レーザースライス切断装置

01 Company Profile

Sophon Tech Precision Microfabrication Instruments (Shenzhen) Co., Ltd.

SiC Laser Slicing · Precision Wafer Processing · Automated Production Lines

Technology-led
Innovation-driven

R&D Team & Expertise

Our team draws talent from Tsinghua University, Beijing Institute of Technology, Jilin University and Australia's University of New South Wales. Long-standing expertise in advanced laser manufacturing and high-end equipment R&D spans materials, processes, machines and automated lines. We have undertaken and completed major national and international research projects.

48 Patents

36 Invention patents

Research Strength

Major national and international research projects completed

SiC Expertise

Programmable pulse control enables precision SiC slicing, combining optical-field modulation, directional crack control and automation. Our capabilities cover process validation, equipment development and line integration, supporting R&D validation through to volume production.

Precision SiC Slicing Solutions

Silicon Carbide

SiC Laser Slicing System

CPP

Programmable Pulse Control

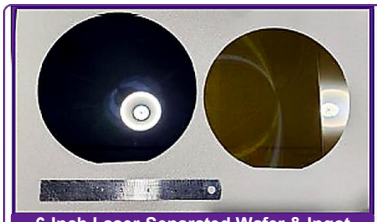
40–80 μm

Total Slicing Loss

6 / 8 / 12 inches

SiC Wafer Slicing Results

Ingot-to-Wafer Slicing Results



6-Inch Laser-Separated Wafer & Ingot

8-Inch Laser-Separated Wafer & Ingot

12-Inch Laser-Separated Wafer & Ingot

From R&D Validation to Volume Production

Materials & Process Validation

Assess materials and cutting requirements

›

Precision Process Development

Tune parameters and stabilize processes

›

Equipment Delivery & Line Integration

Deploy equipment and connect automation

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02 SiC Slicing Technology

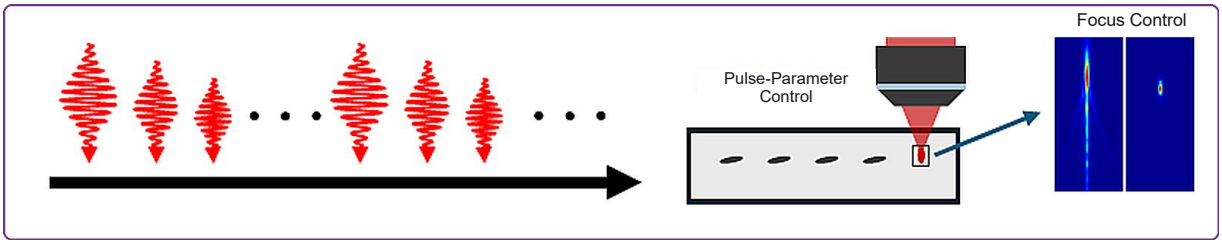
Core SiC Technologies & Capabilities

Programmable Pulse Control	Pulse parameters are matched to the SiC ingot material and optical transmittance to improve processing uniformity and maintain stable stress transfer during separation.
Low-Loss Precision Separation	6- and 8-inch wafer slicing: slicing loss 40–80 μm; wafer thickness range 80 μm–1 mm.
Large-Diameter SiC Slicing	SiC slicing results: 6-inch 15–20 min; 8-inch 25–30 min; 12-inch 35–40 min.

In-House R&D · Programmable Pulse Control · Efficient Precision Slicing

Efficiency, uniformity and process stability for SiC ingots

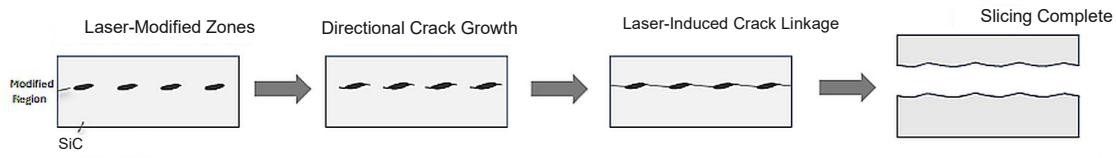
CPP Combined Pulse-Parameter Control



Real-time pulse control: Multiple pulse parameters are jointly adjusted according to ingot material and optical transmittance, improving processing uniformity and efficiency while ensuring stable stress transfer during separation.

Precision focus control: Accurate laser focusing improves energy utilization and enables precise sub-diffraction-limit modification, while reducing the size of the modified region.

Directional Crack-Growth Control



Laser interaction zones are planned around processing paths and requirements. Coordinated control of polarization and modification position applies internal stress precisely, guiding cracks to grow, extend and link reliably along the intended direction for high-quality slicing.

Planned Paths › Polarization Control › Localized Modification › **Reliable Crack Linkage**

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SiC Crystal Laser Separation System

03

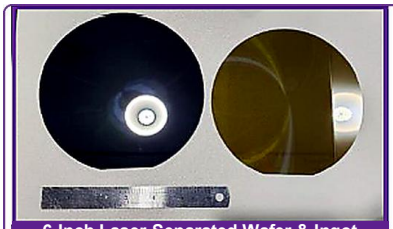
Core Capabilities

Efficient, low-loss precision ingot separation

Total Slicing Loss	**40–80 µm**
Supported Sizes	< 4 / 6 / 8 / 12 / 14 inches
Supported Material	Silicon carbide (SiC)
Optical-Field Modulation	Optical-field modulation supported
Pulse Control	Programmable pulse control

SiC Wafer Slicing Results

6 / 8 / 12 inches



6-Inch Laser-Separated Wafer & Ingot

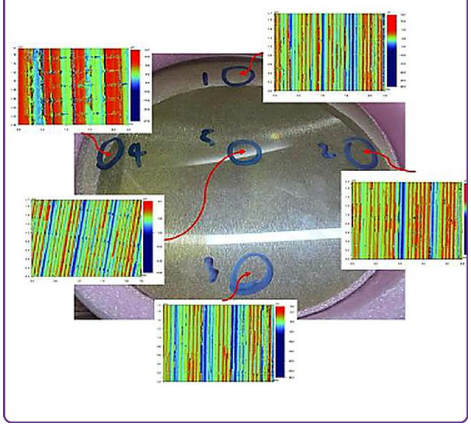
8-Inch Laser-Separated Wafer & Ingot

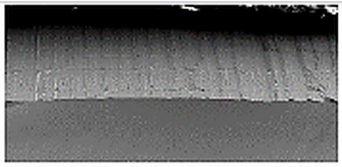
12-Inch Laser-Separated Wafer & Ingot

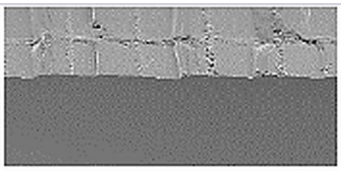
Slicing time: 6-inch 15–20 min · 8-inch 25–30 min · 12-inch 35–40 min **Loss: 40–80 µm**

SiC Surface Roughness after Slicing (White-Light Interferometry)

WLI







Measurement Method

White-light interferometry (WLI) measures the 3D surface topography and roughness of sliced SiC wafers. Five representative locations (Positions 1–5) on one wafer are measured to obtain 3D surface maps and calculate the surface roughness parameters Ra and Rz.

Surface Topography Results

- Regular, continuous striations align with the laser / slicing path.
- Intact, even surfaces and continuous local topography reflect stable precision processing.
- Highly consistent topography across all five areas demonstrates wafer-scale process uniformity.

Measured Results & Process Consistency

Ra	Rz
< 1 µm	**< 15 µm**
Low, stable overall roughness	Stable, controlled peak-to-valley height

Five-Point Consistency	Stable Processing Paths	Uniform & Repeatable
5 representative sites Consistent topography	Striations align with the processing path	Low Ra / Rz variation Stable processing

03 · Equipment / Slicing / Surface Topography Validation

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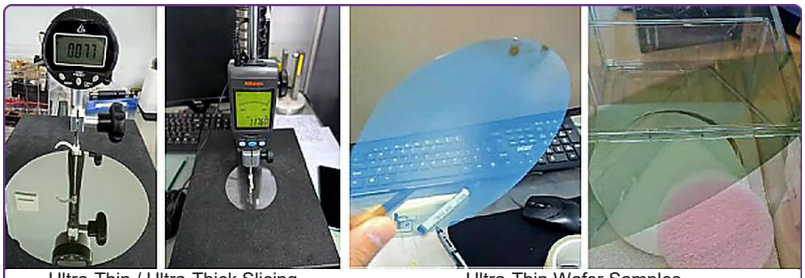
Ultra-Thin / Ultra-Thick Slicing of SiC Ingots

Programmable pulse control for precision slicing of ultra-thin and ultra-thick SiC wafers



Ultra-Thin / Ultra-Thick Slicing　　Ultra-Thin Wafer Samples

6-Inch & 8-Inch Wafer Slicing

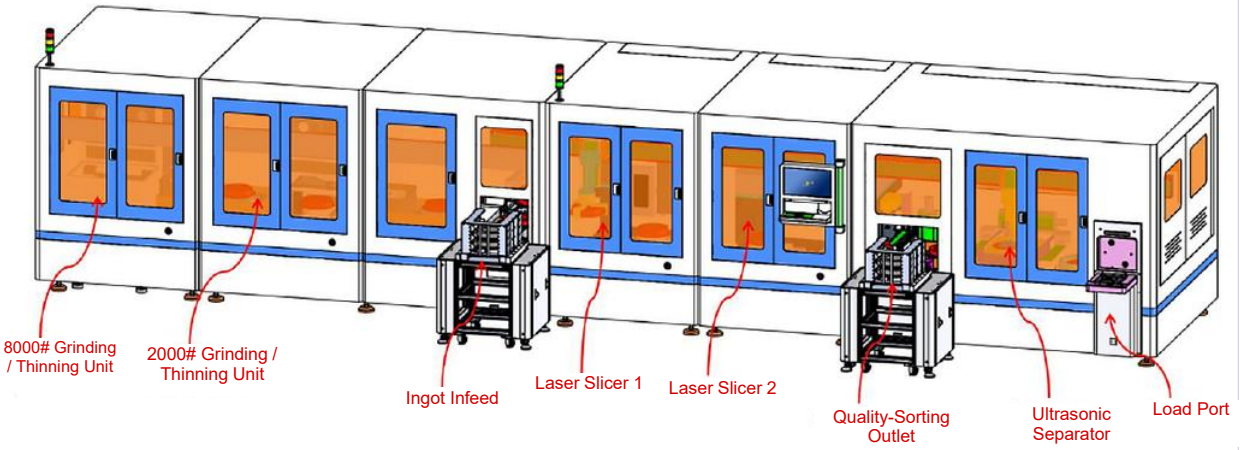
- Thickness range: 80 μm–1 mm
- Slicing loss: 40–80 μm

Example: 20 mm-thick ingot

Yield of 350 μm wafers

40–48 wafers

Automated Production Line Solutions



Key Line Specifications

- For 100 wafers from a 50 mm ingot: 2 wafers per 30 min, with approximately 25 hours to slice the full ingot.
- Infeed and outfeed storage uses a 2+1-tier configuration: 2 working tiers and 1 buffer tier for continuous feeding and coordinated process cycles.
- Approximate weights: 50 mm-thick, 8-inch SiC ingot, 5 kg; Φ360 × 15 mm ceramic plate, 6 kg.

Continuous Feeding | **Dual-Station Slicing** | **Quality Sorting** | **Ultrasonic Separation** | **Line Integration**

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