iX-factory GmbH
Expert for Micro and Nano Technology

Customised Solutions
Customised Solutions

- About iX-factory GmbH
  - Our Services
  - Customer Benefits
  - Micro and Nanotechnology Portfolio
- Multidisciplinarity of Technologies
Located at Micro & Nanotechnology Cluster Dortmund (Germany)

20 years of profound expertise in the MEMS industry

Competence Centre for
  o MEMS / NEMS
  o BioMEMS / BioNEMS
  o Microfluidics
  o Optofluidics

→ Customised technical solutions
Development and fabrication on glass and silicon

Batch Production

Prototyping

Design / Project Work

MEMS Foundry Service
  - Batch processing
  - Single wafer processing
  - Second sourcing
Customer Benefits

Multidisciplinarity of Technologies
100% Innovation

Pure-play Foundry
100% Security

Glass und Silicon
100% Flexibility

State-of-the-Art Equipment
100% Quality

Short Time-to-Market
100% Efficiency
Customised Solutions

- About iX-factory GmbH
  - Our Services
  - Customer Benefits
- Micro and Nanotechnology Portfolio
  - Lithography
  - Dry Etching
  - Wet Etching
  - Bonding
  - Micro Powderblasting
  - Thin Film Techniques / Metallisation
- Multidisciplinarity of Technologies
Specifications:
- nm → µm → mm coating
- Spin coating
- Spray coating
- Polymer processing
- AR 1:10

Application:
Etch mask, lift-off, masters, permanent
direct structures, electroplating
lithography

SU-8 pillars of 800 µm
Glass and Silicon processing

<table>
<thead>
<tr>
<th>Technology</th>
<th>Glass</th>
<th>Silicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry etching</td>
<td>Anisotropic profile, profile control</td>
<td>Anisotropic profile, profile control, Bosch</td>
</tr>
<tr>
<td></td>
<td>Depth: ~ 60 µm</td>
<td>process; through wafer</td>
</tr>
<tr>
<td>Wet etching</td>
<td>Isotropic profile</td>
<td>Anisotropic profile; through wafer</td>
</tr>
<tr>
<td></td>
<td>Depth: ~ 500 µm</td>
<td>below angle 54.7° (standard silicon)</td>
</tr>
<tr>
<td>Micro sandblasting</td>
<td>Anisotropic profile below angle 70°</td>
<td>Anisotropic profile below angle 70°</td>
</tr>
<tr>
<td></td>
<td>Through wafer</td>
<td>Through wafer</td>
</tr>
</tbody>
</table>
Specifications:
- profile tuneable
- Bosch Process
- Though wafer
- AR 1:20
- Sidewall roughness <100 nm

Application:
Acceleration, mirrors, sensor, sieves, antimatter grid

COMB drives in DSOI wafers
Specifications:
- Positive tapered profile
- Angle tunable
- Depth 60 µm
- AR 1:5
- Sidewall roughness ~200 nm

Application:
Fluidic channels, micro lenses, wave guides

Fused silica groove structure
Specifications:

- Angles depends on crystal orientation of silicon, standard 54.7°
- Through wafer
- On depth
- V-grooves

Application:

- channels, cavities, though connections

KOH etched structure with SiN sensor tubes
Specifications:

- hydrofluoric acid (HF)
- isotropic ($\Delta h = \Delta v$)
- Depth 10nm up to 500 $\mu$m
- Bottom roughness <2 nm

Application:

Channels, Cavitations
Specifications:
- through holes or
- defined depth possible
- Side wall angle ~ 75°
- Depth > 100 µm
- Ra ~ 2.5 µm
- Pattern transfer of structures by lithography >150µm
- Perfect aligned

Applications:
- Channels, cavities, connection holes
- Eutectic, anodic, fusion, direct, multi stack bonding
- Glass, silicon, SOI or DSOI
- Nitride membrane

Application:
MEMS structures, mass spectrometer, leakage measurement, microfluidic structures

*Bonded stack with through connection*
Glass Direct Bonding

- Glass to glass
- No adhesion layer
- Up to 20 layers
- Very high bond strength
- For 100µm up 1100µm glass

Application:
Lab-on-a-Chip, micro reactors, CE chips, heat exchanger, microfluidic structures
Specifications:
- Refractive index controlled
- Stress controlled
- Low stress
- Uniformity 2%
- Oxides and Nitrides

Application:
Mask material, gladding, isolation layer, membranes, wave guides
Specifications:
- Stress controlled
- Uniformity 2 %
- Ag, Al, Au, ITO, Cr, Ni, Ti, TiW, Pt, Si, etc

Application:
Electrodes, heaters, mask, resistors, bond pads, conductive lines

5000 multilayer electrodes structures for intelligent micro fluidics
Applications:

- (Bio)MEMS
- Lab-on-a-Chip
- Micro Reactors
- Liquid Chromatography
- Capillary Electrophoreses Chip
- Micro Sieves
- Bio Chip
- Micro Lenses
Conclusion