

## The Effect of $\text{NH}_3$ Plasma Treatment on Low Dielectric Organosilicate Thin Film

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Mechanical properties of low dielectric organosilicate films are very important since it should withstand severe processing conditions imposed by Chemical Mechanical Planarization (CMP) Processing. Surface hardness is critical in terms of CMP compatibility of low- $k$  films. In present study,  $\text{NH}_3$  plasma treatment was applied to organosilicate films to improve micromechanical properties of the film surface by forming densified surface layer. Improvement of surface hardness was measured using depth-sensing indentation with continuous stiffness mode (CSM). Although this improves surface hardness, but a densified surface layer also increases the effective dielectric constant of film. To balance these two effect, it is very important to control the thickness of densified surface layer precisely. To reach this goal, it is also essential to develop an accurate analytic technique to measure the thickness of densified surface layer. We used X-ray reflectivity, FE-SEM and Auger electron spectroscopy to measure the depth profile of  $\text{NH}_3$  plasma treated dielectric film.