Automated Sub-100 nm Local Anodic Oxidation (LAO)-Directed Nanopatterning of Organic Monolayer-Modified Silicon Surfaces

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Table S1. Water Contact Angle and Roughness of Different Organic Monolayers Covalently Bound to Si(111) Surfaces.

<table>
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<tr>
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<th>SiOx&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Si-H</th>
<th>Si-C&lt;sub&gt;10&lt;/sub&gt;H&lt;sub&gt;21&lt;/sub&gt;</th>
<th>Si-C&lt;sub&gt;12&lt;/sub&gt;H&lt;sub&gt;25&lt;/sub&gt;</th>
<th>Si-C&lt;sub&gt;16&lt;/sub&gt;H&lt;sub&gt;33&lt;/sub&gt;</th>
<th>Si-C&lt;sub&gt;10&lt;/sub&gt;H&lt;sub&gt;20&lt;/sub&gt;COOH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact angle &lt;sup&gt;b&lt;/sup&gt;</td>
<td>&lt; 10</td>
<td>90</td>
<td>107</td>
<td>108</td>
<td>108</td>
<td>45</td>
</tr>
<tr>
<td>Roughness &lt;sup&gt;c&lt;/sup&gt;</td>
<td>3.3</td>
<td>1.3</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
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</table>

<sup>a</sup> After oxidation in piranha solution.  <sup>b</sup> Uncertainty: ± 1°. <sup>c</sup> Root-mean-square roughness determined by AFM (uncertainty: ± 0.2 Å).

Figure S1. Simplified experimental setup for automated LAO-directed nanopatterning of modified silicon surfaces.
Supporting Information

Movie S1. Movie describing the automated motion of the AFM tip reproducing a boat drawing composed of vectors.

Figure S2. Patterns generated using an open-loop scanner. Lateral force microscopy image of oxide lines (A) and topography image of a vectorized star (B). The patterns have been electrogendated by LAO at 8 V using a writing speed of 0.1 μm s⁻¹. These images demonstrate that an AFM tip mounted on an open-loop scanner cannot be precisely positioned: the lines are not perfectly parallel (A) and do not cross at the same point (B).
Supporting Information

Figure S3. AFM images (1 × 1 µm²) of undecanoic acid (A) and hexadecyl (B) monolayer-modified Si(111) surfaces.