Electronic Supplementary data

For

Development of a facile and sensitive fluorimetric derivatization reagent for detecting formaldehyde

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Fig. S1 $pK_a$ values of amino groups calculated by MarvinSketch software using macro mode and dynamic acid/base prefix at 298 K

Fig. S2 HRMS spectrum of isolated reaction product of NA3 and formaldehyde
Fig. S3 (a) Photographs of the white filter paper (left) and prepared test paper (right) under natural light, (b) photographs of the test paper in the absence and presence of formaldehyde under natural light. 1, blank; 2, formaldehyde in MeCN (10 % HOAc) solution; 3, formaldehyde in water solution; 4, formaldehyde-contained air condition.

Table S1. Detailed comparison of the reagent NA3 with other reported fluorimetric derivatization reagents

<table>
<thead>
<tr>
<th>regent</th>
<th>reaction site</th>
<th>( \lambda_{em}/ \text{nm} )</th>
<th>detection limit /ΜΜ.L(^{-1} )</th>
<th>reaction time</th>
<th>comment</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>hydralazine</td>
<td>hydrazine</td>
<td>389</td>
<td>0.067</td>
<td>25 min</td>
<td>100°C</td>
<td>1.</td>
</tr>
<tr>
<td>AAA</td>
<td>carboxide</td>
<td>368</td>
<td>0.02</td>
<td>10-30 min</td>
<td>in the presence of ammonia</td>
<td>2</td>
</tr>
<tr>
<td>FAP-1</td>
<td>amino</td>
<td>662</td>
<td>5.0</td>
<td>2 h</td>
<td>--</td>
<td>3.</td>
</tr>
<tr>
<td>FP1</td>
<td>amino</td>
<td>650</td>
<td>10.0</td>
<td>3 h</td>
<td>37 °C</td>
<td>4</td>
</tr>
<tr>
<td>NPz</td>
<td>hydrazine</td>
<td>540</td>
<td>8.72</td>
<td>4 min</td>
<td>room temperature</td>
<td>5</td>
</tr>
<tr>
<td>RFFP</td>
<td>amino</td>
<td>359, 451</td>
<td>18.7</td>
<td>&gt; 3h</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td>NA3</td>
<td>hydrazine</td>
<td>515</td>
<td>0.104</td>
<td>9min</td>
<td>room temperature</td>
<td>this work</td>
</tr>
</tbody>
</table>

Fig. S4 $^1$H-NMR spectrum of NA1

Fig. S5 $^{13}$C-NMR spectrum of NA1
Fig. S6 HR-ESI-MS spectrum of NA1

Fig. S7 $^1$H-NMR spectrum of NA2
Fig. S8 $^{13}$C-NMR spectrum of NA2

Fig. S9 HR-ESI-MS spectrum of NA2
Fig. S10 $^1$H-NMR spectrum of NA3

Fig. S11 $^{13}$C-NMR spectrum of NA3
Fig. S12 HR-ESI-MS spectrum of NA3

Fig. S13 HPLC spectrum of NA3
Reference: