Supporting information

Figure S1. $^1$H-NMR spectrum of FHE

Figure S2. $^{13}$C-NMR spectrum of FHE
Figure S3. An HR-Mass spectrum of FHE

Figure S4. Changes in photophysical properties of FHE upon interaction with various cations and anions observed under visible light (top) and UV lamp with the wavelength 315 nm (bottom).

Benesi-Hildebrand equation

\[
\frac{1}{(F - F_0)} = \frac{1}{K_a(F_{\text{max}} - F_0)} \frac{1}{[Zn^{2+}]} + \frac{1}{(F_{\text{max}} - F_0)} \quad (\text{Eq. S1})
\]

Where,

- \( F_0 \) is the fluorescence of FHE (\( \lambda_{\text{ex}} = 305 \) nm, \( \lambda_{\text{em}} = 503 \) nm)
- \( F \) is the fluorescence intensity in the presence of the varying \([Zn^{2+}]\)
- \( F_{\text{max}} \) is the maximum fluorescence intensity (\( \lambda_{\text{ex}} = 305 \) nm, \( \lambda_{\text{em}} = 503 \) nm) up on titration with \([Zn^{2+}]\)
- \( K_a \) is the association constant (M\(^{-1}\))
- \([Zn^{2+}]\) is the concentration of the Zn\(^{2+}\) ion added during titration study
Table S1. Comparison of FHE and reported probes used for the Zn$^{2+}$ detection

<table>
<thead>
<tr>
<th>Probe Structure</th>
<th>Stokes shift (nm)</th>
<th>LOD (nM)</th>
<th>Detection mechanism</th>
<th>Solvent</th>
<th>Application</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Probe 1" /></td>
<td>140</td>
<td>650</td>
<td>CHEF</td>
<td>H$_2$O/ethanol (8 : 2, v/v)</td>
<td>×</td>
<td>✔</td>
</tr>
<tr>
<td><img src="image2.png" alt="Probe 2" /></td>
<td>135</td>
<td>98</td>
<td>PET</td>
<td>ACN</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><img src="image3.png" alt="Probe 3" /></td>
<td>135</td>
<td>95</td>
<td>CHEF</td>
<td>Ethanol</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><img src="image4.png" alt="Probe 4" /></td>
<td>129</td>
<td>5070</td>
<td>CHEF</td>
<td>THF/H$_2$O (8:2, v/v)</td>
<td>×</td>
<td>✔</td>
</tr>
<tr>
<td><img src="image5.png" alt="Probe 5" /></td>
<td>88</td>
<td>284</td>
<td>PET</td>
<td>CH$_3$OH/H$_2$O, (9:1, v/v)</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><img src="image6.png" alt="Probe 6" /></td>
<td>114</td>
<td>77.4</td>
<td>PET</td>
<td>CH$_3$OH</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><img src="image7.png" alt="FHE" /></td>
<td>198</td>
<td>12.7</td>
<td>CHEF</td>
<td>HEPES Buffer (pH = 7.4, ACN 50%, v/v)</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

LOD, limit of detection; CHEF, complexation induced fluorescence enhancement; ACN, acetonitrile; PET, photoinduced electron transfer;

References


