A-04

# 스퍼터링 및 전기 도금으로 제조된 구리 박막에서의 표면 결함에 미치는 결정립계의 영향

**(Grain Boundary Characteristics and Stress-induced Damage Morphologies in Sputtered and Electroplated Copper Films)**

Various Cu films were fabricated using sputtering and electroplating with and without additive, and their surface damages after annealing were investigated. After annealing at 435°C, the difference between damage morphologies of the films was observed. In some films stress-induced grooves along the grain boundaries were observed, while in the others voids at the grain boundary triple junctions were observed. It was also observed that the stress-induced groove was formed along the high energy grain boundaries. It was found out that the difference of the morphologies of surface damages in Cu films depends on not process type but grain boundary characteristics. To explain the morphological difference of surface damages, a simple parameter considering the contributions of grain structures and grain boundary characteristics to surface and grain boundary diffusions is suggested. The effective grain boundary area, which is a function of grain size, film thickness and the fraction of high energy grain boundaries, played a key role in the morphological difference.