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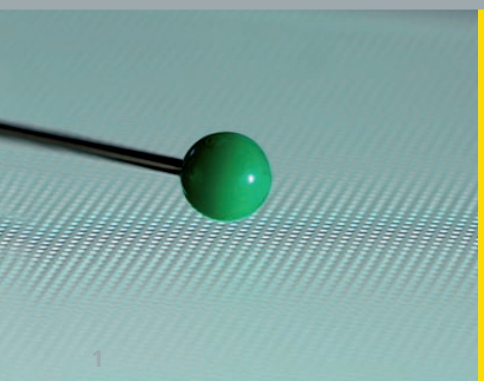

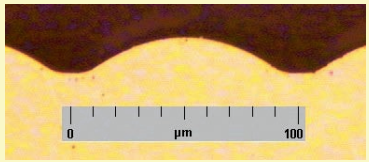

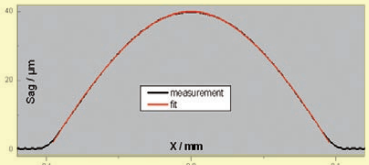

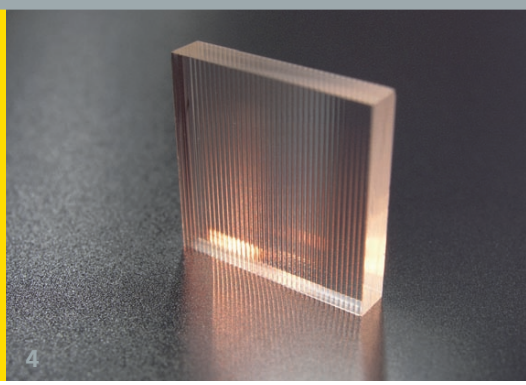

1 *RIE processed lens array in glass.*
2 *Cross section of etched cylindrical lenses.*
3 *Conical lens profile (NA=0.25, k=-2) dry etched in fused silica.*
4 *Chip diced optical element with double-sided aligned and focus matched cylinder lens arrays in borosilicate glass.*

MICRO OPTICS IN FUSED SILICA, BOROSILICATE GLASS AND SILICON

Objective

Fabrication of micro-optical elements with high durability, high laser damage threshold and transparency ranging from UV to IR in fused silica, borosilicate glass and silicon

Application

- UV, VIS and IR-optics
- Laser / Fiber-collimation
- Beam forming elements
- Homogenisation
- Fill factor enhancement of detector arrays

Characteristics

- Spherical and cylindrical lenses
- Diffractive elements
- Arrays with sub-µm position accuracy
- Aspherical lens profiles
- Lens sag up to approx. 50 µm
- Uniformity ± 2% on 100 mm Wafer
- Reproducibility ± 2%
- rms profile accuracy ± 0.3% of lens height within 95% of lens diameter
- Base material: Wafer Ø 100/150 mm, up to ca. 6 mm thickness

Technology

- Wafer-scale process technology on silicon, fused silica or borosilicate glass
- Primary pattern generation by lithography and polymer reflow or variable dose laser lithography
- Proportional transfer by plasma dry etching (RIE, ICP)
- Double-sided aligned processing
- Surface AR-Coatings
- Separation by chip dicing

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