

# Silicon Carbide Precision Polishing Case Study

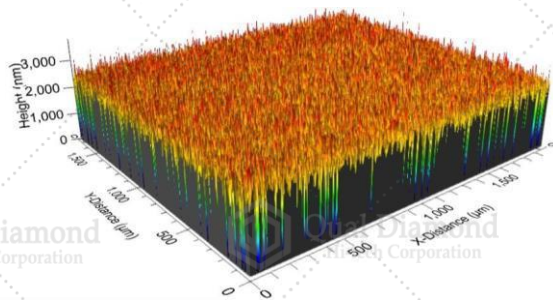
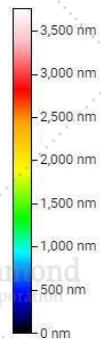
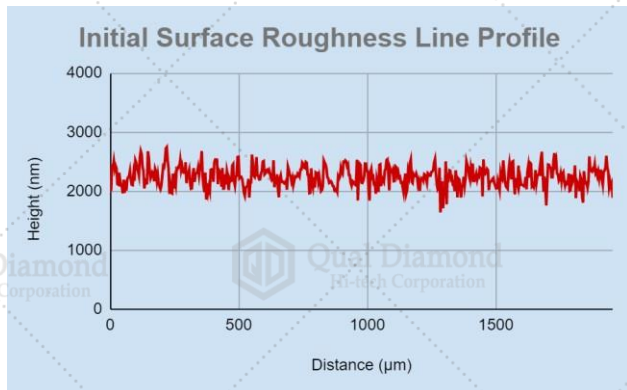
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The main objective of this case study is to test a cost-effective and efficient way using 2 Qual Diamond diamond slurries for the precision polishing of Silicon Carbide (SiC). The Qual Diamond diamond slurries are able to shorten the time required for polishing and reduce a 3-step procedure to a 2-step precision polishing procedure.

# Experiment Brief

- Silicon Carbide wafer with 2" diameter and 400  $\mu\text{m}$  thickness.
- Initial Ra (nm) :148 nm.
- Qual Diamond polycrystalline slurry size 4-6 for 1<sup>st</sup> step, size 0-0.25 for 2<sup>nd</sup> (final) step.
- The test lasted for 45 minutes 2X to reach the desired roughnesses.
- The results of the test show exceptional performance both in terms of parallelism and surface roughness.
- Details of the results are shown in the subsequent slides.

# SiC Initial Surface Inspection



- Material: Silicon Carbide wafer
- Initial Ra (nm) :148 nm

# Polishing Apparatus & Setup



Weight

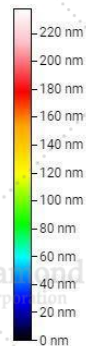
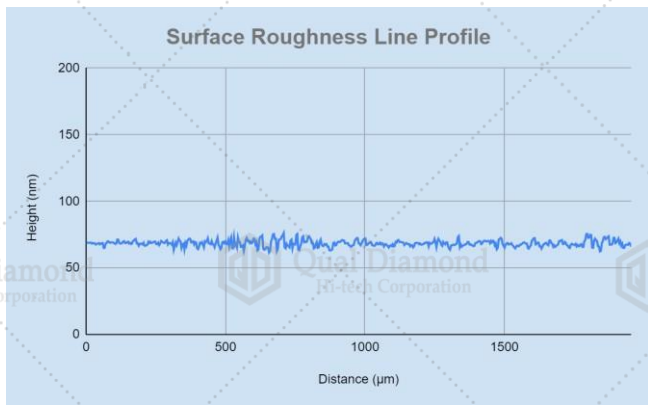
Glass plate where SiC wafer  
is held underneath

Polishing pad where  
diamond slurry is applied

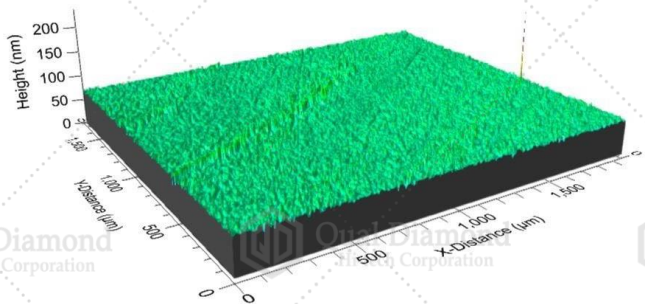
Catch Pan



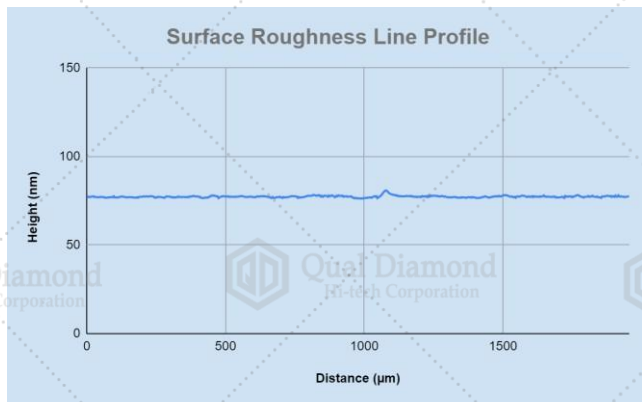
# First Roughness Assessments



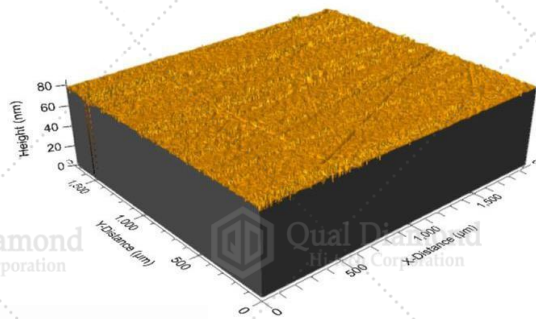
Ra = 2nm



- This combines 2 steps into 1 step for SiC wafer polishing using pad.
- It eliminates the step that often causes significant digs and scratches.



$R_a=0.23\text{nm}$

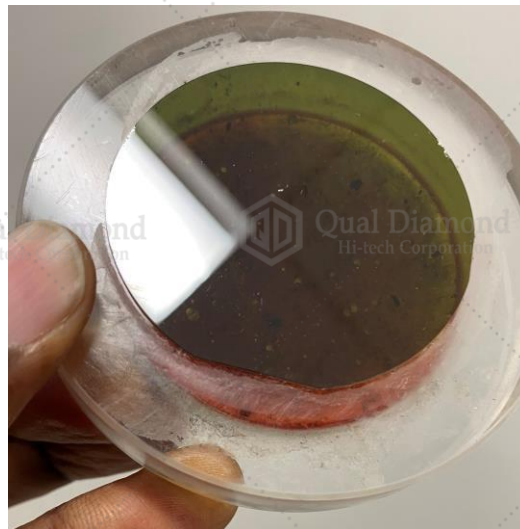


- No scratches are observed on the surface.
- Significant improvement in Ra value at Angstroms level.
- Typical result shown for illustration purposes.

# Before and After Comparisons



Initial Surface



Final Polished Surface



- Qual Diamond diamond slurries can be used to efficiently process Silicon Carbide wafer.
- The results show consistent surface profile along the measured surface area, indicating the initial step is not needed and significantly reducing digs and scratches from the initial step.