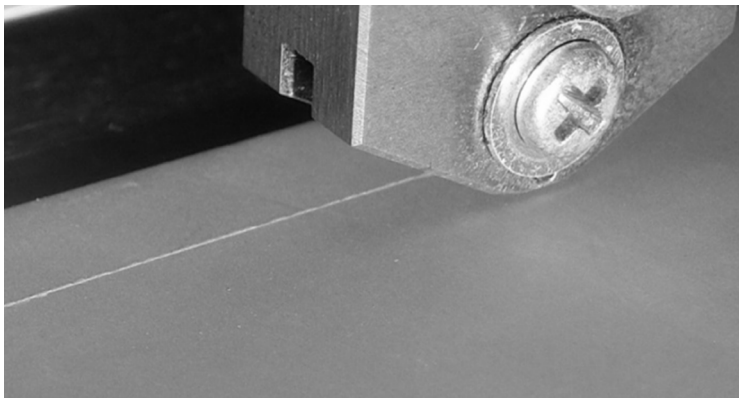
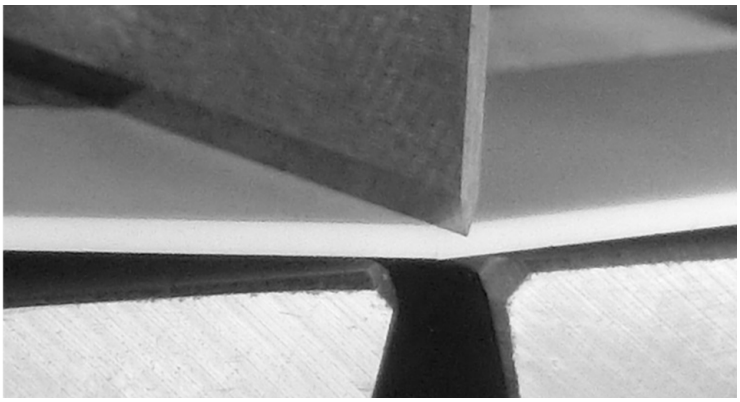
A brand-new cutting for fine-ceramics

Wheel Scribe & Break





New cutting method for fine-ceramics utilizing the brittleness of the material

In the scribe process, a crack perpendicular to the substrate is formed.
Then in the break process, cracks are developed and separate the substrate apart.

Complete Dry Process

Needs no water
Eco-friendly

No Kerf Loss

Efficient number of chips on a substrate

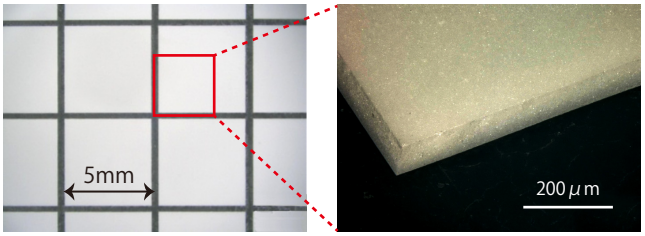
High Throughput

High speed method
300mm/sec
of processing speed

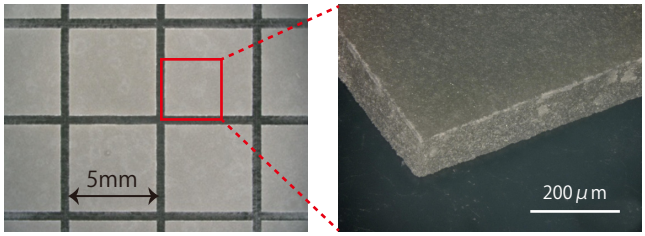
No Heat Damage

No thermal effects
that can occur with lasers
Can process various materials

Compatible with various ceramics in their cutting processes.



Al_2O_3 (t0.25mm, 5.0mm × 5.0mm)



Si_3N_4 (t0.32mm, 5.0mm × 5.0mm)

AlN, ZrO_2 (YSZ, PSZ), dielectrics, etc. can also be processed.

MDI owns an in-house developed tool and equipment
that helps pursuing the optimum process conditions for all of our customers.
Also offering "Total Solution" including after-sales service for our customers.

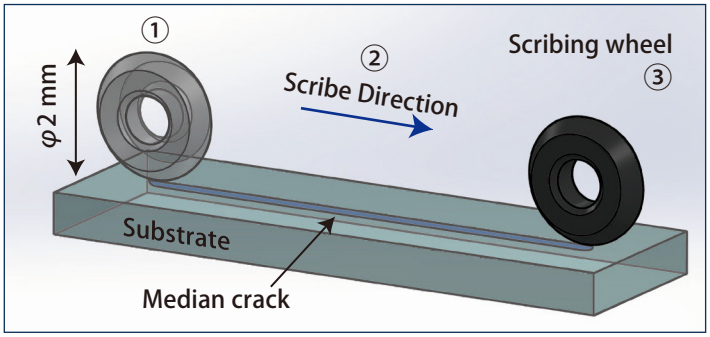
Mitsuboshi Diamond Industrial Co., Ltd.
32-12 Koroen Settsu, Osaka 566-0034, Japan
TEL: +81-72-648-5000 FAX: +81-72-648-5201 URL：www.mitsuboshidiamond.com

【Outline of “wheel scribe process”】

① Press the tool named "scribing wheel”
which is shaped like abacus ball against the substrate.
(Tool-substrate contact width : <20 μm, contact depth : <5 μm)

② The wheel rotates by giving a relative speed between the wheel and the substrate.

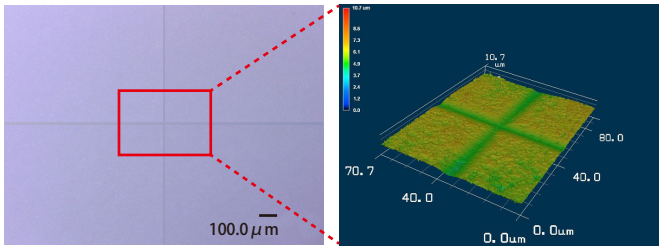
③ Scribing line on the substrate develops and a vertical crack to the substrate is formed.



【Comparison among cutting processes with S&B】

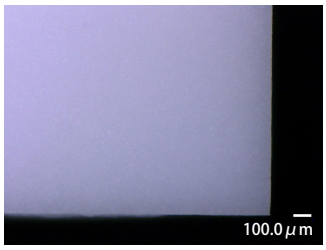
“ Wheel Scribe & Break ”

Surface

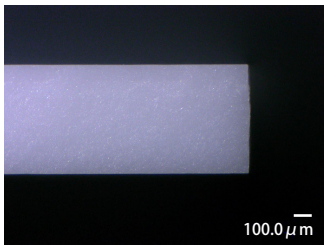


After break

Surface

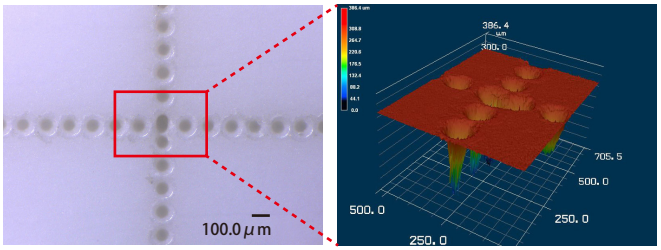


Cross section



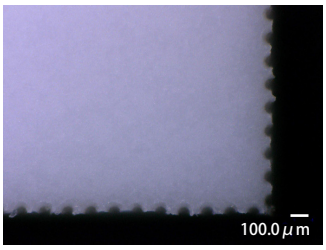
Laser (CO_2)

Surface

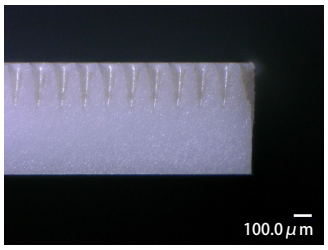


After break

Surface



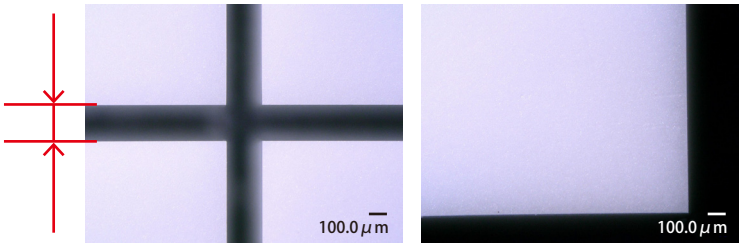
Cross section



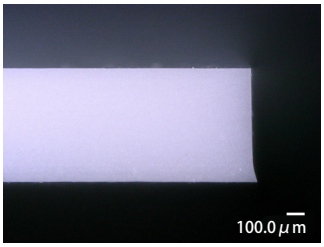
Dicing

Kerf loss

Surface



Cross section



Cutting process	“Wheel Scribe & Break”	Laser	Dicing
Basic mechanism	Crack propagation	Ablation (Dot processing)	Removal processing
Kerf loss	None	None	Large
Processing width	< 20 μm	100 - 120 μm	50 - 150 μm
Cutting speed	100 - 300 mm/s	100 - 300 mm/s	1 - 10 mm/s
Environment condition	Dry	Dry （*assist gas : O_2）	Wet
Thermal damage	None	Large	None
Chipping	None	None	Large