Supporting Information Available for

Synthesis, Reaction, and Optical Properties of Cyclic Oligomers bearing 9,10-Diphenylantracene Based on an Aromatic Tertiary Amide Unit

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Scheme S1. Synthetic route to cyclic aromatic oligomers C3A’ and C4A’.

C3A’
Yield, 25%. M.p. >300 °C. $^1$H NMR ($\delta$, 600 MHz, ppm, CDCl$_3$) 7.64 (d, $J = 8.0$ Hz, 6H), 7.54 (d, $J = 8.9$ Hz, 6H), 7.47 (d, $J = 8.9$ Hz, 6H), 7.41 (d, $J = 8.2$ Hz, 6H), 7.39–7.36 (12H), 6.94 (m, 6H), 6.89 (m, 6H), 4.21 (t, $J = 7.8$ Hz, 6H), 1.95 (m, 6H), 1.14 (t, $J = 7.7$ Hz, 9H). $^{13}$C NMR ($\delta$, 150 MHz, ppm, CDCl$_3$) 170.5, 143.0, 140.7, 136.8, 136.2, 136.1, 135.9, 131.9, 130.6, 130.0, 129.9, 128.9, 128.1, 126.5, 126.1, 125.5, 125.2, 51.6, 21.2, 11.5.

C4A’
Yield 10%. M.p. >300 °C. $^1$H NMR ($\delta$, 600 MHz, ppm, CDCl$_3$) 7.67 (d, $J = 7.9$ Hz, 6H), 7.60 (m, 6H), 7.57 (m, 6 H), 7.43 (d, $J = 8.3$ Hz, 6H), 7.41 (d, $J = 8.3$ Hz, 6H), 7.35 (d, $J = 8.3$ Hz, 6H), 7.15 (t, $J = 7.0$ Hz, 6H), 7.11 (t, $J = 7.0$ Hz, 6H), 4.17 (t, $J = 7.4$ Hz, 6H), 1.90 (m, 6H), 1.57 (m, 6H), 1.13 (t, $J = 7.0$ Hz, 9H). $^{13}$C NMR ($\delta$, 150 MHz, ppm, CDCl$_3$) Not available due to low solubility.
Scheme S2. Synthetic route to model compound 2. Condition and reagents: i) Benzoylchloride, Pyridine, THF, reflux; (ii) N-Methylaniline, LiHMDS (1 M THF soln.), THF, 0 °C.

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Compound 1′ was prepared as 1. To a solution of 1′ (222 mg/ 0.5 mmol) in pyridine (2 mL) and THF (2 mL) was added benzoylchloride (0.08 mL/ 0.6 mmol), and the system was heated to reflux overnight. The reaction mixture was poured into water, and an aqueous phase was extracted with DCM. The combined organic phase was washed with 1 M HCl. After drying over MgSO₄, solvents were removed by the rotary evaporator. The crude product was purified by column chromatography (ethyl acetate/DCM = 1/3) to obtain yellow powder (250 mg, 91%). M.p. 256–257 °C. ¹H NMR (δ, 200 MHz, ppm, CDCl₃) 8.28 (d, J = 8.6 Hz, 2H), 8.17 (d, J = 8.0 Hz, 2H), 7.71–7.27 (17H), 4.10–3.90 (5H), 1.83 (m, 2H), 1.08 (t, J = 7.0 Hz, 3H).

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To a THF (5 mL) solution of 6 (250 mg/ 0.45 mmol) and N-methylaniline (0.08 mL/ 0.75 mmol) was added dropwise a 1.0 M THF solution of LiHMDS (1.0 mL), and the system was stirred for 10 h. After saturated aq. NH₄Cl was added, an aqueous phase was extracted with DCM. A combined organic phase was dried over MgSO₄ and solvents were removed by the rotary evaporator. The resulted solid was recrystallized with CHCl₃/hexane to give yellow crystals (140 mg, 50%). M.p. 329–330 °C. ¹H NMR (δ, 200 MHz, ppm, CDCl₃) 7.53 (d, J = 7.8 Hz, 2H), 7.51–7.46 (2H), 7.43 (d, J = 7.8 Hz, 2H), 7.37–7.21 (d, J = 7.9 Hz, 2H), 7.20 (d, J = 8.6 Hz, 2H), 4.06 (d, J = 6.1 Hz, 2H), 3.61 (s, 3H), 1.07 (t, J = 6.1 Hz, 3H). ¹³C NMR (δ, 50 MHz, ppm, CDCl₃) 170.7, 170.4, 144.9, 140.2, 136.6, 136.2, 131.9, 130.7, 129.5, 129.1, 128.7, 128.1, 127.7, 127.1, 126.7, 125.1, 38.3, 30.3, 21.2, 11.5.
2. Copy of NMR spectra

Figure S1. $^1$H NMR spectrum of 3 in CDCl$_3$.

Figure S2. $^{13}$C NMR spectrum of 3 in CDCl$_3$. 
Figure S3. $^1$H NMR spectrum of 4 in CDCl$_3$.

Figure S4. $^{13}$C NMR spectrum of 4 in CDCl$_3$. 
Figure S5. $^1$H NMR spectrum of 5 in CDCl₃.

Figure S6. $^{13}$C NMR spectrum of 5 in CDCl₃.
Figure S7. $^1$H NMR spectrum of 1 in CDCl$_3$.

Figure S8. $^{13}$C NMR spectrum of 1 in CDCl$_3$. 

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Figure S9. $^1$H NMR spectrum of C3A in CDCl$_3$.

Figure S10. $^{13}$C NMR spectrum of C3A in CDCl$_3$.
Figure S11. H-H COSY of C3A in CDCl3 (aromatic region).

Figure S12. ROESY of C3A in CDCl3 (aromatic region).
Figure S13. $^1$H NMR spectrum of C4A in CDCl$_3$.

Figure S14. H-H COSY of C4A in CDCl$_3$ (aromatic region).
Figure S15. $^1$H NMR spectrum of HC3A in CDCl$_3$.

Figure S16. H-H COSY of HC3A in CDCl$_3$ (aromatic region)
Figure S17. Variable-temperature $^1$H NMR spectra of C3A in CDCl$_3$. 
Figure S18. $^1$H NMR spectrum of 2 in CDCl$_3$.

Figure S19. $^{13}$C NMR spectrum of 2 in CDCl$_3$. 
2. GPC profiles

Figure S20. GPC (THF) profiles of reaction mixture.
3. MALDI-TOF MS

Figure S21. MALDI-TOF MS of C3A.

Figure S22. MALDI-TOF MS of C4A.
Figure S23. MALDI-TOF MS of HC3A.
4. UV and fluorescence spectra

Table S1. Detailed absorption and emission peak positions of C3A and 2 in DCM.

<table>
<thead>
<tr>
<th>Compound</th>
<th>$\lambda_{abs}$/nm</th>
<th>$\varepsilon$/M$^1$cm$^{-1}$</th>
<th>$\lambda_{em}$/nm</th>
<th>$\Phi^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C3A</strong></td>
<td>377</td>
<td>52000</td>
<td>438</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>C4A</strong></td>
<td>378</td>
<td>59900</td>
<td>439</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>376</td>
<td>14900</td>
<td>425</td>
<td>0.15</td>
</tr>
</tbody>
</table>

$^a$ Relative to quinine sulfate with $\Phi_\text{fl}=0.55$ as the standard.

Figure S24. UV and fluorescence spectra of **C3A** in Cyclohexane (purple), THF (green), DCM (black), MeCN (orange), and MeOH (red) (10$^{-5}$ M).
Figure S25. UV and fluorescence spectra of C3A (blue line) and C4A (red line) in DCM (solid line, 10⁻⁵ M) and solid-state (dashed line).

Figure S26. Solvent-dependent UV spectra of HC3A (10⁻⁵ M).
Table S2. Detailed absorption and emission peak positions of HC3A in different solvents.

<table>
<thead>
<tr>
<th>Solvent</th>
<th>ET(30) /kcal · mol⁻¹</th>
<th>λₐₛₜ /nm</th>
<th>ε /M⁻¹cm⁻¹</th>
<th>λₑₘ /nm</th>
<th>Stokes shift /cm⁻¹</th>
<th>Φᵃ /%</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH</td>
<td>30.9</td>
<td>396</td>
<td>31000</td>
<td>449</td>
<td>2980.8</td>
<td>0.10</td>
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<tr>
<td>Hexane</td>
<td>31.0</td>
<td>395</td>
<td>27000</td>
<td>446</td>
<td>2894.9</td>
<td>0.10</td>
</tr>
<tr>
<td>Toluene</td>
<td>33.9</td>
<td>397</td>
<td>32500</td>
<td>464</td>
<td>3637.2</td>
<td>0.10</td>
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<tr>
<td>DOX</td>
<td>36.0</td>
<td>397</td>
<td>29200</td>
<td>472</td>
<td>4002.5</td>
<td>0.16</td>
</tr>
<tr>
<td>EtOAc</td>
<td>38.1</td>
<td>395</td>
<td>31700</td>
<td>488</td>
<td>4824.7</td>
<td>0.11</td>
</tr>
<tr>
<td>DCM</td>
<td>40.7</td>
<td>397</td>
<td>31300</td>
<td>489</td>
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<td>0.08</td>
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<tr>
<td>Acetone</td>
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<td>396</td>
<td>31500</td>
<td>509</td>
<td>5606.2</td>
<td>0.09</td>
</tr>
<tr>
<td>DMAc</td>
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<td>30500</td>
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<td>6141.3</td>
<td>0.11</td>
</tr>
<tr>
<td>DMF</td>
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<td>29400</td>
<td>527</td>
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<td>0.09</td>
</tr>
<tr>
<td>DMSO</td>
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<td>399</td>
<td>23000</td>
<td>543</td>
<td>6646.5</td>
<td>0.10</td>
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</tbody>
</table>

ᵃ Relative to quinine sulfate with Φₐ=0.55 as the standard.

Figure S27. Changes in UV and fluorescence spectra of HC3A in DCM upon the addition of TFA and TEA; HC3A (red solid line), HC3A/TFA = 1/100 (blue solid line), and HC3A/TFA/TEA = 1/100/200 (red broken line).