pads. This talk will cover a comprehensive review of our experimental strategies. Specifically, we discuss our pioneering application of dynamic mechanical analysis (DMA) to study polyurethane CMP pad interactions with organic solvents, aqueous buffers and CMP slurries in order to simulate pad degradation.[1-2] We will also discuss our ongoing work in spectroscopic (XPS, static SIMS and FTIR) and microscopy studies (SEM, AFM) on 'in-service pad' degradation.[3-4] We conclude with a discussion of the mechanism and practical implications of this pad degradation phenomenon.

REFERNCES

1) Dynamic Mechanical Analysis (DMA) of CMP Pad Materials, Irene Li, Kersten M. Forsthoefel, Kathleen A. Richardson, Yaw S. Obeng, William G. Easter, and Alvaro Maury, Chemical-Mechanical Polishing 2000--Fundamentals and Materials Issues, 198th MRS meeting, Phoenix, Arizona, October 22-27, 2000, Symposium E, R.K. Singh, R. Bajaj, M. Meuris, M. Moinpour, A. Maury (eds.), MRS Proceedings Volume 613

2) Mechanistic Aspects Of The Relationship Between Cmp Consumables And Polishing Characteristics. Irene Li, Kersten M. Forsthoefel, Kathleen A. Richardson, Yaw S. Obeng, William G. Easter, Alvaro Maury, presented at the Fourth International Symposium on Chemical Mechanical Polishing (CMP), 198th MRS meeting, Phoenix, Arizona, October 22-27, 2000, Symposium E, R.K. Singh, R. Bajaj, M. Meuris, M. Moinpour, A. Maury (eds.), MRS Proceedings Volume 613

3) Microstructural Characterization of CMP Polyurethane Polishing Pads - S. Machinski, K. Richardson, and W.G. Easter, presented at the Fourth International Symposium on Chemical Mechanical Polishing (CMP), 198th MRS meeting, Phoenix, Arizona, October 22-27, 2000, Symposium E, R.K. Singh, R. Bajaj, M. Meuris, M. Moinpour, A. Maury (eds.), MRS Proceedings Volume 613

4) Chemical Structure, Morphology, and Mechanical Response of Segmented Polyurethane Surface Domains as Characterized by X-ray Photoelectron Spectroscopy (XPS), Static Secondary Ion Mass Spectrometry (SSIMS), and Scanning Probe Microscopy (SPM) Techniques, Jeff Ramsdell and Sudipta Seal, Presented at the Fall TMS Meeting, Indianapolis, IN, November 6, 2001