

Femtosecond laser Micro-nanomachining system



Real high quality micro processing for Biological sample/

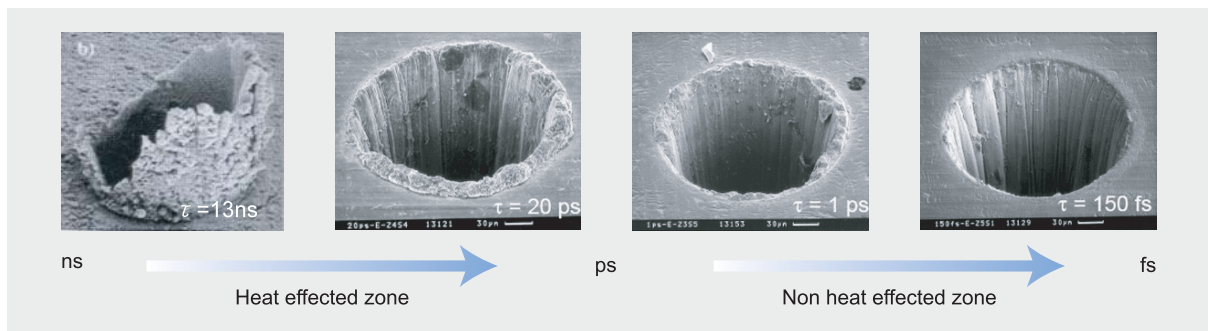
Transparent material / Thin film material

» Feature

1 Cold processing

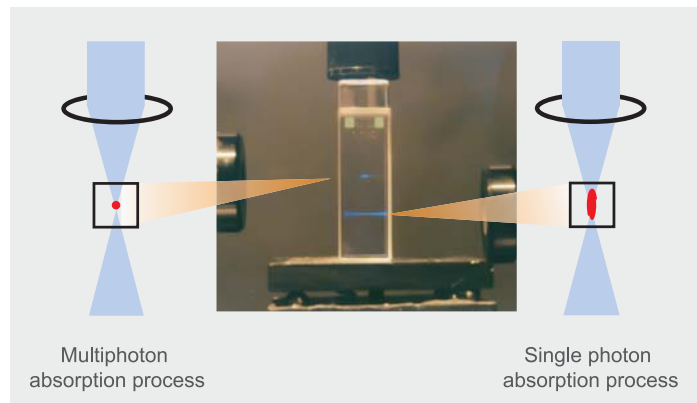
In case of femtosecond laser, it is possible to do processing at focus point without heat affect around the point because femtosecond laser irradiates sample during ultrashort time.

It is possible to get very high quality processing sample.



2 High resolution over diffraction limit with multiphoton absorption

In case of transparent material, it is possible to do processing with beam spot size over diffraction limit (less than 300nm) inside sample



3 Direct drawing

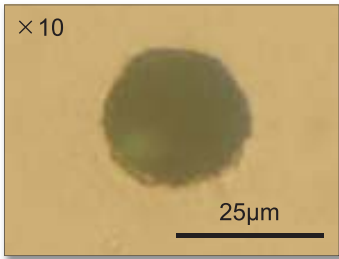
You can check microscope imaging and decide on processing condition on Monitor (Touch screen monitor).

4 High accuracy auto-focus mechanism with confocal optical system

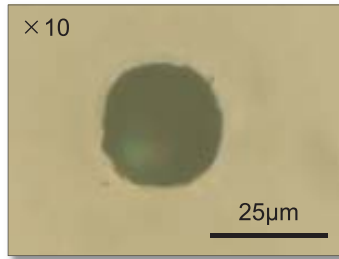
It is possible to find sample surface position for low reflection samples. As advanced function, it is possible to do processing including tilt and rotation offset of sample.

5 Other lasers (CW, ns and ps laser) instead of fs laser are available.

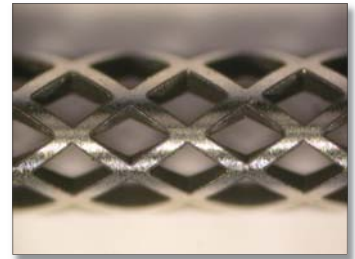
Micromachining samples



Through hole of metal material
(Front surface)



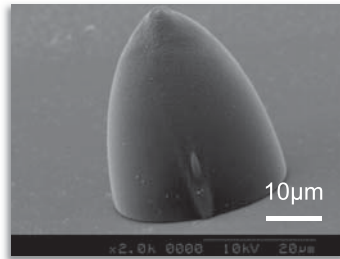
Through hole of metal material
(Rear surface)



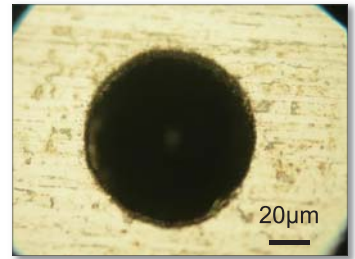
Stent cutting
(Stainless)



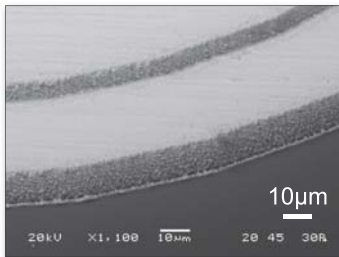
Inside processing of silicon wafer
(Cut surface)



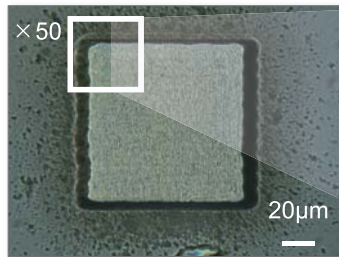
3D laser lithography
(Two-photon Photopolymer)



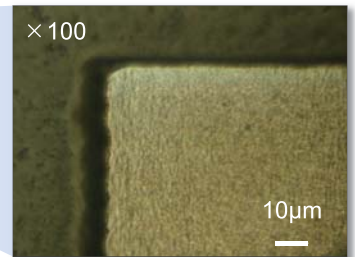
Through hole of metal material
(SUS304)



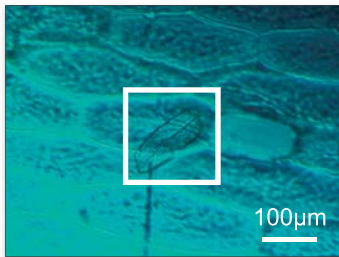
Cutting of metal material
(Pt)



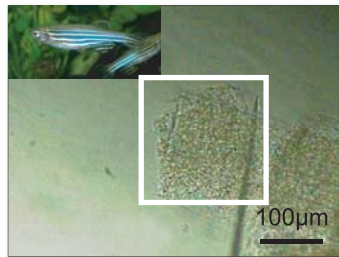
Ablation of DLC film



Ablation of DLC film



* Isolation of single cell
(Onion)



* Sample cutting in water
(Zebra fish)



* Laser induced mutation of yeast sample
(High added value yeast)

Specification

Laser	Products	Solid state laser	Fiber laser
	Wavelength ^{*1}	800nm/1028nm	1064nm
	Pulse energy ^{*2}	<3.5mJ@1kHz/800nm <0.2mJ@1kHz/1028nm	<2μJ@1MHz
	Repetition rate ^{*3}	Single shot~1kHz@800nm Single shot~200kHz@1028nm	Single shot~1MHz
	Pulse duration ^{*4}	<100fs@800nm <290fs@1028nm	<500fs
	Spatial mode	TEM ₀₀ M ² <1.3	
Optical unit ^{*5}	Auto-focus mechanism with confocal optical system: Scan range±2mm, resolution<1μm Control of pulse energy and polarization		
Irradiation unit	Positioning stage ^{*6} :	XY axis: ±50mm, resolution: 2μm, Maximum scan speed: 16mm/s	
	Stepping motor stage	Z axis: 0~20mm, resolution: 1μm, Maximum scan speed: 5mm/s	
	Sample stage ^{*7}	Vacuum table(Stainless steel)	
	Microscope based body, Irradiation optical system, Observation optical system		
Control unit	Controller, Power supply, Software		
Optical table with air spring ^{*8} (Vibration removal optical table with air spring)	Optical table(Steel honeycomb structure): 1500(W) × 800(H) × 1800(L)mm		
Physical characteristics ^{*9}	Main unit(including Laser, Optical unit, Irradiation unit and optical table): 1500(W) × 1800(H) × 1800(L)mm Control unit: 900(W) × 1000(H) × 570(L)mm (19 inch rack mount)		
Operating conditions	Main unit: AC100V/20A (Including Optical unit, Irradiation unit and Optical table) Laser: AC100V/60A@800nm, AC100V/20A@1028nm, AC100V/3A@1064nm		

*1 Harmonic module unit option
Wavelength800nm→Wavelength400nm/266nm
Wavelength1028nm→Wavelength515nm/343nm/257nm
Wavelength1064nm→Wavelength532nm/355nm/266nm

*2 High energy option

Up to 1.0mJ@1kHz

*3 High repetition rate option

Up to 10kHz@800nm

Up to 1MHz@1028nm

*4 Extend pulse duration option

Up to 10ps

*5 Beam shaping and Polarization conversion option

Top-hat beam, Multi-beam, etc

Circular, Radial and Azimuth polarization

*6 It is possible to select other stage.(linear motor, piezo motor stage, Galvo mirror, etc)

*7 It is possible to select porous ceramic vacuum table.

*8 It is possible to select rubber spring type and stone surface type.

*9 It will change physical characteristics depend on configuration.

* If you have any requests, It is possible to customize system.
Please do not hesitate to contact us.



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