

STI CMP용 Ceria Slurry에 관한 연구 무기 연마 입자와 유기 첨가제

소재현*, 김사라¹, 김남수, 이동준, 양승만¹
삼성전자; ¹한국과학기술원
(sjh0909@samsung.com*)

CMP process is one of important steps in semiconductor fabrication. Particularly, CMP slurry is the most important consumable, which is composed of colloidal abrasives and various chemical additives. As the design rule of semiconductor device decreases, ceria slurries are strongly recommended in shallow trench isolation (STI) CMP technologies. In this study, we investigated highly selective ceria slurry on shallow trench isolation (STI) CMP process with the points of inorganic ceria abrasives and organic high selective additives. First, cerium oxide particles were prepared, which could be used as polishing abrasives in STI CMP with organic additives. According to the calcination temperature, abrasive size (both primary and secondary size and material removal rate) were changed drastically. Secondly, adsorption characteristics and chain conformation of polymer additives at ceria-water interface were studied to correlate colloidal behavior of CMP slurry with polishing properties. Interactions of polymer additives and ceria abrasives were examined in terms of pH, salt concentration, and types of salts to interpret the performance of STI CMP process. The effects of chain conformation of polyelectrolytes adsorbed onto the ceria slurry were investigated.