Supporting Information

Ultrahigh-Sensitive Finlike Double-sided E-skin for Force Direction Detection

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Figure S1. (a) Macroscopic photo of the CNTs sponge. (b) Schematic diagram of the CNTs sponge.

Figure S2. Macroscopic photographs of the CNTs sponge before (a) and after (b) compression.
Figure S3. Raman spectra of the CNTs sponge.

Figure S4. (a), (b) Single interdigital electrode parameters and macroscopic photo. (c), (d) The $4 \times 4$ elements array interdigital electrode parameters and macroscopic photo.
Figure S5. The macroscopic photos of the e-skin assembly process. (a) The interdigital electrode was attached to PDMS. (b) Carbon nanotube sponge was coated on the interdigital electrode, and then coated with PDMS.

Figure S6. The sensitive retention as a function of loading-unloading cycles. The sensitivity remains greater than 90% of the original value even after 5,000 cycles.
Figure S7. I-V measurements for forward and backward sweepings of voltages from -1 to 1 V at an external pressure of 6 kPa.

Figure S8. Physical picture of the wireless detection system.
Table S1. Performance comparison of the current pressure sensor with previously reported pressure sensors in sensitivity, linearity, and testing range.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Sensitivity (kPa$^{-1}$)</th>
<th>Linearity (kPa)</th>
<th>Identification Range (kPa)</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Ti$_3$C$_2$</td>
<td>180.1</td>
<td>0-5</td>
<td>40</td>
<td>38</td>
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<tr>
<td>MXene-sponge network</td>
<td>442</td>
<td>5.37-18.56</td>
<td>20</td>
<td>31</td>
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<tr>
<td>Graphene</td>
<td>25.1</td>
<td>0-2.6</td>
<td>40</td>
<td>19</td>
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<tr>
<td>Graphene sheet</td>
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<td>0-25</td>
<td>30</td>
<td>40</td>
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<td>Carbon block-sponge</td>
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<td>0.091-16.4</td>
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<td>Graphene-Silicon</td>
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<td>60</td>
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<td>polypyrrole/PDMS micropyramid</td>
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<td>Ag NW/PDMS rough film</td>
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<td><strong>0-4</strong></td>
<td>100</td>
<td><strong>Our work</strong></td>
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<td>CNTs sponge</td>
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<td><strong>4-20</strong></td>
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