

Cu CMP에서 Corrosion Inhibitor에 의한 연마 특성 분석

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Analysis of Cu CMP according to Corrosion Inhibitor Concentration

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Abstract : Cu CMP (Chemical Mechanical Planarization) has been used to remove copper film and obtain a planar surface which is essential for the semiconductor devices. Generally, it is known that chemical reaction is a dominant factor in Cu CMP comparing to Silicon dioxide CMP. Therefore, Cu CMP slurry has been regarded as an important factor in the entire process. This investigation focused on understanding the effect of corrosion inhibitor on copper surface and CMP results. Benzotriazole (BTA) was used as a corrosion inhibitor in this experiment. For the surface analysis, electrochemical characteristics of Cu was measured by a potentiostat and surface modification was investigated by X-ray photoelectron spectroscopy (XPS). As a result, corrosion potential (E_{corr}) increased and nitrogen concentration ratio on the copper surface also increased with BTA concentration. These results indicate that BTA prevents Cu surface from corrosion and forms Cu-BTA layer on Cu surface. CMP results are also well matched with these results. Material removal rate (MRR) decreased with BTA concentration and static etch rate also showed same trend. Consequently, adjustment of BTA concentration can give us control of step height variation and furthermore, this can be applicable for Cu pattern CMP.

Key Words : Cu CMP, Corrosion inhibitor, BTA (Benzotriazole)