OPTIMIZATION OF CHEMICAL MECHANICAL PLANARIZATION OF PATTERNED ALUMINUM OVER TOPOGRAPHY ***N.Nampalli*** *and D. Ewbank*, Department of Microelectronic Engineering, nxn9489@rit.edu, deeemc@rit.edu*

Chemical Mechanical Planarization (CMP) is an abrasive process that employs chemical action and mechanical polishing in order to planarize the surface of a wafer. CMP achieves the greatest degree of planarization of any currently known technique. Planarization is an important step in device fabrication, especially in processes where it is necessary to maintain photolithographic depth of focus or when a non-planar topography may result in less than optimal device performance. In this experiment, the CMP of patterned aluminum metal over topography is investigated. The mechanical factors affecting the quality of the planarization are specifically studied while keeping the chemical factors unchanged. This is done by observing the effects of the variation in processing time (30 to 70 seconds), spindle speed (40 to 60 RPM) and pad pressure (6 to 9 psi) while using the same slurry (NALCO 2350) and slurry drip rate (4 drops per second). By analyzing the data collected in a designed experiment, the process is optimized to yield maximum local planarization. It is then compared to commonly-used simple CMP models. Presentation will include a background on the CMP process, simplified removal rate models (the original Preston's Equation and the modified Preston's Equation) and a discussion of the actual experimental results.