Electronic Supplementary Information

A fluorimetric nitrite biosensor with polythienothiophene fullerene thin film detectors for on-site water monitoring

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Nanomaterial characterization

Surface morphology

Fig. S1 AFM topography image (scan size 6×6μm) of the fabricated BHJ film.
Experimental methods

**Composition of aquaculture background water**

**Table S1.** Description of components and quantities for the preparation of aquaculture background water with soft hardness

<table>
<thead>
<tr>
<th>Components</th>
<th>Concentration in 1L (mg L⁻¹)</th>
<th>Molar Mass (g mol⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaHCO₃</td>
<td>12</td>
<td>84.01</td>
</tr>
<tr>
<td>CaSO₄·2H₂O</td>
<td>7.5</td>
<td>172.19</td>
</tr>
<tr>
<td>MgSO₄</td>
<td>7.5</td>
<td>120.38</td>
</tr>
<tr>
<td>KCl</td>
<td>0.5</td>
<td>74.55</td>
</tr>
</tbody>
</table>
**Experimental results**

*Calibration curve with aquaculture background water*

![Calibration curve with aquaculture background water](image)

**Fig. S2.** Dose-response curve of nitrite detection in aquaculture background water using the PTB7:PC$_{70}$BM OPD fluorimetric biosensor. SNR was determined by the ratio of photocurrent due to nitrite detection to that obtained with no addition of water sample. Detection tests were conducted in triplicate ($n=3$), RSD<9.5%. 

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S4
Experimental results

Detection tests in different matrices

Fig. S3. Detection of nitrite in standard (DI water background) and aquaculture background water samples using the PTB7:PC_{70}BM OPD fluorimetric biosensor. Detection tests were conducted in triplicate (n=3) for the concentrations 5.5 μM (S1), 15.4 μM (S2) and 20 μM (S3).