# Characterization of Segmented Polyurethane Surface Domains as related to Chemical Mechanical Polishing (CMP)

Jeffrey Ramsdell[1] and Sudipta Seal[1]

[1]University of Central Florida
Advanced Materials Processing and Analysis Center
P.O. Box 162455
Orlando, FL 32816
USA

This paper reports on the continuing study of the surface domains of segmented polyurethane materials, as used in chemical mechanical polishing (CMP). The surface chemical structure, morphology, and mechanical response of these materials were investigated using various characterization techniques. X-ray photoelectron spectroscopy (XPS) and static secondary ion mass spectrometry (SSIMS) were used to map the changes in the surface chemistry of segmented polyurethanes due to curing conditions, chemical exposure, and abrasive use. Atomic force microscopy (AFM) and other scanning probe microscopy (SPM) techniques were used to further characterize the surface of known polyurethane bulk samples after chemical exposure. These techniques allow for correlation of morphological and mechanical response changes with surface chemistry changes found using XPS and SSIMS. Nanoindentation and microscratching are included to quantify surface domain hardness and tribological properties. Results of this investigation contribute to a better understanding of the degradation of CMP pads during use.