Electronic Supporting Information for:

“3D-Printed Poly(vinylidene fluoride) / Carbon Nanotube Composites as a Tuneable, Low-Cost Chemical Vapour Sensing Platform”

Zachary C. Kennedy, Josef F. Christ, Kent A. Evans, Bruce W. Arey, Lucas E. Sweet, Marvin G. Warner, Rebecca L. Erikson, and Christopher A. Barrett*

*Pacific Northwest National Laboratory, P.O. Box 999, Richland, WA 99352 (USA)
Email: chris.barrett@pnnl.gov

PVDF filament thickness with MWCNT loading:

**Figure S1**: Average (n > 3) diameter of filament after extrusion at 200 °C through a 1.56 mm diameter die. PVDF-HFP exhibited a similar reduction in filament diameter as PVDF homopolymer when blended with MWCNTs; however, the swelling was suppressed to a lesser extent at each ratio.
**Figure S2:** A two-layer (10:90)-MWCNT/PVDF dogbone sensor held between two sets of tweezers demonstrating the high flexibility of the printed composite materials.

**Figure S3:** Structural characterization of (15:85)-MWCNT/PVDF 3D-printed composites using XRD as printed (room temp.), heated at 90 °C for 4 h, and 150 °C for 4 h. Reference patterns for CNTs, α-PVDF, and γ-PVDF are provided.

Further discussion of XRD results: Thin-film samples are extruded and printed with exposure to high temperature for only seconds at each step. To assess this short-term exposure, denoted as the ‘RT’ condition, relative to a longer-term heating treatment, the printed coupon was annealed at increased temperatures for extended time periods. Heating of the sample at 90 °C for 4 h (Figure S3) did not result in noticeable PVDF phase changes. However, upon heating the sample at 150 °C for 4 h, the overall diffraction intensity of PVDF decreased relative to the CNT peak at 2θ = 26° significantly, suggesting reduced crystallinity in the polymer.
Figure S4: Top-down HeIM image of a 3D-printed (15:85)-MWCNT/PVDF dogbone.

Figure S5: Results from acetone sensing over 25 exposure-vacuum cycles (2 min each) with a printed, single-layer (15:85)-MWCNT/PVDF dogbone sensor. The first and last 8 cycles are shown for clarity.
<table>
<thead>
<tr>
<th>MWCNT loading (%)</th>
<th>$R_{\text{avg}}$ increase w/ acetone (%)</th>
<th>$R_{\text{avg}}$ decrease w/ vacuum (%)</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>161.3 ± 24.7</td>
<td>139.6 ± 21.5</td>
</tr>
<tr>
<td>10</td>
<td>78.5 ± 9.6</td>
<td>60.3 ± 10.3</td>
</tr>
<tr>
<td>15</td>
<td>26.0 ± 2.8</td>
<td>19.5 ± 1.2</td>
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</tbody>
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**Table S1:** Results from acetone sensing over 4 exposure-vacuum cycles as a function of MWCNT content in MWCNT/PVDF printed dogbone sensors composed of a single printed layer. *(Plotted in Figure 7 of the main text).*