Tunable multilayer assemblies of nanofibrous composite mats as permeable protective materials against chemical warfare agents

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Supporting Information

Table S1: Mechanical properties of pristine polyamide 66 nanofiber (PANF) and composite nanofiber mats ([I]MgO/PANF and [I]POM/PANF).

<table>
<thead>
<tr>
<th></th>
<th>Modulus (N/mm²)</th>
<th>Tensile stress at yield (MPa)</th>
<th>Tensile strain at yield (%)</th>
<th>Tensile stress at break (MPa)</th>
<th>Tensile strain at break (%)</th>
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</thead>
<tbody>
<tr>
<td>PANF</td>
<td>209.51 ± 13.73</td>
<td>5.23 ± 0.20</td>
<td>2.45 ± 0.18</td>
<td>25.47 ± 1.07</td>
<td>42.10 ± 1.74</td>
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<tr>
<td>[I]MgO/PANF</td>
<td>253.07 ± 21.42</td>
<td>6.52 ± 0.04</td>
<td>2.09 ± 0.25</td>
<td>24.62 ± 1.95</td>
<td>36.09 ± 1.86</td>
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<tr>
<td>[I]POM/PANF</td>
<td>228.94 ± 19.54</td>
<td>4.64 ± 0.01</td>
<td>2.10 ± 0.01</td>
<td>18.86 ± 0.97</td>
<td>41.79 ± 1.54</td>
</tr>
</tbody>
</table>
Figure S1: Schematic representation of the simultaneous electrospinning and electrospraying (SEE) process.
Figure S2: First and second differential scanning calorimetry curves of mANF. The glass transition temperature ($T_g$) of mANF was detected at around 273 °C.
Figure S3: Schematic representations of experimental systems used to investigate the resistance of the composite nanofiber mats to permeation by gas CWA simulants according to a modified ASTM F739 standard.
Figure S4: Fabrication of assemblies of composite nanofiber mats via adhesion with glue spraying and hot pressing.
Figure S5: Schematic representation of the permeation experiments performed according to the TOP 8-2-501 standard.
Figure S6: Morphology of pristine meta-aramid nanofibers. Double headed arrows show the alignment direction of the meta-aramid nanofibers. The scale bar represents 1 μm.
Figure S7: EDS mapping image of (a) MgO/mNAF and (b) POM/mANF nanofibre composites.
Figure S8: Morphology of pristine polyamide 66 nanofibers. The scale bar represents 1 μm.
Figure S9: Flow pore characteristics of the nanofiber mats PANF and [I]MgO/PANF measured by capillary flow porometry.
Figure S10: Penetration behavior of CWA simulants through assemblies containing MgO: (a) 2-CEES and (b) DMMP.