SEMI-FINISHED BONDED SUBSTRATES CONSISTING OF LITHIUMTANTALATE AND SILICON

Materials
Fraunhofer ENAS uses common lithium tantalate and all monocrystalline standard silicon wafers for the fabrication.

Lithium tantalate:

<table>
<thead>
<tr>
<th>Type</th>
<th>LiTaO₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness range</td>
<td>250 – 500 µm</td>
</tr>
</tbody>
</table>

- Device layer thickness: from 10 µm up
- Edge geometry incl. flat(s): According to SEMI for monocrystalline Si wafers and special bondgap removal (Edge-Grind)
- Total thickness variation (TTV): 5 … 20 µm
- Warp: ≤ 100 µm

Surfaces
Fraunhofer ENAS offers these semi-finished bonded substrates with either ground or polished surfaces as required. The surface texture can be selected depending on the intended application (anodic bonding, direct bonding, etching, need for hydrophobic or hydrophilic surfaces etc.). With specially developed polishing techniques low surface roughness can be achieved within Angström range. The combination of polished and ground surfaces within semi-finished bonded substrates is possible.

Materials
Fraunhofer ENAS uses common lithium tantalate and all monocrystalline standard silicon wafers for the fabrication.

Lithium tantalate:

<table>
<thead>
<tr>
<th>Type</th>
<th>LiTaO₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness range</td>
<td>250 – 500 µm</td>
</tr>
</tbody>
</table>

- Device layer thickness: from 10 µm up
- Edge geometry incl. flat(s): According to SEMI for monocrystalline Si wafers and special bondgap removal (Edge-Grind)
- Total thickness variation (TTV): 5 … 20 µm
- Warp: ≤ 100 µm

Surfaces
Fraunhofer ENAS offers these semi-finished bonded substrates with either ground or polished surfaces as required. The surface texture can be selected depending on the intended application (anodic bonding, direct bonding, etching, need for hydrophobic or hydrophilic surfaces etc.). With specially developed polishing techniques low surface roughness can be achieved within Angström range. The combination of polished and ground surfaces within semi-finished bonded substrates is possible.

Materials
Fraunhofer ENAS uses common lithium tantalate and all monocrystalline standard silicon wafers for the fabrication.

Lithium tantalate:

<table>
<thead>
<tr>
<th>Type</th>
<th>LiTaO₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness range</td>
<td>250 – 500 µm</td>
</tr>
</tbody>
</table>

- Device layer thickness: from 10 µm up
- Edge geometry incl. flat(s): According to SEMI for monocrystalline Si wafers and special bondgap removal (Edge-Grind)
- Total thickness variation (TTV): 5 … 20 µm
- Warp: ≤ 100 µm

Surfaces
Fraunhofer ENAS offers these semi-finished bonded substrates with either ground or polished surfaces as required. The surface texture can be selected depending on the intended application (anodic bonding, direct bonding, etching, need for hydrophobic or hydrophilic surfaces etc.). With specially developed polishing techniques low surface roughness can be achieved within Angström range. The combination of polished and ground surfaces within semi-finished bonded substrates is possible.

Photo acknowledgments:
Fraunhofer ENAS
All information contained in this datasheet is preliminary and subject to change. Furthermore, the described systems, materials and processes are not commercial products.

Figure: Silicon-LiTaO₃-Silicon wafer level stack including electrical redistribution.

Contact
Fraunhofer Institute for Electronic Nano Systems ENAS
Technologie-Campus 3
09126 Chemnitz | Germany

Contact person
Dr. Maik Wiemer
Phone: +49 371 45001-233
E-mail: maik.wiemer@enas.fraunhofer.de

Dirk Wuensch
Phone: +49 371 45001-262
E-mail: dirk.wuensch@enas.fraunhofer.de

Photo acknowledgments:
Fraunhofer ENAS
All information contained in this datasheet is preliminary and subject to change. Furthermore, the described systems, materials and processes are not commercial products.

Figure: Silicon-LiTaO₃-Silicon wafer level stack including electrical redistribution.