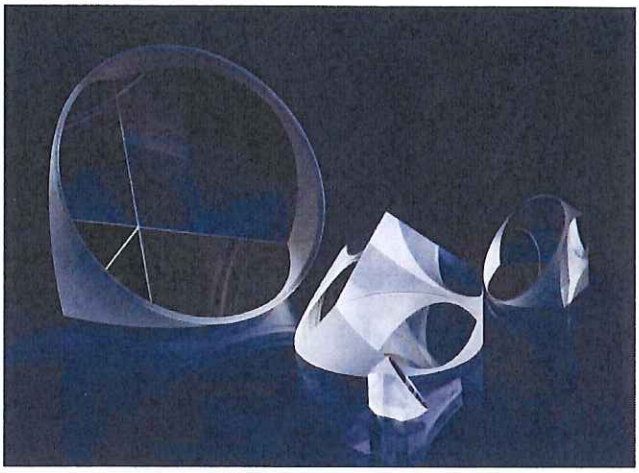
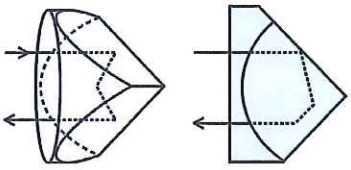
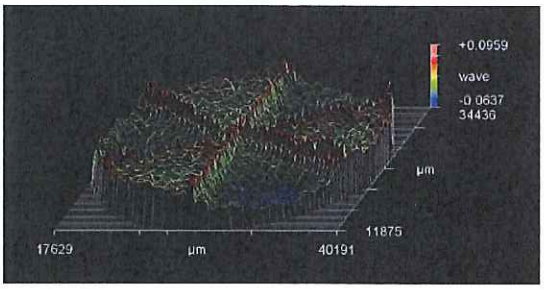
High Precision Optics

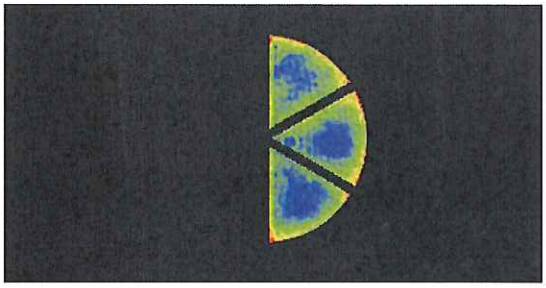
Corner Cube Prism (CCP)





Corner Cube Prisms (CCP) are triangular prisms consisted of three right angles of 90 degrees. Reflected beam has a characteristic of inevitably returning in the direction of the incoming optical axis. Processing from fused silica as well as optical glass is available upon your request.



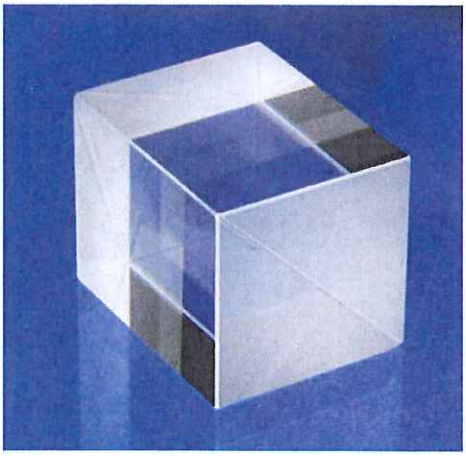


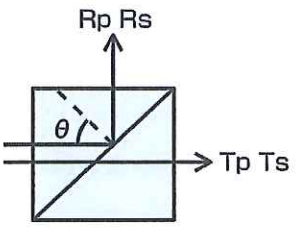
Size	●	φ25.4mm*19mm(h)	
Reflected Wavefront	●	PV	0.160 wave
		RMS	0.025 wave

*PV : Peak to Valley
*RMS: Root Mean Square

Size	●	φ25.4mm*19mm(h)
Max Beam Deviation	●	0.4 sec

Polarizing Beam Splitter (PBS) — Adhesive Free —

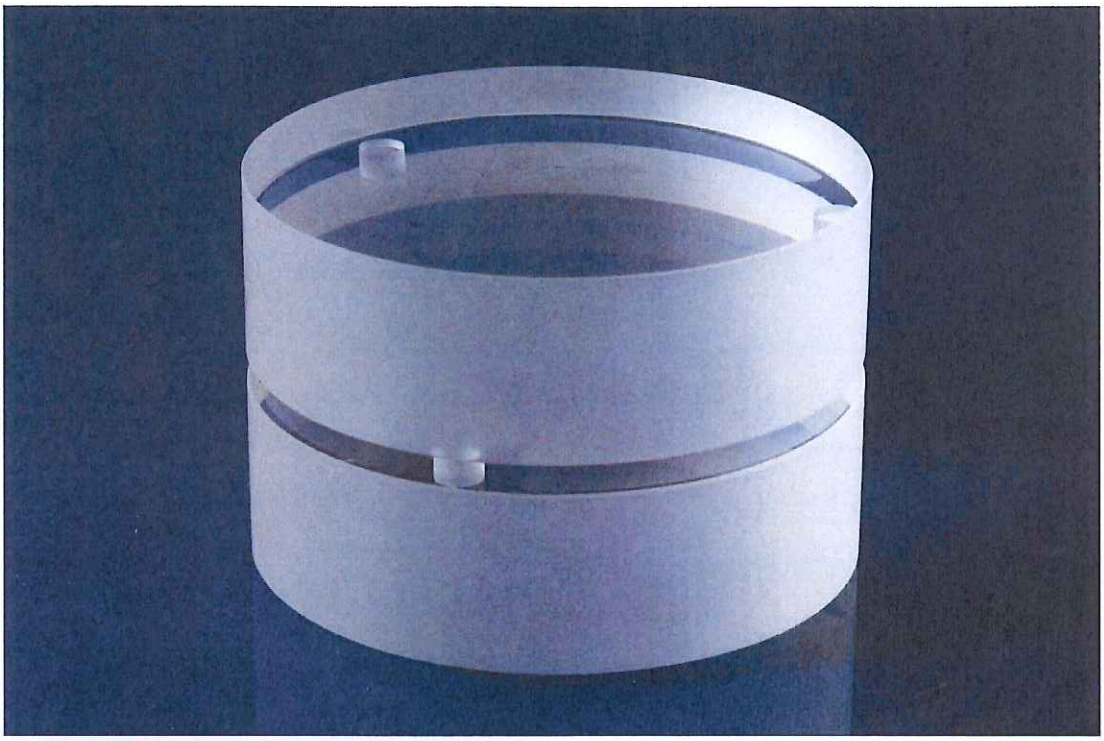


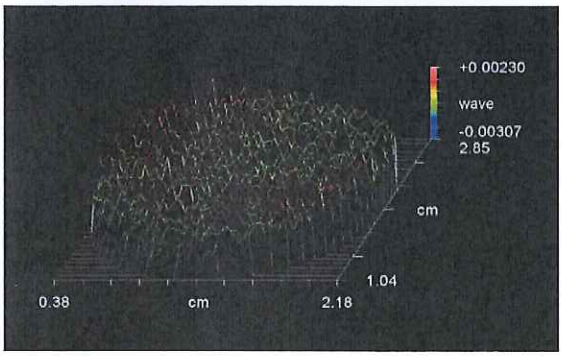


In the latest optical disk technologies (Blu-ray Disc, HD DVD) that use blue diodes, adhesives that have been used without any problems up to now have reached a limit in their reliability due to making luminous wavelengths shorter and the increase in energy density. In NITTO OPTICAL, a beam splitter bonding method with optical contact was developed as a solution for this problem

Optical components for Excimer Laser Lithography

Fabry-Perot Etalon





Size	●	ϕ30mm*10mm(t)
Surface Quality	●	PV 0.005 wave
		RMS 0.001 wave

*PV : Peak to Valley
*RMS: Root Mean Square

Fabry-perot Etalon is an optical element that has multiple reflections. Two parallel high reflectance planes (optical flat) are set by specific spacers in parallel. A reflection coating corresponding to the wavelength is deposited on the reflecting surface.

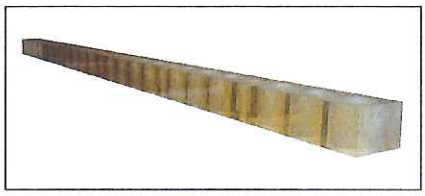
Measurement Bar Mirror for Semiconductor and LCD Steppers

Nitto Optical provides Bar Mirrors, which became large, high precision and diversified in materials with demand expansion for semiconductor and LCD market.

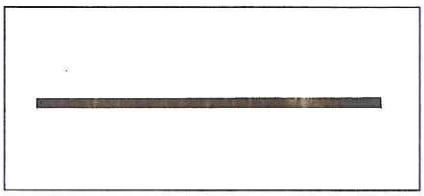
- ●Size : ~3300mm (please ask about size, shape, and materials)
- ●Flatness : μm~λ at 633nm
- ●Measuring Instrument : Mirror Flatness by ZYGO32(ϕ800) or 12″(ϕ300) interferometers
  (Please contact us for details about size, shape and materials.)

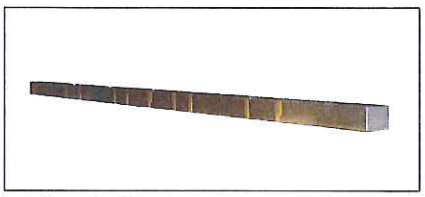
LCD Stepper Application

●Size: 100~3300mm (Please contact us for details about size, shape and materials.)

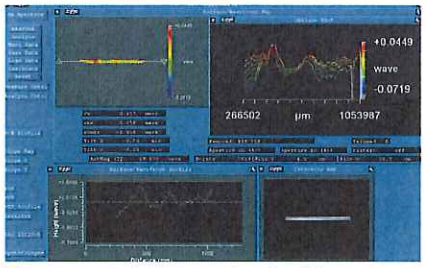


Ultra long bar mirror 3300mm class for G10 application





Long bar mirror 1500mm Class for G6

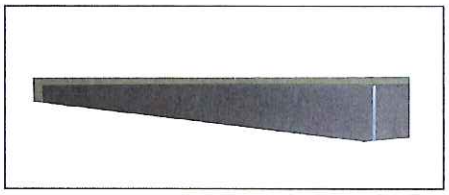


Measurement of 1500mm class Bar Mirror

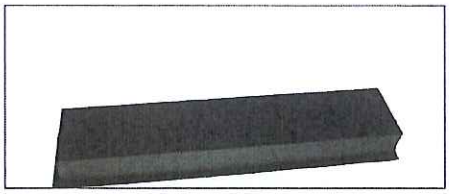
Measuring Instrument : ZYGO32 (ϕ800) Interferometer

Semiconductor Stepper Application

●Size: 100~1000mm (Please contact us for details about size, shape and materials.)

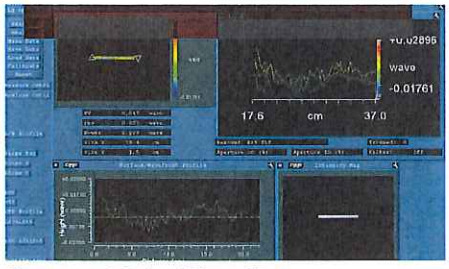


Ceramics Bar Mirror 400mm Class



SiC Ceramic Bar Mirror

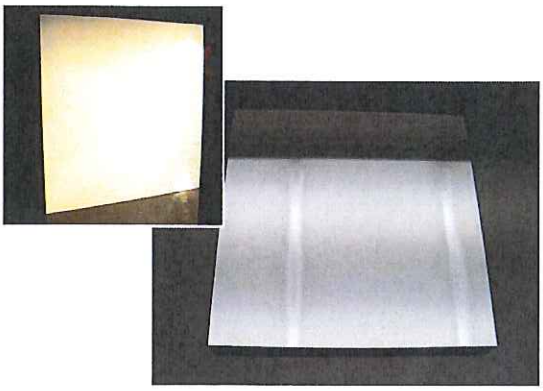
Measuring Instrument : ZYGO12″(ϕ300) Interferometer

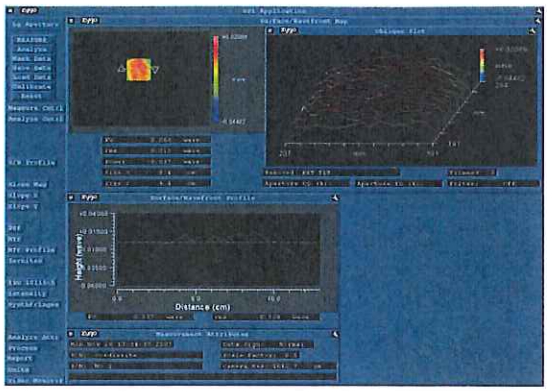


Measurement Data : 400mm Class

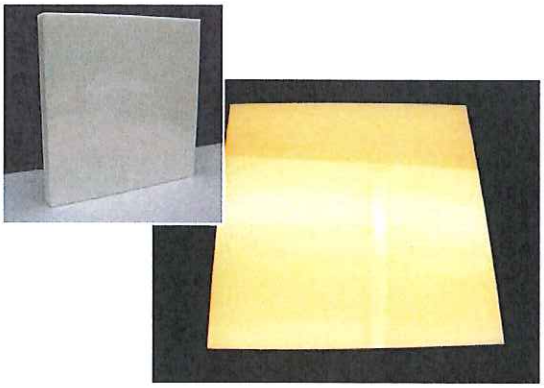
Ceramics Polishing and Coating

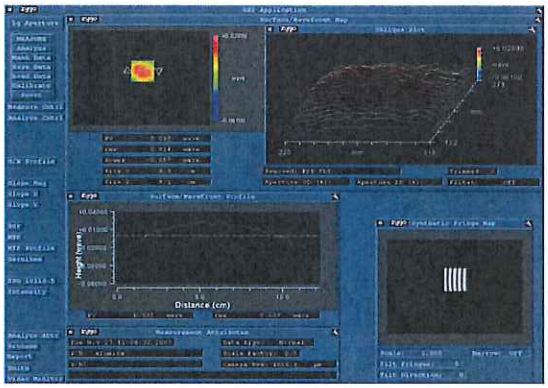
Cordierite



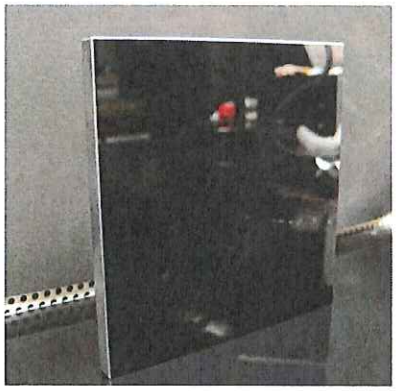


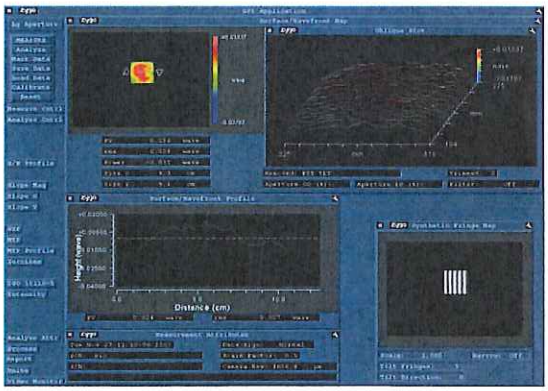
Alumina





SiC





Recently, ceramics are commonly used for semiconductor manufacturing equipment.
Nitto Optical is capable of Polishing and Coating various ceramics in very high quality.

Products Using Ion Beam Spattering (IBS)

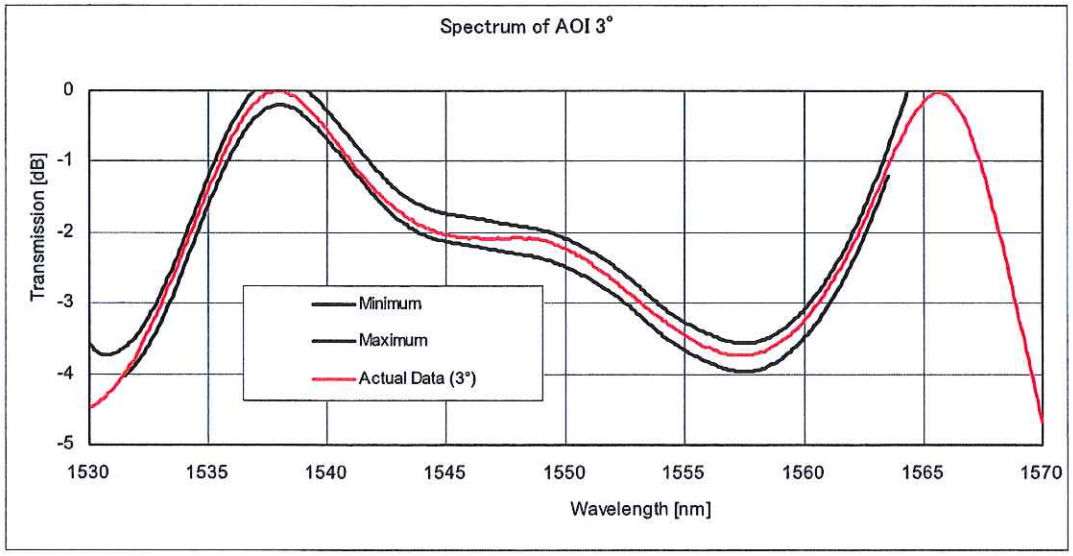
Low Scattering Mirror

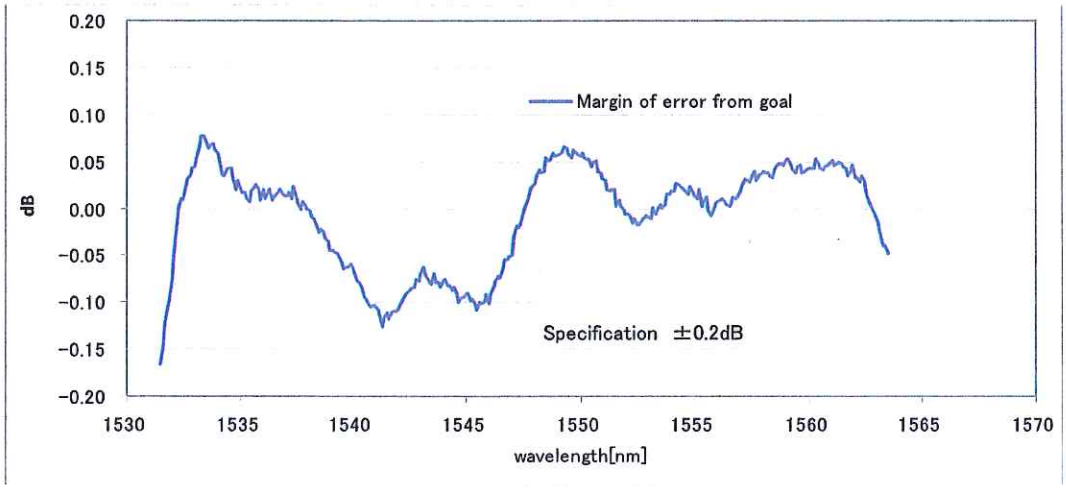
Specification

Work Size:	φ9×t4mm	AOI:	±7°
Material:	BK7	Reflectance:	99.993%
Wavelength:	633nm	Transmittance:	0.001%

※Detailed Specifications are available per your request.

Gain Flattening Filter





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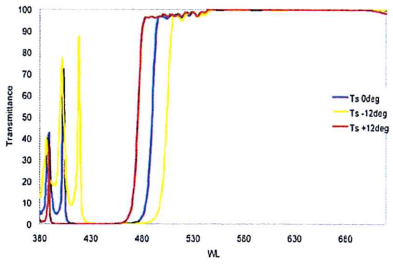
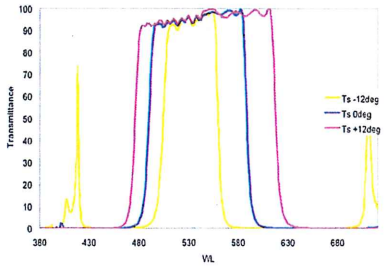
Micro Optics

■ Micro Optics for Laser Projector

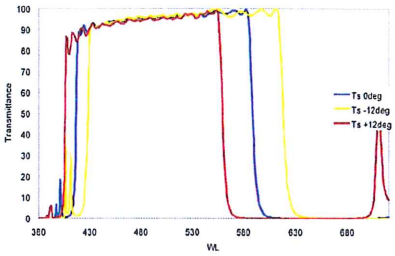
Blue Reflect Dichroic Specification (S-pol)



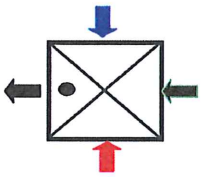
Green Transmit Dichroic Specification (S-pol)

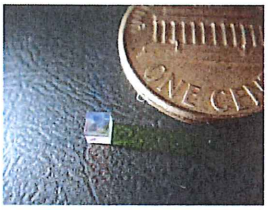


Red Reflect Dichroic Specification (S-pol)



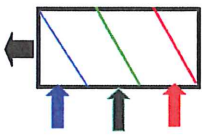
X-Cube Type

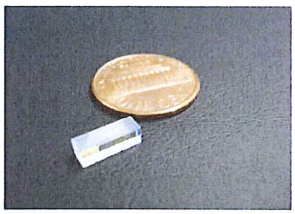




Product size on display: 2mm × 2mm

Rhomboid Type

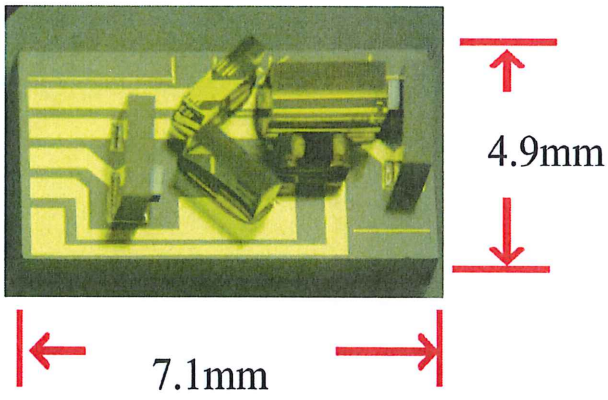




※ Shape, specification and quantity are available per your request

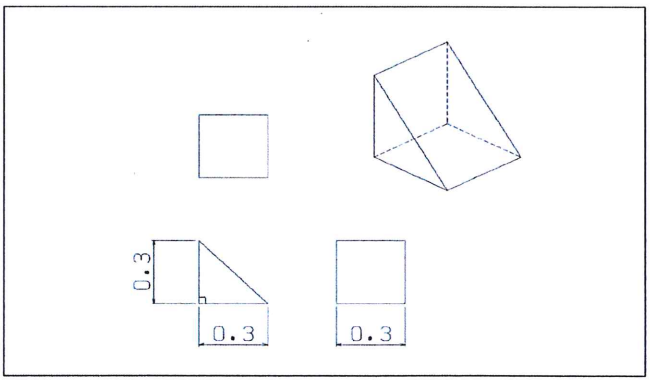
■ Micro Optics for Fiber Optics

Photo: Fiber Optics Equipment Assembly



■ Micro Optics for Medical

Image: Medical Optics



Product size on display: 0.3mm

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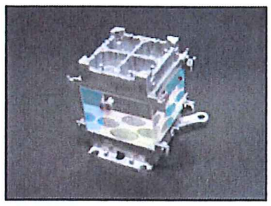
Optics for Projectors

The market of front projectors is expanding for a business presentation use recently. The growth of Home Theater and Large Rear-projection Television is also expected in the TV market in addition to business and education fields.

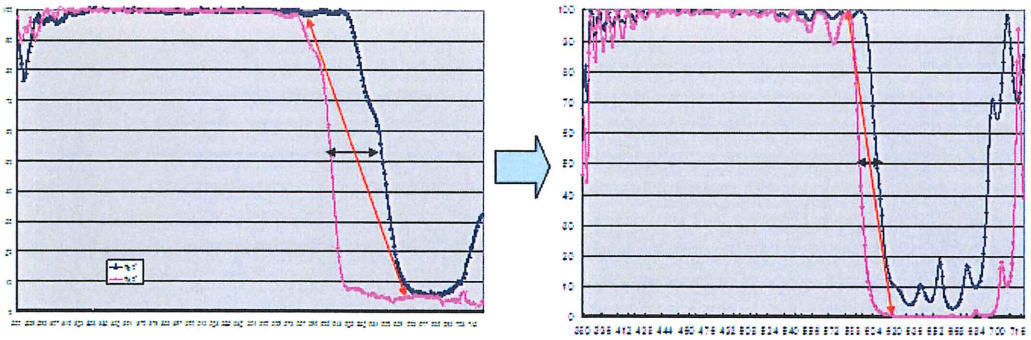
Nitto Optical provides the key parts of prisms and filters for projectors.

Technology for LED Light Source (X-Cube)



High performance coating characteristic with P-pol and S-pol (red)

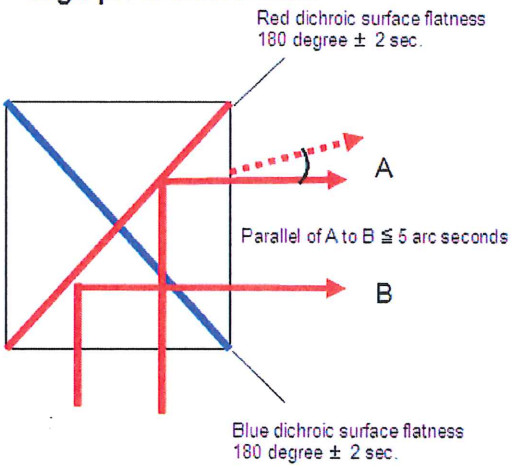
-Gap between P-pol and S-pol is narrow
-Cut-off is very steep



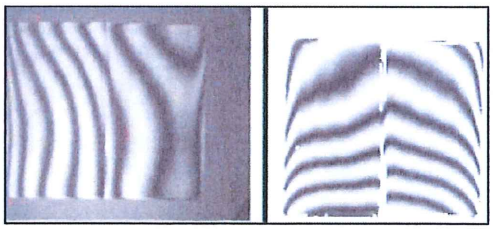
Technology for High Definition Projectors

As high definition projector's specification is improving, very small pixel pitch is required.
To match the requirement, prism's beam deviation must be very small.

High precision X-Cube



Example of precision X-Cube



Wedge Angle
Data = 1.350 sec

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High – coercivity FePt coated Magnetic Force Microscope (MFM) probe

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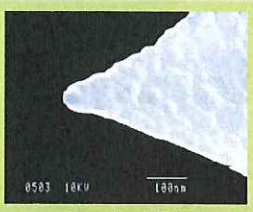
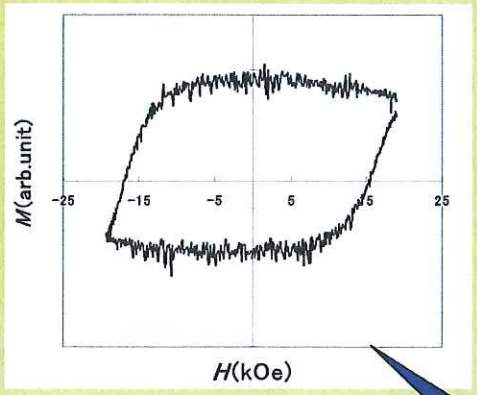


FePt coated probe SEM image with surface treatment

FePt coated probe SEM image without surface treatment



magnetization curve

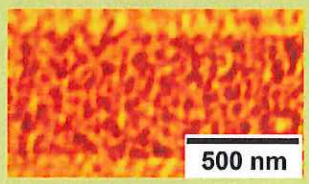
Nitto Optical succeeded in the development of the high coercivity FePt MFM probe.

Special surface treatment for Si probe has investigated to avoid reaction between Si probe - FePt films at heat-treatment ,as a result , the shape of probe maintained.

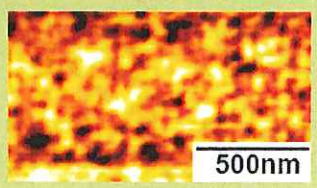
High-coercivity probe more than 10kOe

Example of the MFM measurement

- MFM Instrument: SPI3800N (SII Nano Technology Inc)
- operated in Vacuum · Q factor: 8000 · tip to sample distance : 10nm
- sample: CoCrPt-SiO2 perpendicular recording medium (*Hc*: 6.5kOe)
  Line recording density: 1000 kfci (Bit length: 25nm)



FePt Probe

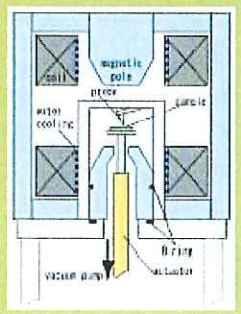


Conventional Probe (for comparison)

By the high coercivity of the probe, it can restrain a probe magnetization change by the stray magnetic field from an observation sample, as a result, the magnetic domain observation in the high resolution is possible.

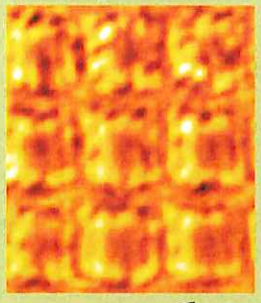
Example of the MFM measurement under magnetic field

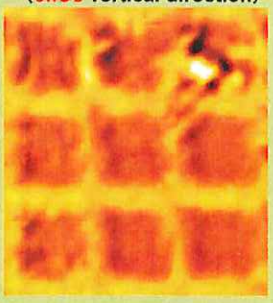
- MFM Instrument : SPA300HV
  with perpendicular magnetic field applying unit
  (SII Nano Technology Inc)
- operated in Vacuum · Q factor : 3000
- tip to sample distance : 20nm
- sample : FePt magnetic dot (*Hc*: 3.0kOe)

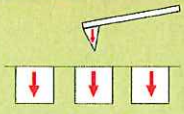


No magnetic field

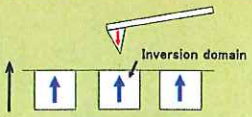
With external magnetic field (5kOe vertical direction)







Gravitation:
Bright contrast



Repulsion:
Dark contrast

Although magnetization of the FePt magnetic dot inverted by external magnetic field, probe magnetization doesn't change. As a result, the measurement in the magnetic field is possible.