Effect of Hydroxyl Ethyl Cellulose Concentration in Colloidal Silica Slurry on Surface Roughness for Poly-Si Chemical Mechanical Polishing

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Abstract : Poly-Si is an essential material for floating gate in NAND Flash memory. To fabricate this material within region of floating gate, chemical mechanical polishing (CMP) is commonly used process for manufacturing NAND flash memory. We use colloidal silica abrasive with alkaline agent, polymeric additive and organic surfactant to obtain high Poly-Si to SiO2 film selectivity and reduce surface defect in Poly-Si CMP. We already studied about the effects of alkaline agent and polymeric additive. But the effect of organic surfactant in Poly-Si CMP is not clearly defined. So we will examine the function of organic surfactant in Poly-Si CMP with concentration separation test. We expect that surface roughness will be improved with the addition of organic surfactant as the case of wafering CMP.

Poly-Si wafer are deposited by low pressure chemical vapor deposition (LPCVD) and oxide film are prepared by the method of plasma-enhanced tetra ethyl ortho silicate (PETEOS). The polishing test will be performed by a Strasbaugh 6EC polisher with an IC1000/Suba IV stacked pad and the pad will be conditioned by ex situ diamond disk. And the thickness difference of wafer between before and after polishing test will be measured by Ellipsometer and Nanospec. The roughness of Poly-Si film will be analyzed by atomic force microscope.