MoS₂复合纳滤膜的制备及其光热抗菌性能的研究

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图 S1 Structural formula of electronegativity dye Evans Blue

图 S2 A digital photograph of a TCT-MoS₂-0.70 laminar membrane with a diameter of around 13 cm.
Figure S2 Surface and cross-section morphologies of a series of TCT-MoS2 laminar membranes.
**Figure S3** Surface roughness of a series of TCT-MoS$_2$ laminar membranes. The scale of the AFM image is $25.0 \times 25.0 \ \mu m^2$.

**Figure S4** FT-IR spectra of a series of TCT-MoS$_2$ laminar membranes.
Figure S5 (a) XPS and (b) XRD spectra of PAN substrates, TA-MoS$_2$-0.70 and TCT-MoS$_2$-0.70 laminar membranes.

Table S1 Chemical compositions of PAN substrates, TA-MoS$_2$-0.70 and TCT-MoS$_2$-0.70 laminar membranes.

<table>
<thead>
<tr>
<th>Sample</th>
<th>C (%)</th>
<th>O (%)</th>
<th>N (%)</th>
<th>S (%)</th>
<th>Mo (%)</th>
<th>O/C</th>
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<tbody>
<tr>
<td>PAN substrates</td>
<td>71.35</td>
<td>19.42</td>
<td>9.22</td>
<td>/</td>
<td>/</td>
<td>0.272</td>
</tr>
<tr>
<td>TA-MoS$_2$-0.70</td>
<td>75.18</td>
<td>16.04</td>
<td>/</td>
<td>5.88</td>
<td>2.89</td>
<td>0.213</td>
</tr>
<tr>
<td>TCT-MoS$_2$-0.70</td>
<td>72.75</td>
<td>19.76</td>
<td>/</td>
<td>5.08</td>
<td>2.41</td>
<td>0.272</td>
</tr>
</tbody>
</table>

Figure S6 (a) Zeta potentials and (b) water contact angles of a series of TCT-MoS$_2$ laminar membranes. The Zeta potentials are measured under different pH values.
**Figure S7** UV-vis spectra of the soaking solutions of TA-MoS2-0.70 and various TCT-MoS2 laminar membranes in (a) NaOH solution (pH = 13), (b) acetone and (c) HCl solution (pH = 1), respectively. The immersion time is 24 h.

**Figure S8** Nanofiltration performances of TMC-TA and TCT-MoS2 laminar membranes with different mass thickness of TA-MoS2 nanosheets. Test conditions: Na2SO4 concentration = 1.0 mg/mL, temperature = 25 °C, pressure = 0.6 MPa, and cross-flow rate = 30 L/h.
Figure S9 The permeation and MgSO₄ rejection of the TCT-MoS₂-0.70 laminar membranes as a function of time. Test conditions: MgSO₄ concentration = 1.0 mg/mL, temperature = 25 °C, pressure = 0.6 MPa, and cross-flow rate = 30 L/h.

Figure S10 Surface temperatures of diverse TCT-MoS₂-0.70 laminar membranes under NIR irradiation (808 nm) as a function of power density detected by an IR camera.
Figure S11 (a) UV-vis spectra of the eluent and (b) TA release of TA-MoS\textsubscript{2}-0.70 and TCT-MoS\textsubscript{2}-0.70 laminar membranes under NIR irradiation for 30 min in wet and dry states, respectively. The power density and irradiation time of NIR laser are 818 mW/cm\textsuperscript{2} and 30 min, respectively.

Figure S12 The time-independent flux of TCT-MoS\textsubscript{2}-0.70 laminar membranes under NIR irradiation. The power density and irradiation time of NIR laser are 818 mW/cm\textsuperscript{2} and 30 min, respectively.