Novel CMP Slurries for Planarization of Multilevel Copper Interconnect

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Novel slurries were developed for Cu, TaN, and dielectric chemical mechanical polish (CMP) to greatly enhance the planarity of Cu dual damascene interconnect (DDI). Compared with conventional alumina-based slurries, the newly designed polymer-based slurries achieve best sheet resistance (Rs) control over a wide range of Cu density on various stack layers with excellent overpolish window. Through optimizing chemical components, these novel slurries also demonstrated smooth Cu morphology and least galvanic corrosion during polish and robust reliability of eight level Cu interconnect, including electromigration (EM) and stress migration (SM), has been achieved.