ABSTRACT

HIGH THROUGHPUT CHEMICAL MECHANICAL POLISHING COMPOSITION FOR METAL FILM PLANARIZATION

A chemical mechanical polishing process including a single Step I CMP slurry formulation for planarization of a microelectronic device structure preferably having copper deposited thereon. The process includes the bulk removal of a copper layer using a first CMP slurry formulation having oxidizing agent, passivating agent, abrasive and solvent, and the soft polishing and over-polishing of the microelectronic device structure using a formulation including the first CMP slurry formulation and at least one additional additive. The CMP process described herein provides a high copper removal rate, a comparatively low barrier material removal rate, appropriate material selectivity ranges to minimize copper dishing at the onset of barrier material exposure, and good planarization efficiency.

Fig. 10