Supporting Information

Short-Range Ordered-Disordered Transition of NiOOH/Ni(OH)_2 Pair Induces Switchable Wettability

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Contents
(1) Supplementary Figures and Table

Figure S1. Plating profile of amorphous and nanoporous NiOOH.
Figure S2. Long-term stability and cycling test.
Figure S3. Roughness of FTO and stainless steel.
Figure S4. A photograph of shape deformation on rough SS before detachment, leading to the calculated adhesion force between the water droplet and Ni(OH)_2/SS of 33μN.
Figure S5. Conventional XRD of as-prepared film and its exposure to high EC for 1 hr, and to UVO_3 for 10 mins.
Figure S6. (a) Ordered Ni-LDH, (b) turbostratic disordered Ni(OH)_2 and (c) short-range disordered Ni(OH)_2 where the basal planes face the air at a certain angle.
Figure S7. A photograph of the smiling pattern with wet eyes and mouth on a dry face.
Figure S8. (a) Cathodic waves of cyclic voltammetry for nickel. The inset is a photograph of the nickel strips. (b) Gold nanoparticles suspended on the scaffolds of hydrophobic Ni(OH)_2 at -2V.

Table S1. Summary of the O 1s peak fitting results for the O\textsuperscript{2−}, OH\textsuperscript{−} and hydroscopic H_2O.

(2) Supplementary Videos
Video S2. The proof of good water-repellancy between the Ni(OH)_2/SS and the water roplet.
Video S3. The real-record of 2D microfluidic channels with optical microscopy.
Figure S1. Plating profile of amorphous and nanoporous NiOOH.

Figure S2. (a) Long-term stability of wetting state (NiOOH/FTO) and dewetting state ((Ni(OH)₂/FTO) stored at ambient atmosphere during 8 days. (b) Dewetting state (Ni(OH)₂ stored at ambient atmosphere after 3 months. (c) Cycling test upon environmental chamber and UV/ozone alternatively. (d) FE-SEM image of hydrophobic Ni(OH)₂ film with micro-collapse after thermally cycling test.
Figure S3. Roughness of FTO and stainless steel.

Figure S4. A photograph of shape deformation on rough SS before detachment, leading to the calculated adhesion force between the water droplet and Ni(OH)$_2$/SS of 33μN by balancing vertical forces, as shown in equation (S1).

\[
f = \pi R_x \sqrt{1 + \frac{R_x}{R_y}} - \rho V g
\]

where \( \gamma \) is surface tension of water, \( R_x \) and \( R_y \) are the principal radii of curvature. The last term represents the gravitational force acting on the lower part of the water droplet, where \( \rho \) and \( V \) are the density and volume of lower part of water droplet, and \( g \) is the gravitational acceleration.
Figure S5. Conventional XRD of as-prepared film and its exposure to high EC for 1 hr, and to UVO₃ for 10 mins.

Figure S6. (a) Ordered Ni-LDH, (b) turbostratic disordered Ni(OH)₂ and (c) short-range disordered Ni(OH)₂ where the basal planes face the air at a certain angle.
**Table S1.** Summary of the O 1s peak fitting results for the $O^{2-}$, $OH^-$ and hydroscopic $H_2O$.

<table>
<thead>
<tr>
<th>Sample/Area</th>
<th>$O^{2-}$</th>
<th>$OH^-$</th>
<th>hydroscopic $H_2O$</th>
<th>$O^2/OH^-$</th>
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</thead>
<tbody>
<tr>
<td>As-prepared</td>
<td>22,480</td>
<td>23,286</td>
<td>4,642</td>
<td>0.97</td>
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<tr>
<td>High EC</td>
<td>0</td>
<td>45,120</td>
<td>0</td>
<td>0</td>
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<tr>
<td>UVO$_3$</td>
<td>11,273</td>
<td>35,344</td>
<td>5,532</td>
<td>0.32</td>
</tr>
</tbody>
</table>

**Figure S7.** A photograph of the smiling pattern with wet eyes and mouth on a dry face.

**Figure S8.** (a) Cathodic waves of cyclic voltammetry for nickel. The inset is a photograph of the nickel strips. (b) Gold nanoparticles suspended on the scaffolds of hydrophobic Ni(OH)$_2$ at -2V.