Gentle Chemical Mechanical Polishing of Copper/Low K Based Interconnects

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With the rapid deployment of soft materials such as copper and low K dielectrics in back-end processes, concerted effort efforts have been directed towards novel slurries that can overcome the challenges in the typical CMP system . Traditional slurry systems typically contain hard abrasive materials, which may create a large number of defects such as adhering particles, scratches on the wafers, high shear and normal stresses, delamination of the dielectric and pattern dependent surface topographical defects such as dishing, erosion and dielectric loss resulting from poor slurry selectivity and slurry planarity. Additionally, issues related to long-term stability, two-component mixing effects, aging characteristics of the particles in the slurry and the need for sophisticated slurry handling equipment results in significant variations in the CMP performance and higher manufacturing costs. To overcome these issues, sophisticated polishing schemes have been developed which decreases the size of the processing window for optimum results. This focus of this talk is the development of novel gentle chemical-mechanical slurries which can overcome most of the above mentioned outstanding issues. By using "soft", gentle slurries, the defectivity, planarity and ease of slurry handling can be significantly enhanced. This talk will discuss some of the polishing characteristics obtained by using the gentle slurries.