SUPPLEMENTARY MATERIAL

Benign and reproducible preparation of titanium tips

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Fig. S1: Statistics of tips etched with quality metrics.
Phase Diagram for Tip Etching of Ti in NaCl-containing Ethylene Glycol

- **X# (n/m)**
  - A: >100 nm
  - B: >100 nm & <500 nm
  - C: >500 nm & <1µm
  - D: >1µm (dull)
  - F: no tips or tips that take >5 hours to etch

- **# = tip smoothness**
  - 1: Smooth throughout
  - 2: Smooth, particulates present
  - 3: Rough, leveled surface
  - 4: Ragged and irregular

- **(n/m) = success ratio**

Diagram showing the relationship between applied voltage (DC) and mass % of H₂O in Electrolyte.
Fig. S2: EDX data of Ti wire surfaces before and after tip etching. No residue of the passive layer is detectible at the surface, in particular no chlorine residue. Carbon from ambient contamination is always detected, and hence no conclusions can be drawn. The relatively thick native oxide layer was removed by the etching except for a very thin fresh layer that was not detectible in EDX. SEM imaging was performed with a JEOL JSM-7000F scanning electron microscope, equipped with a Schottkytype field emission gun (FEG) filament. Energy-dispersive X-ray (EDX) spectroscopy was carried out using a 15 kV accelerating voltage. INCA 300, EDX System (Oxford, UK) software was used for the data acquisition and analysis.

<table>
<thead>
<tr>
<th>Element</th>
<th>Atom% before etch</th>
<th>Atom% after etch</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>8.69</td>
<td>5.25</td>
</tr>
<tr>
<td>O</td>
<td>7.15</td>
<td>0.00</td>
</tr>
<tr>
<td>Na</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Al</td>
<td>0.43</td>
<td>1.04</td>
</tr>
<tr>
<td>Cl</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Ti</td>
<td>83.72</td>
<td>93.71</td>
</tr>
</tbody>
</table>

EDX spectrum before etch

EDX spectrum after etch

SEM images before etch

SEM images after etch