Solid Diamond AFM Probes

The imec CAMS diamond AFM tips are made from solid boron-doped polycrystalline diamond. These tips enable high-resolution electrical AFM measurements requiring high forces, such as Scanning Spreading Resistance Microscopy (SSRM), both for contact and non-contact mode. Each probe has three cantilevers with distinct spring constants for ultimate versatility.

Tips

The tips are made of B-doped polycrystalline diamond in a pyramidal shape. The measured resistance of the diamond tips on a Platinum surface is between 10 and 1000 kΩ, depending on the tip radius. The electrical resolution is typically below 1 nm, as measured on a dedicated buried oxide sample (see image on the right).

Cantilevers

Each probe has three cantilevers with different spring constants covering a wide range of force constants, from 3 to 27 N/m. The Ni cantilevers are mounted on a metallized Si chip (3.4 x 1.6 x 0.4 mm).

Technical Specifications

<table>
<thead>
<tr>
<th>Cantilever</th>
<th>Spring Constant</th>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N/m) nominal</td>
<td>(μm)</td>
<td>(μm)</td>
<td>(μm) (±1)</td>
</tr>
<tr>
<td>Short</td>
<td>27</td>
<td>14-47</td>
<td>225</td>
<td>50</td>
</tr>
<tr>
<td>Medium</td>
<td>11</td>
<td>5-19</td>
<td>305</td>
<td>50</td>
</tr>
<tr>
<td>Long</td>
<td>3</td>
<td>1.6</td>
<td>465</td>
<td>50</td>
</tr>
</tbody>
</table>

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