Chemical Mechanical Polishing (CMP) Characteristics of Diluted Slurry by Adding of Silica Abrasives

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Chemical mechanical polishing (CMP) has been widely used for the planarization of multi-layer structures in semiconductor manufacturing. The results of CMP can be optimized by several process parameters such as equipment and consumables (pad, backing film and slurry). However, the COO (cost of ownership) is very high, because of high consumable cost. Especially, among the consumables, slurry dominates more than 40 percents.

In this paper, we focused how to reduce the consumption of raw original slurry and improvement of CMP characteristics. First, we investigated the pH changes of diluted slurry and pH control method. Also, the removal rates of slurry with different dilution ratio were investigated. Finally, the CMP characteristics as a function of silica abrasive contents were discussed. As an experimental result, the CMP characteristics of 1:10 diluted slurry with silica abrasives of 2 weight percent contents were showed high removal rate and low non-uniformity.