Introduction

CMP = SYNERGY between a Chemical and a Mechanical action

The slurry chemically modify the surface while the pad with the abrasive particles mechanically remove the modified surface. The pad plays a key role in the CMP process, it helps both the chemical and mechanical actions.

Experimental and Methodology

Blanket Si Wafers polished on two kinds of Pads with different pore sizes

Conventional Pad
Large Pores

Advanced Pad
Small Pores

Pads Characterization:
- Roughness Parameters (Texture Open),
- Height Distributions
- Asperities Properties

Wafers Characterization:
- Surface Roughness and Height Distributions (AFM),
- Defect Levels
- Si removal rates

Results and Discussion

As Si CMP is a more chemical process [1], removal rate is very dependent on slurry transport ability and consequently on texture open. Higher pore size increases the texture open and leads to higher removal rate. Larger pores also allow a better evacuation of the byproducts, resulting in better defect level.

On the contrary, decreasing the texture open favor the mechanical action of the process, that’s why the planarization is better.

Chemical/Mechanical Balance can be managed through Pad Microstructure. Advanced Pad & Wafer Characterization are required to better understand Roughness Transfer from Pad to Wafer and to achieve better CMP Performances.