Electronic Supplementary Information (ESI)

“Metal-Free Annulation of β-Acylamino Ketones: Facile Access to Spirooxazolines and Oxazolines via Oxidative C-O Bond Formation”

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1. General Information
Solvents were purified and dried by standard procedures before use. Petroleum ether of boiling range 60–80 °C was used. Melting points are uncorrected. $^1$H NMR and $^{13}$C NMR spectra were recorded on AC-200, 400, 500 MHz NMR spectrometers. CDCl$_3$ was used as internal standard. HRMS data for all new compounds were recorded using Orbitrap mass analyzer associated with Accela 1250 pump. Purification was done using column chromatography (100-200 mesh). Unless otherwise specified, all reactions were carried out under nitrogen atmosphere in oven-dried round-bottom flasks. The reactions were monitored by TLC visualized by UV (254 nm) and/or with iodine. Coupling constants are given in hertz (Hz) and the classical abbreviations are used to describe the signal multiplicities. All chemicals are purchased from Sigma-Aldrich and used without further purification.

2. Optimization of Reaction Conditions
We started our investigation by taking β-acylamino ketone 1a as a model substrate to determine the optimal reaction conditions for the cyclization reaction sequence to form 2a. Several experiments were performed to investigate the effect of oxidant, additive and solvent on the reaction. As highlighted in Table 1, the choice of oxidant, additive as well as solvent had a great influence on the reaction. Initially, treatment of β-acylamino ketone 1a with 2.0 equiv of PhI(OCOCF$_3$) and TFAA in dry 1,2-dichloroethane, delivered 68% of the desired spirooxazoline product 2a (Table 1, entry 1). While decreasing the loading of amount of additive, the desired product 2a was isolated in lower yield (Table 1, entry 2 & 3). Subsequently, the effect of amount of oxidant was also investigated (Table 1, entry 4 & 5). Reducing the oxidant loading from 2 to 1.5 equiv slightly decreased the efficiency of the spirooxazoline product (Table 1, entry 5). Next, we examined the influence of various additives on the cyclization reaction (Table 1, entries 6-10). Notably, the BF$_3$.OEt$_2$ as an additive was found to be more effective and furnished the titled compound 2a in 81% yield.
(Table 1, entry 8). After screening of oxidant and additives we moved our attention to find out compatible solvent for the intramolecular cyclization reaction leading to the synthesis of spirooxazoline product 2a. A series of solvents were tested (Table 1, entries 11-18). Unfortunately, the use of solvents such as Et₂O, MeOH, MeCN and CCl₄ didn’t lead to the formation of desired compound 2a (Table 1, entries 13-16). Gratifyingly, 88% yield of 2a was obtained in CH₂Cl₂ as a solvent (Table 1, entry 17). Solvent switching from CH₂Cl₂ to ethyl acetate resulted in the lower yield of final compound 2a.

**Table 1** Optimization of reaction conditions for the synthesis spirooxazoline via iodine (III)-mediated annulation of β-amidoketones

<table>
<thead>
<tr>
<th>Entry</th>
<th>Oxidant (equiv)</th>
<th>Additive (equiv)</th>
<th>Solvent</th>
<th>Yield (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>PIFA (2)</td>
<td>TFAA (0.5)</td>
<td>DCE</td>
<td>68</td>
</tr>
<tr>
<td>2</td>
<td>PIFA (1.5)</td>
<td>TFAA (0.5)</td>
<td>DCE</td>
<td>53</td>
</tr>
<tr>
<td>3</td>
<td>PIFA (2)</td>
<td>TFAA (0.2)</td>
<td>DCE</td>
<td>47</td>
</tr>
<tr>
<td>4</td>
<td>PIDA (2)</td>
<td>TFAA (0.5)</td>
<td>DCE</td>
<td>72</td>
</tr>
<tr>
<td>5</td>
<td>PIDA (1.5)</td>
<td>TFAA (0.5)</td>
<td>DCE</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>PIDA (2)</td>
<td>(CF₃SO₂)₂O (0.5)</td>
<td>DCE</td>
<td>74</td>
</tr>
<tr>
<td>7</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>DCE</td>
<td>81</td>
</tr>
<tr>
<td>8</td>
<td>PIDA (2)</td>
<td>TFA (0.5)</td>
<td>DCE</td>
<td>60</td>
</tr>
<tr>
<td>9</td>
<td>PIDA (2)</td>
<td>PTSA (0.5)</td>
<td>DCE</td>
<td>40</td>
</tr>
<tr>
<td>10</td>
<td>PIDA (2)</td>
<td>TfOH (0.5)</td>
<td>DCE</td>
<td>n.d</td>
</tr>
<tr>
<td>11</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>PhH</td>
<td>23</td>
</tr>
<tr>
<td>12</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>PhMe</td>
<td>16</td>
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<tr>
<td>13</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>Et₂O</td>
<td>n.d</td>
</tr>
<tr>
<td>14</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>MeOH</td>
<td>n.d</td>
</tr>
<tr>
<td>15</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>MeCN</td>
<td>n.d</td>
</tr>
<tr>
<td>16</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.5)</td>
<td>CCl₄</td>
<td>n.d</td>
</tr>
<tr>
<td>17</td>
<td>PIDA (2)</td>
<td>BF₃Et₂O (0.25)</td>
<td>CH₂Cl₂</td>
<td><strong>88</strong></td>
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</tbody>
</table>
After examining a series of oxidants, additives and solvents, PIDA (2.0 equiv) as the oxidant, BF$_3$.Et$_2$O (0.25 equiv) as an additive and CH$_2$Cl$_2$ as the solvent was selected as the best reaction condition for the cyclization reaction, resulting in the 88% yield of 2a (Table 1, entry 17). Attempts to decrease the amount of both oxidant and additive resulted in much lower yields of desired product 2a.

### 3.0 Experimental Section

#### 3.1 General procedure for the synthesis of spirooxazolines (examples 2a-2h):

To a well-stirred solution of $\beta$-acylamino ketone 1a (461 mg, 1.0 mmol) and PIDA (644 mg, 2.0 mmol) in dry CH$_2$Cl$_2$ (10 mL) was added BF$_3$.Et$_2$O (0.030 mL, 0.25 mmol) at 0 °C. The reaction mixture was then stirred at room temperature until the completion of the reaction as indicated by TLC. The resulting mixture was poured into saturated aqueous NaCl (100 mL), neutralized with saturated aqueous NaHCO$_3$, and extracted with CH$_2$Cl$_2$ (3×20 mL). The combined organic phase was washed with water, dried over anhydrous Na$_2$SO$_4$, filtered, and evaporated in vacuo. The crude product was purified by flash chromatography (silica gel, petroleum ether/ethyl acetate = 80/20) to give 2a as a yellow oil (403 mg, 88%).
3.2 General procedure for the synthesis of oxazolines (examples 4a-4ze):

To a well-stirred solution of β-acylamino ketone 3a (393 mg, 1.0 mmol) and PIDA (644 mg, 2.0 mmol) in dry CH₂Cl₂ (10 mL) was added BF₃·Et₂O (0.060 mL, 0.5 mmol) at 0 °C. The reaction mixture was then stirred at room temperature until the completion of the reaction as indicated by TLC. The resulting mixture was poured into saturated aqueous NaCl (100 mL), neutralized with saturated aqueous NaHCO₃ and extracted with CH₂Cl₂ (3×20 mL). The combined organic phase was washed with water, dried over anhydrous Na₂SO₄, filtered, and evaporated in vacuo. The crude product was purified by flash chromatography (silica gel, petroleum ether/ethyl acetate = 80/20) to give 4a as a white solid (289 mg, 74%).

3.3 Transformation of Product 4c into 5a:

Procedure: Degassed methanol (4.0 ml) was added to the mixture of Pd/C (10 wt %) and oxazoline 4c (1.0 mmol, 314 mg). After stirring under 1 atm pressure of hydrogen for 7 h at room temperature, the reaction mixture was filtered, and then evaporated under reduced pressure. The crude product was then purified by flash column chromatography to give hydrogenated product 5a as a white solid (286 mg, 95%).
3.4 General procedure for the synthesis of oxazoles from oxazolines (examples 6a-6c):

To a well-stirred solution of Oxazolines 4 (1.0 mmol) in dichloroethane (10 mL) was added NBS (1.2 mmol) and K$_2$CO$_3$ (1.2 mmol) at room temperature. The reaction mixture was then stirred at room temperature until the completion of the reaction as indicated by TLC. The mixture was then treated with saturated Na$_2$S$_2$O$_3$ (3×20 mL) and extracted with dichloromethane (3×20 mL) and then evaporated under reduced pressure. The combined organic phase was washed with water, dried over anhydrous Na$_2$SO$_4$, filtered, and evaporated in vacuo. The crude product was then purified by flash chromatography (silica gel, petroleum ether/ethyl acetate = 9:1) to give oxazoles 6a-6c as a White solid.
### 2',4'-di-p-tolyl-3,4-dihydro-1H,4'H-spiro[naphthalene-2,5'-oxazol]-1-one (2a)

<table>
<thead>
<tr>
<th>Rf: 0.33 (Pet. ether/EtOAc = 80/20); Yield: 79 mg, 88%;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow oil; (^1)H NMR (500 MHz, CDCl(<em>3)) (\delta): 8.19 (1H, d, (J = 7.6) Hz), 7.97 (2H, d, (J = 8.0) Hz), 7.49 - 7.60 (1H, m), 7.38 - 7.43 (1H, m), 7.25 (2H, br. s.), 7.16 (5H, s), 5.98 (1H, s), 3.11 - 3.16 (1H, m), 2.71 (1H, dt, (J = 17.0, 5.2) Hz), 2.44 (3H, s), 2.38 (3H, s), 2.13 - 2.18 (1H, m), 1.79 (1H, td, (J = 9.3, 4.6) Hz); (^13)C NMR (101 MHz, CDCl(<em>3)) (\delta): 192.7, 162.5, 143.7, 142.0, 137.5, 134.1, 130.9, 129.0, 128.7, 128.5, 127.9, 126.9, 124.6, 87.2, 72.6, 30.1, 25.4, 21.6, 21.1; HRMS (ESI) calculated [M+H]+ for C(</em>{26})H(</em>{24})O(_2)N: 382.1805, found: 382.1802.</td>
</tr>
</tbody>
</table>

### 4'-(o-tolyl)-2'(p-tolyl)-3,4-dihydro-1H,4'H-spiro[naphthalene-2,5'-oxazol]-1-one (2b)

<table>
<thead>
<tr>
<th>Rf: 0.29 (Pet. ether/EtOAc = 80/20); Yield: 81 mg, 82%;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow oil; (^1)H NMR (500 MHz, CDCl(<em>3)) (\delta): 7.51-7.57 (1H, m), 7.39 (1H, t, (J = 7.4) Hz), 7.29-7.34 (1H, m), 7.16-7.26 (6H, m), 7.12 (1H, d, (J = 6.9) Hz), 6.34 (1H, s), 3.14-3.28 (1H, m), 2.67 (1H, dt, (J = 17.2, 4.6) Hz), 2.41 (3H, s), 2.13 (3H, s), 2.01 (1H, dt, (J = 14.5, 4.6) Hz), 1.59 (1H, ddd, (J = 14.7, 10.1, 5.0) Hz); (^13)C NMR (100 MHz, CDCl(<em>3)) (\delta): 192.3, 161.9, 143.9, 141.9, 136.6, 135.6, 134.2, 130.8, 130.2, 129.0, 128.9, 128.7, 128.4, 128.2, 127.6, 127.1, 126.0, 124.5, 86.4, 69.5, 30.7, 25.4, 21.6, 19.9; HRMS (ESI) calculated [M+H]+ for C(</em>{26})H(</em>{24})O(_2)N: 382.1802, found: 382.1786.</td>
</tr>
</tbody>
</table>

### 2'-phenyl-4'(p-tolyl)-3,4-dihydro-1H,4'H-spiro[naphthalene-2,5'-oxazol]-1-one (2c)

<table>
<thead>
<tr>
<th>Rf: 0.35 (Pet. ether/EtOAc = 80/20); Yield: 78 mg, 79%;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>2,4-di-p-tolyl-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2d)</td>
</tr>
<tr>
<td>4-(o-tolyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2e)</td>
</tr>
</tbody>
</table>
4-(3,4-dimethoxyphenyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2f)

**Rf:** 0.35 (Pet. ether/EtOAc = 80/20); **Yield:** 84 mg, 86%; Gummy oil; **^1H NMR** (400 MHz, CDCl$_3$) $\delta$: 7.97 (d, $J = 7.9$ Hz, 2H), 7.27-7.30 (m, 2H), 7.25 (s, 1H), 6.59 (s, 1H), 6.63 (s, 1H), 3.91 (s, 3H), 3.84 (s, 3H), 2.85-2.95 (m, 1H), 2.48-2.56 (m, 1H), 2.43 (s, 3H), 1.80-1.89 (m, 4H), 1.42-1.54 (m, 2H), 1.25-1.35 (m, 2H); **^{13}C NMR** (100 MHz, CDCl$_3$) $\delta$: 215.3 (s), 148.8, 145.9, 143.6, 141.4, 130.2, 129.3, 129.2, 129.0, 127.4, 111.0, 108.9, 99.8, 76.7, 60.5, 56.5, 56.3, 56.0, 44.5, 30.2, 28.7, 25.4, 24.9, 21.5; **HRMS** (ESI) calculated [M+H]$^+$ for C$_{24}$H$_{28}$O$_4$N: 394.2013, found: 394.2017.

9-(tert-butyl)-4-(4-methoxyphenyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.5]dec-2-en-6-one (2g)

**Rf:** 0.35 (Pet. ether/EtOAc = 80/20); **Yield:** 79 mg, 81%; Yellow oil; **^1H NMR** (400 MHz, CDCl$_3$) $\delta$: 7.94 (d, $J = 8.2$ Hz, 2H), 7.28 (s, 1H), 7.26 (s, 1H), 7.11-7.19 (m, 2H), 6.82-6.88 (m, 2H), 6.04 (s, 1H), 3.81 (s, 3H), 2.99 (td, $J = 13.5$, 6.0 Hz, 1H), 2.56 (dt, $J = 12.9$, 3.4 Hz, 1H), 2.43 (s, 3H), 2.13-2.17 (m, 1H), 1.85-1.96 (m, 2H), 1.64-1.74 (m, 2H), 1.25-1.35 (m, 2H).
0.75 (s, 9H); $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$: 206.9, 159.0, 129.1, 129.0, 128.7, 128.3, 115.4, 113.6, 90.1, 69.1, 55.2, 42.9, 38.9, 37.1, 32.1, 29.7, 28.4, 27.4, 21.6; HRMS (ESI) calculated [M+H]$^+$ for C$_{26}$H$_{32}$O$_3$N: 406.2377, found: 406.2380.

4-(4-fluorophenyl)-2-phenyl-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2h)

**Rf:** 0.45 (Pet. ether/EtOAc = 80/20); **Yield:** 50 mg, 65%; colourless oil; $^1$H NMR (500 MHz, CDCl$_3$) $\delta$: 8.05-8.13 (2H, m), 7.52-7.61 (1H, m), 7.46-7.52 (2H, m), 7.28-7.34 (2H, m), 7.04 (2H, t, $J = 8.6$ Hz), 5.62 (1H, s), 2.92 (1H, dt, $J = 13.2$, 5.2 Hz), 2.52-2.60 (1H, m), 1.93-1.99 (2H, m), 1.67-1.72 (1H, m), 1.55-1.64 (2H, m), 1.42 (1H, dt, $J = 15.1$, 4.1 Hz), 1.18-1.26 (1H, m), 1.06 (1H, ddd, $J = 15.3$, 11.6, 4.0 Hz); $^{13}$C NMR (125 MHz, CDCl$_3$) $\delta$: 211.5, 163.1, 133.4, 131.9, 129.7-129.6 (d, $J = 7.6$ Hz), 128.6, 128.5, 127.5, 115.3-115.2 (d, $J = 21$Hz), 95.1, 74.6, 40.3, 33.6, 27.5, 25.3, 23.8; LCMS (ES+) m/z = 338.1 ([M + H]$^+$, tr = 1.51 min).

Naphthalen-1-yl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4a)

**Rf:** 0.21 (Pet. ether/EtOAc = 80/20); **Yield:** 73 mg, 74%; White solid; **mp:** 141°C; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$: 8.68 (1H, d, $J = 8.5$ Hz), 8.02 (1H, d, $J = 7.9$ Hz), 7.95 (2H, d, $J = 7.9$ Hz), 7.88 (1H, d, $J = 7.9$ Hz), 7.79 (1H, d, $J = 7.3$ Hz), 7.49-7.65 (2H, m), 7.43 (1H, t, $J = 7.6$ Hz), 7.26-7.35 (3H, m), 7.23 (2H, d, $J = 7.9$ Hz), 7.19 (2H, d, $J = 6.7$ Hz), 5.72 (1H, d, $J = 6.1$ Hz), 5.51 (1H, d, $J = 6.1$ Hz), 2.39 (3H, s); $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$: 198.4, 164.2, 142.3, 141.3, 133.9, 133.7, 132.0, 130.8, 129.1, 128.9, 128.8, 128.6,
Naphthalen-2-yl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4b)

Rf: 0.23 (Pet. ether /EtOAc = 80/20); Yield: 68 mg, 70%; White solid; mp: 141°C; 1H NMR (200 MHz, CDCl₃) δ:
8.33 (1H, s), 7.85-8.03 (5H, m), 7.80 (1H, d, J = 8.1 Hz), 7.50-7.67 (2H, m), 7.36 (4H, d, J = 4.0 Hz), 7.24 (3H, d, J = 4.2 Hz), 5.80 (1H, d, J = 6.8 Hz), 5.53 (1H, d, J = 6.8 Hz), 2.42 (3H, s); 13C NMR (126 MHz, CDCl₃) δ: 194.3, 164.0, 142.3, 141.2, 135.9, 132.3, 131.4, 131.3, 129.6, 129.1, 129.0, 128.9, 128.7, 128.2, 127.8, 127.2, 127.0, 124.2, 124.1, 96.1, 87.0, 73.9, 21.6; HRMS (ESI) calculated [M+H]+ for C₂₇H₂₂NO₂: 392.1645, found: 392.1650.

Phenyl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4c)

Rf: 0.19 (Pet. ether /EtOAc = 80/20); Yield: 73 mg, 73%; White solid; mp: 140°C; 1H NMR (500 MHz, CDCl₃) δ:
7.98 (2 H, d, J = 8.4 Hz), 7.93 (2 H, m, J = 7.2 Hz), 7.61 (1 H, t, J = 7.4 Hz), 7.47 (2H, t, J = 7.8 Hz), 7.38 (2H, m), 7.32 (3 H, m), 7.25 (2H, d, J = 8.0 Hz), 5.67 (1H, d, J = 6.9 Hz), 5.50 (1H, d, J = 6.5 Hz), 2.41 (3H, s); 13C NMR (50 MHz, CDCl₃) δ: 194.5, 163.8, 142.2, 141.1, 134.1, 133.9, 129.1, 129.0, 128.9, 128.7, 128.6, 128.0, 127.0, 124.0, 86.6, 73.5, 21.5; HRMS (ESI) calculated [M+H]+ for C₂₃H₂₀NO₂: 342.1489, found: 342.1489.

(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4d)

Rf: 0.22 (Pet. ether /EtOAc = 80/20); Yield: 76 mg, 77%;
White solid; **mp**: 101 °C; **¹H NMR (200 MHz, CDCl₃)** δ: 7.97 (2H, d, J = 8.2 Hz), 7.72-7.87 (2H, m), 7.35-7.42 (1H, m), 7.30-7.35 (3H, m), 7.24-7.30 (3H, m), 7.20-7.24 (2H, m), 5.64 (1H, d, J = 6.6 Hz), 5.47 (1H, d, J = 6.6 Hz), 2.41 (3H, s), 2.40 (3H, s); **¹³C NMR (50 MHz, CDCl₃)** δ: 194.1, 163.9, 144.9, 142.2, 141.2, 131.6, 129.5, 129.2, 129.1, 128.9, 128.8, 128.0, 127.0, 124.1, 86.6, 73.6, 21.7, 21.6; **HRMS (ESI)** calculated [M+H]⁺ for C₂₄H₂₂NO₂: 356.1645, found: 356.1645.

**White solid; mp**: 141°C; **¹H NMR (500 MHz, CDCl₃)** δ: 7.97 (2H, m, J = 8.01 Hz), 7.91 (2H, m, J = 8.77 Hz), 7.37 (2H, m), 7.32 (3H, m), 7.25 (2H, d, J = 8.01 Hz), 6.93 (2H, m, J = 9.16 Hz), 5.62 (1H, d, J = 6.87 Hz), 5.50 (1H, d, J = 6.87 Hz), 3.87 (3H, s), 2.41 (3H, s); **¹³C NMR (126 MHz, CDCl₃)** δ: 192.9, 164.2, 142.3, 141.3, 131.4, 129.1, 128.9, 128.7, 128.0, 127.1, 127.0, 124.1, 114.0, 86.5, 73.6, 55.5, 21.6; **HRMS (ESI)** calculated [M+H]⁺ for C₂₄H₂₂NO₃: 372.1594, found: 372.1594.

**White solid; mp**: 110 °C; **¹H NMR (500 MHz, CDCl₃)** δ: 7.95 (2H, d, J = 8.01 Hz), 7.80 (2H, m, J = 8.39 Hz), 7.61 (2H, m, J = 8.77 Hz), 7.38 (2H, m), 7.32 (3H, m), 7.25 (2H, d, J = 8.01 Hz), 5.59 (1H, d, J = 6.87 Hz), 5.51 (1H, d, J = 6.49 Hz), 2.41 (3H, s); **¹³C NMR (126 MHz, CDCl₃)** δ:
(4-chlorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4g)

\[
\begin{align*}
\text{Rf: } & 0.21 \text{ (Pet. ether / EtOAc = 80/20); Y}\text{ield: } 77 \text{ mg, 78%;} \\
\text{White solid; mp: } & 146 ^\circ \text{C; } ^1\text{H NMR (500 MHz, CDCl}_3\text{)} \delta: \\
& 7.96 (2H, d, J = 8.01 Hz), 7.88 (2H, m, J = 8.39 Hz), 7.46 (2H, m, J = 8.39 Hz), 7.39 (2H, m), 7.35 (1H, d, J = 6.87 Hz), 7.31 (2H, d, J = 6.87 Hz), 7.26 (2H, m), 5.61 (1H, d, J = 6.49 Hz), 5.51 (1H, d, J = 6.49 Hz), 2.42 (3H, s); \\
\text{HRMS (ESI) calculated [M+H] }^+ \text{ for C}_{23}\text{H}_{19}\text{NO}_2\text{Br: } 420.0594, \text{ found: 420.0598.}
\end{align*}
\]

(4-fluorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4h)

\[
\begin{align*}
\text{Rf: } & 0.25 \text{ (Pet. ether / EtOAc = 80/20); Y}\text{ield: } 80 \text{ mg, 81%;} \\
\text{White solid; mp: } & 128 ^\circ \text{C; } ^1\text{H NMR (200 MHz, CDCl}_3\text{)} \delta: \\
& 7.97-8.04 (2H, m), 7.91-7.97 (2H, m), 7.33-7.47 (3H, m), 7.28-7.33 (2H, m), 7.22-7.28 (2H, m), 7.08-7.19 (2H, m), 5.60 (1H, d, J = 6.8 Hz), 5.52 (1H, d, J = 6.7 Hz), 2.41 (3H, s); \\
\text{HRMS (ESI) calculated [M+H] }^+ \text{ for C}_{23}\text{H}_{19}\text{NO}_2\text{F: } 360.1394, \text{ found: 376.1100.}
\end{align*}
\]
(4-iodophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4i)

Rf: 0.30 (Pet. ether /EtOAc = 80/20); Yield: 70 mg, 72%; White solid; mp: 140 °C; 1H NMR (400 MHz, CDCl₃) δ: 7.95 (2H, d, J = 7.3 Hz), 7.85 (2H, d, J = 7.3 Hz), 7.64 (2H, d, J = 7.3 Hz), 7.37 (3H, m), 7.30 (2H, m), 7.25 (2H, d, J = 7.3 Hz), 5.58 (1H, d, J = 6.1 Hz), 5.51 (1H, d, J = 6.1 Hz), 2.42 (3H, s); 13C NMR (101 MHz, CDCl₃) δ: 194.1, 163.8, 142.5, 141.0, 138.1, 133.4, 130.4, 129.2, 129.0, 128.7, 128.2, 127.0, 123.9, 102.4, 86.7, 73.4, 21.6; HRMS (ESI) calculated [M+H]+ for C₂₃H₁₉NO₂I: 468.0455, found: 468.0457.

(3-bromophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4j)

Rf: 0.22 (Pet. ether /EtOAc = 80/20); Yield: 82 mg, 84%; White solid; mp: 146 °C; 1H NMR (200 MHz, CDCl₃) δ: 8.07 (1H, t, J = 1.8 Hz), 7.96 (2H, d, J = 8.2 Hz), 7.83 (1H, dt, J = 7.8, 1.4 Hz), 7.72 (1H, ddd, J = 8.0, 1.9, 1.0 Hz), 7.39 (1H, d, J = 1.3 Hz), 7.34 (4H, ddd, J = 5.8, 4.1, 2.2 Hz), 7.21-7.30 (3H, m), 5.58 (1H, d, J = 6.6 Hz), 5.50 (1H, d, J = 6.7 Hz), 2.41 (3H, s); 13C NMR (50 MHz, CDCl₃) δ: 193.4, 163.7, 142.4, 140.9, 136.7, 135.8, 132.1, 130.3, 129.1, 129.0, 128.6, 128.2, 127.5, 126.9, 123.9, 123.1, 86.8, 73.5, 21.6; HRMS (ESI) calculated [M+H]+ for C₂₃H₁₉NO₂Br: 420.0594, found: 420.0601.

(3-nitrophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4k)

Rf: 0.26 (Pet. ether /EtOAc = 80/20); Yield: 78 mg, 79%; White solid; mp: 152 °C; 1H NMR (200 MHz, CDCl₃) δ:
(2,4-dichlorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4l)

**Rf**: 0.25 (Pet. ether /EtOAc = 80/20); **Yield**: 84 mg, 85%; **White solid; mp**: 110 °C; **1H NMR (200 MHz, CDCl₃)** δ:
- 8.05 (d, J = 8.2 Hz, 2H), 7.92 (dt, J = 7.8, 1.8 Hz, 1H), 7.74 (d, J = 2.0 Hz, 1H), 7.46-7.59 (m, 3H), 7.37 (s, 1H), 7.33 (s, 2H), 7.30 (s, 1H), 6.35 (d, J = 10.9 Hz, 1H), 5.92 (d, J = 10.9 Hz, 1H), 2.47 (s, 3H); **13C NMR (50 MHz, CDCl₃) δ**: 207.1, 194.3, 164.6, 148.3, 143.6, 143.6, 134.4, 134.3, 133.3, 129.9, 129.3, 129.0, 128.8, 123.6, 123.1, 122.1, 86.5, 72.1, 31.0, 21.7; **HRMS (ESI) calculated [M+H]^+ for C₂₃H₁₉N₂O₄**: 387.1339, found: 387.1339.

(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(thiophen-2-yl)methanone (4m)

**Rf**: 0.26 (Pet. ether /EtOAc = 80/20); **Yield**: 88 mg, 90%; **White solid; mp**: 148 °C; **1H NMR (200 MHz, CDCl₃)** δ:
- 8.07 (d, J = 8.2 Hz, 2H), 7.60 (dd, J = 1.0, 3.9 Hz, 1H), 7.54 (dd, J = 1.1, 4.9 Hz, 1H), 7.32 (d, J = 8.0 Hz, 3H), 7.12-6.98 (m, 6 H), 5.96-5.80 (m, 2H), 2.46 (s, 3H); **13C NMR (50 MHz, CDCl₃) δ**: 193.6, 166.2, 147.4, 144.1, 143.0, 135.4, 133.9, 129.3, 129.2, 128.8, 128.7, 127.2, 123.8, 88.6, 73.8, 21.6; **HRMS (ESI) calculated [M+H]^+ for C₂₃H₁₈NO₂Cl**: 410.0709, found: 410.0705.

(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(thiophen-2-yl)methanone (4m)
HRMS (ESI) calculated [M+H]$^+$ for C$_{21}$H$_{18}$NO$_2$S: 348.1053, found: 348.1053.

(5-bromothiophen-2-yl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4n)

![Chemical structure of 4n](image)

R$_f$: 0.34 (Pet. ether /EtOAc = 80/20); Yield: 80 mg, 82%; White Solid; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$: 8.01 (2H, t, $J = 6.4$ Hz), 7.94 (2H, m), 7.66 (1H, d, $J = 6.7$ Hz), 7.53 (2H, d, $J = 6.7$ Hz), 7.25 (2H, m), 6.96 (1H, m), 6.79 (1H, m), 5.72 (2H, m), 2.41 (3H, br. s.); $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$: 193.8, 164.5, 146.4, 142.7, 134.2, 129.9, 129.2, 129.2, 128.9, 128.7, 125.2, 123.6, 86.2, 69.1, 21.6; HRMS (ESI) calculated [M+H]$^+$ for C$_{21}$H$_{17}$O$_2$NBrS: 426.0158, found: 426.0156.

(4-(naphthalen-1-yl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4o)

![Chemical structure of 4o](image)

R$_f$: 0.28 (Pet. ether /EtOAc = 80/20); Yield: 72 mg, 73%; White solid; mp: 95 °C; $^1$H NMR (500 MHz, CDCl$_3$) $\delta$: 7.96 (6H, d, $J = 8.4$ Hz), 7.64 (1H, t, $J = 7.2$ Hz), 7.50 (2H, t, $J = 7.8$ Hz), 7.31 (4H, m), 7.27 (3H, m), 7.20 (1H, m), 5.60 (1H, d, $J = 6.5$ Hz), 5.55 (1H, d, $J = 6.9$ Hz), 2.42 (3H, s); $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$: 194.4, 164.2, 143.3, 142.6, 134.9, 134.2, 134.1, 130.2, 129.2, 129.2, 128.9, 128.7, 128.3, 127.1, 125.2, 123.8, 86.5, 72.7, 21.6; HRMS (ESI) calculated [M+H]$^+$ for C$_{27}$H$_{15}$NONa: 392.1046, found: 392.1059.

(4-(4-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4p)

![Chemical structure of 4p](image)

R$_f$: 0.24 (Pet. ether /EtOAc = 80/20); Yield: 63 mg, 63%; White solid; mp: 96 °C; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$: 8.02 (2H, d, $J = 6.7$ Hz), 7.55 (2H, m, $J = 7.3$ Hz), 7.50 (1H,
$$\text{(4-(4-nitrophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4q)}$$

\begin{align*}
\text{Rf: } & 0.30 \text{ (Pet. ether /EtOAc } = 80/20); \text{ Yield: } 70 \text{ mg, 69%; White solid; mp: } 188 \degree \text{C; } ^1\text{H NMR (400 MHz, CDCl}_3) \delta: \\
& 8.03 (2\text{H, d, } J = 7.9 \text{ Hz}), 7.87 (2\text{H, d, } J = 8.5 \text{ Hz}), 7.55 (3\text{H, d, } J = 7.9 \text{ Hz}), 7.50 (1\text{H, d, } J = 7.3 \text{ Hz}), 7.31 (5\text{H, m, } J = 7.13 \text{ Hz})
\end{align*}

$$\text{13C NMR (101 MHz, CDCl}_3) \delta: 193.7, 166.3, 147.4, 144.1, 143.0, 135.4, 133.9, 129.3, 129.2, 128.8, 128.7, 127.7, 123.5, 123.0, 83.8, 73.3, 21.7; \text{ HRMS (ESI) calculated } [\text{M+H}]^+ \text{ for } C_{23}H_{19}N_2O_4: 387.1339, \text{ found: 387.1340.}$$

$$\text{phenyl(2-(p-tolyl)-4-(4-(trifluoromethyl)phenyl)-4,5-dihydrooxazol-5-yl)methanone (4r)}$$

$$\text{Rf: } 0.25 \text{ (Pet. ether /EtOAc } = 80/20); \text{ Yield: } 72 \text{ mg, 73%; White solid; mp: } 82 \degree \text{C; } ^1\text{H NMR (200 MHz, CDCl}_3) \delta: \\
& 8.12-7.99 \text{ (m, } J = 8.2 \text{ Hz, } 2\text{H}), 7.57-7.42 \text{ (m, } 3\text{H}), 7.40-7.27 \text{ (m, } 5\text{H}), 7.25 \text{ (s, } 1\text{H}), 7.12-6.97 \text{ (m, } J = 8.1 \text{ Hz, } 2\text{H}), 6.31 \text{ (d, } J = 10.9 \text{ Hz, } 1\text{H}), 5.85 \text{ (d, } J = 10.7 \text{ Hz, } 1\text{H}), 2.46 \text{ (s, } 3\text{H}; ^{13}\text{C NMR (50 MHz, CDCl}_3) \delta: 194.2, 165.8, 142.8, 140.7, 135.7, 133.5, 129.3, 128.8, 128.6, 127.6, 124.8-124.7 \text{ (d, } J = 3.83 \text{ Hz), } 123.7, 84.0, 73.5, 21.7; \text{ HRMS (ESI) calculated}$$
(4-(3-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4s)

Rf: 0.27 (Pet. ether /EtOAc = 80/20); Yield: 82 mg, 83%; White solid; mp: 98 °C; \(^1\)H NMR (500 MHz, CDCl\(_3\)) \(\delta\): 7.96 (4H, d, \(J = 8.0\) Hz), 7.65 (1H, m), 7.49 (4H, m), 7.25 (5H, m), 5.60 (1H, d, \(J = 6.9\) Hz), 5.54 (1H, d, \(J = 6.9\) Hz), 2.42 (3H, s); \(^{13}\)C NMR (126 MHz, CDCl\(_3\)) \(\delta\): 194.3, 164.2, 143.5, 142.6, 134.2, 131.2, 130.5, 130.0, 129.2, 129.2, 128.9, 128.7, 125.7, 123.8, 123.1, 86.5, 72.6, 21.6; HRMS (ESI) calculated [M+H]\(^+\) for C\(_{24}\)H\(_{19}\)NO\(_2\)F: 422.0573, found: 422.0569.

(4-(3-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4t)

Rf: 0.27 (Pet. ether /EtOAc = 80/20); Yield: 79 mg, 80%; White solid; mp: 146 °C; \(^1\)H NMR (200 MHz, CDCl\(_3\)) \(\delta\): 8.04 (d, \(J = 8.2\) Hz, 2H), 7.61-7.44 (m, 3H), 7.41-7.28 (m, 4H), 7.07-6.92 (m, 2H), 6.92-6.72 (m, 2H), 6.27 (d, \(J = 11.0\) Hz, 1H), 5.77 (d, \(J = 10.5\) Hz, 1H), 2.45 (s, 3H); \(^{13}\)C NMR (50 MHz, CDCl\(_3\)) \(\delta\): 194.1, 165.7, 142.7, 138.6, 135.7, 133.8, 133.5, 129.2, 129.2, 128.8, 128.5, 128.4, 128.0, 127.7, 126.3, 123.7, 84.0, 73.4, 21.7; HRMS (ESI) calculated [M+H]\(^+\) for C\(_{23}\)H\(_{19}\)NO\(_2\)Cl: 376.1099, found: 376.1103.

phenyl(4-(o-tolyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4u)

Rf: 0.25 (Pet. ether /EtOAc = 80/20); Yield: 83 mg, 84%; White solid; mp: 118 °C; \(^1\)H NMR (200 MHz, CDCl\(_3\)) \(\delta\): 8.01-7.90 (m, 4H), 7.66-7.56 (m, 1H), 7.52-7.43 (m, 2H), 7.35-7.26 (m, 2H), 7.25-7.11 (m, 4H), 5.85 (d, \(J = 6.4\) Hz, 1H), 5.69 (d, \(J = 6.4\) Hz, 1H), 2.41 (s, 3H), 2.24 (s, 3H); \(^{13}\)C
**NMR (50 MHz, CDCl₃) δ:** 194.5, 163.6, 142.2, 139.2, 135.5, 134.3, 133.9, 130.6, 129.1, 128.9, 128.7, 128.6, 127.9, 127.0, 126.8, 124.1, 86.2, 69.7, 21.6, 19.3; **HRMS (ESI) calculated [M+H]⁺ for C₂₄H₂₂NO₂: 356.1645, found: 356.1645.

*(4-(2-fluorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4v)*

**Rf:** 0.24 (Pet. ether /EtOAc = 80/20); **Yield:** 70 mg, 71%; White solid; **mp:** 120 °C; **¹H NMR (500 MHz, CDCl₃) δ:** 7.96 (4H, d, J = 8.0 Hz), 7.61 (1H, t, J = 7.4 Hz), 7.47 (2H, t, J = 7.6 Hz), 7.37 (1H, t, J = 7.2 Hz), 7.30 (1H, m), 7.24 (2H, d, J = 7.6 Hz), 7.16 (1H, m), 7.06 (1H, t, J = 9.2 Hz), 5.84 (1H, d, J = 6.5 Hz), 5.73 (1H, d, J = 6.5 Hz), 2.40 (3H, s); **¹³C NMR (126 MHz, CDCl₃) δ:** 193.8, 164.2, 161.2, 159.2, 142.3, 134.2, 133.9, 129.7, 129.1, 128.9, 128.7, 128.6, 128.1, 128.0, 124.6, 124.5, 123.9, 115.8, 115.6, 85.0, 67.5, 21.5; **HRMS (ESI) calculated [M+H]⁺ for C₂₃H₁₉NO₂F: 360.1394, found: 360.1393.

*(4-(2-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4w)*

**Rf:** 0.21 (Pet. ether /EtOAc = 80/20); **Yield:** 76 mg, 77%; White solid; **mp:** 116 °C; **¹H NMR (200 MHz, CDCl₃) δ:** 8.04 (d, J = 8.1 Hz, 3H), 7.59-7.48 (m, 3H), 7.40 (dd, J = 1.7, 6.1 Hz, 1H), 7.25-7.05 (m, 4H), 6.96-6.81 (m, 1H), 6.39 (d, J = 10.6 Hz, 1H), 6.26 (d, J = 10.7 Hz, 1H), 2.45 (s, 3H); **¹³C NMR (50 MHz, CDCl₃) δ:** 199.3, 163.2, 143.5, 142.6, 134.2, 131.2, 130.5, 130.0, 129.2, 128.9, 128.7, 125.7, 123.8, 123.1, 86.5, 72.6, 21.6; **HRMS (ESI) calculated [M+H]⁺ for C₂₃H₁₉NO₂Br: 420.0594, found:420.0597.
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<th>Compound</th>
<th>Rf</th>
<th>Yield</th>
<th>mp</th>
<th>1H NMR (MHz, solvent) δ</th>
<th>13C NMR (MHz, solvent) δ</th>
<th>HRMS (ESI) calculated [M+H]+ for</th>
<th>Finding</th>
</tr>
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<tr>
<td>(4-(2,4-difluorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4x)</td>
<td>0.24</td>
<td>73 mg, 74%</td>
<td>72 °C</td>
<td>8.02 (2H, d, J = 7.6 Hz), 7.59 (2H, d, J = 7.6 Hz), 7.51 (1H, t, J = 7.4 Hz), 7.31 (5H, m), 7.06 (1H, m), 6.69 (1H, m), 6.31 (1H, br. s.), 6.13 (1H, d, J = 11.1 Hz), 2.44 (3H, s); 13C NMR (126 MHz, CDCl₃) δ: 194.3, 166.0, 142.6, 135.1, 133.6, 130.8, 129.3, 128.8, 128.5, 127.7, 124.0, 111.6, 111.4, 102.9, 102.7, 102.5, 82.5, 66.0, 21.7; HRMS (ESI) calculated [M+H]+ for C₂₃H₁₈NO₂F₂: 378.1300, found: 378.1298.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

| (4-(2-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4y) | 0.28     | 69.4 mg, 70% | 110 °C | 8.00-7.83 (m, 4H), 7.45-7.32 (m, 2H), 7.32-7.28 (m, 2H), 7.27-7.20 (m, 4H), 6.09 (d, J = 6.2 Hz, 1H), 5.66 (d, J = 6.2 Hz, 1H), 2.43 (s, 3H), 2.41 (s, 3H); 13C NMR (50 MHz, CDCl₃) δ: 193.2, 164.2, 145.0, 142.4, 139.0, 132.7, 132.0, 129.7, 129.5, 129.2, 129.1, 128.9, 128.6, 127.3, 124.0, 84.5, 69.8, 21.8, 21.6; HRMS (ESI) calculated [M+H]+ for C₂₄H₂₁NO₂Cl: 390.1255, found: 390.1261. |

| (4-chlorophenyl)(4-(2-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4z) | 0.25     | 72.8 mg, 73% | 116 °C | 7.98-7.88 (m, 4H), 7.50-7.42 (m, 2H), 7.42-7.34 (m, 2H), 7.29 (d, J = 2.3 Hz, 1H), 7.26-7.20 (m, 3H), 6.09 (d, J = 6.2 Hz, 1H), 5.60 (d, J = 6.2 Hz, 1H), 2.40 (s, 3H); 13C NMR (50 MHz, CDCl₃) δ: 192.2, 163.9, 142.4, 140.5, 139.0, 133.0, 129.7, 129.5, 129.2, 129.1, 128.9, 128.6, 127.3, 124.0, 84.5, 69.8, 21.8, 21.6; HRMS (ESI) calculated [M+H]+ for C₂₃H₁₉NO₂Cl: 384.1255, found: 384.1256. |
132.7, 130.5, 129.7, 129.2, 128.9, 128.7, 127.6, 127.4, 123.9, 84.5, 69.7, 21.7; **HRMS** (ESI) calculated [M+H]+ for C$_{23}$H$_{18}$NO$_2$Cl$_2$: 410.0709, found: 410.0714.

**4za**

(2-(2-bromo-4-methoxyphenyl)-4-phenyl-4,5-dihydrooxazol-5-yl)(4-isopropylphenyl)methanone

RF: 0.24 (Pet. ether /EtOAc = 80/20); **Yield:** 77.9 mg, 79%; White solid; **mp:** 76 °C; **$^1$H NMR** (200 MHz, CDCl$_3$) $\delta$: 7.87 (d, $J = 8.2$ Hz, 2H), 7.39 (d, $J = 8.7$ Hz, 1H), 7.27-7.16 (m, 7H), 7.13 (d, $J = 2.4$ Hz, 1H), 6.79 (dd, $J = 2.4$, 8.7 Hz, 1H), 5.60-5.31 (m, 2H), 3.77 (s, 3H), 3.02-2.75 (m, 1H), 1.21 (s, 3H), 1.17 (s, 3H); **$^{13}$C NMR** (50 MHz, CDCl$_3$) $\delta$: 197.8, 163.8, 162.2, 153.1, 141.4, 131.6, 129.6, 128.8, 128.7, 127.9, 126.6, 126.5, 124.3, 122.0, 119.7, 112.9, 88.0, 73.7, 55.7, 34.2, 23.7; **HRMS** (ESI) calculated [M+H]$^+$ for C$_{26}$H$_{25}$NO$_3$: 478.0699, found: 478.0700.

(2-bromo-4-methoxyphenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4zb)

RF: 0.21 (Pet. ether /EtOAc = 80/20); **Yield:** 70 mg, 71%; White solid; **mp:** 141 °C; **$^1$H NMR** (200 MHz, CDCl$_3$) $\delta$: 7.87 (s, 1H), 7.75-7.85 (m, 1H), 7.46 (d, $J = 8.6$ Hz, 1H), 7.24-7.37 (m, 7H), 7.20 (d, $J = 2.4$ Hz, 1H), 6.85 (dd, $J = 8.7$, 2.5 Hz, 1H), 5.55 (q, $J = 6.5$ Hz, 2H), 3.83 (s, 3H), 2.38 (s, 3H); **$^{13}$C NMR** (50 MHz, CDCl$_3$) $\delta$: 195.50, 161.9, 138.2, 136.79, 132.74, 131.83, 129.30, 128.37, 128.27, 128.2, 128.07, 126.7, 125.8, 121.2, 119, 112.9, 85.19, 73.39, 55.6, 21.2; **HRMS** (ESI) calculated [M+H]$^+$ for C$_{24}$H$_{21}$NO$_3$Br: 450.0699, found: 450.0700.

(2-bromo-4-methoxyphenyl)(2,4-diphenyl-4,5-dihydrooxazol-5-yl)methanone (4zc)
**S-22**

**White solid; mp:** 66 °C; **$^1$H NMR** (200 MHz, CDCl$_3$) $\delta$: 8.0 (dd, $J = 8.15$, 1.45 Hz, 2H), 7.4-7.5 (m, 4H), 7.4 (dd, $J = 7.26$, 1.71 Hz, 2H), 7.2-7.3 (m, 4H), 6.9 (dd, $J = 8.65$, 2.46 Hz, 1H), 5.5-5.6 (m, 2H), 3.8 (s, 3H); **$^{13}$C NMR** (50 MHz, CDCl$_3$) $\delta$: 197.7, 163.8, 162.3, 141.3, 131.8, 131.6, 129.6, 128.8, 128.6, 128.4, 127.9, 126.8, 126.7, 122.0, 119.8, 113.0, 88.1, 73.8, 55.7; **HRMS** (ESI) calculated [M+H]$^+$ for C$_{23}$H$_{19}$NO$_3$Br: 436.0543, found: 436.0540.

**2-(4-bromo-4-methoxyphenyl)-(4-(naphthalen-1-yl)-2-phenyl-4,5-dihydrooxazol-5-yl)methanone (4zd)**

**Rf:** 0.27 (Pet. ether /EtOAc = 80/20); **Yield:** 79.7 mg, 81%; White solid; **mp:** 64 °C; **$^1$H NMR** (200 MHz, CDCl$_3$) $\delta$: 8.2 (d, $J = 7.20$ Hz, 1H), 8.0 (d, $J = 8.21$ Hz, 1H), 7.9-8.0 (m, 1H), 7.5-7.6 (m, 3H), 7.5 (d, $J = 3.28$ Hz, 1H), 7.4 (s, 5H), 7.2 (d, $J = 2.40$ Hz, 1H), 6.9 (dd, $J = 8.59$, 2.40 Hz, 1H), 5.7 (d, $J = 6.32$ Hz, 1H), 5.6 (d, $J = 6.19$ Hz, 1H), 3.9 (s, 3H); **$^{13}$C NMR** (50 MHz, CDCl$_3$) $\delta$: 198.1, 163.7, 162.3, 141.5, 133.7, 132.5, 131.7, 131.3, 129.8, 129.8, 128.9, 128.5, 128.0, 127.6, 126.7, 126.4, 126.2, 124.6, 123.4, 122.1, 119.8, 113.1, 87.1, 74.6, 55.8; **HRMS** (ESI) calculated [M+H]$^+$ for C$_{27}$H$_{21}$NO$_3$Br: 486.0699, found: 486.0702.

**2-(4-bromo-4-methoxyphenyl)-4-phenyl-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4ze)**

**Rf:** 0.05 (Pet. ether /EtOAc = 80/20); **Yield:** 74.2 mg, 75%;
N-(1,3-diphenylpropyl)-4-methylbenzamide (5a)

Rf: 0.22 (Pet. ether /EtOAc = 30/70); Yield: 48 mg, 69%; White Solid; mp: 81 °C; 1H NMR (500 MHz, CDCl₃) δ: 7.96 (2H, m, J = 8.4 Hz), 7.82 (2H, d, J = 8.4 Hz), 7.60 (2H, m, J = 8.4 Hz), 7.33-7.45 (3H, m), 7.29 (4H, t, J = 8.0 Hz), 5.67 (1H, d, J = 6.9 Hz), 5.49 (1H, d, J = 6.5 Hz), 2.45 (3H, s); 13C NMR (126 MHz, CDCl₃) δ: 193.5, 163.0, 145.0, 140.9, 131.8, 131.7, 130.3, 129.6, 129.2, 129.0, 128.2, 127.0, 126.6, 126.0, 86.8, 73.7, 21.8; LCMS (ES+) m/z = 422.0 ([M + H]+, tr = 1.60 min).

Phenyl(4-phenyl-2-(p-tolyl)oxazol-5-yl)methanone (6a)

Rf: 0.35 (Pet. ether /EtOAc = 90/10); Yield: 84 mg, 86%; White Solid; 1H NMR (500 MHz, CDCl₃) δ: 8.08 (4H, m), 7.97 (2H, d, J = 7.6 Hz), 7.59 (1H, t, J = 7.4 Hz), 7.48 (2H, t, J = 7.8 Hz), 7.43 (3H, m), 7.33 (3H, d, J = 8.0 Hz), 2.45 (3H, s); 13C NMR (125 MHz, CDCl₃) δ: 183.1, 162.2, 148.9, 143.3, 142.4, 137.6, 132.8, 130.7, 129.8, 129.7, 129.6, 129.3, 128.3, 128.2, 127.4, 123.6, 21.7; HRMS (ESI) calculated
(5-bromothiophen-2-yl)(4-phenyl-2-(p-tolyl)oxazol-5-yl)methanone (6b)

Rf: 0.30 (Pet. ether /EtOAc = 90/10); Yield: 76 mg, 78%; White Solid; $^1$H NMR (500 MHz, CDCl$_3$) $\delta$: 8.26 (d, $J$ = 4.2 Hz, 1H), 8.11 (m, $J$ = 7.6 Hz, 2H), 8.04 (m, $J$ = 8.0 Hz, 2H), 7.65 (t, $J$ = 7.2 Hz, 1H), 7.57 (t, $J$ = 7.4 Hz, 2H), 7.33 (d, $J$ = 7.6 Hz, 2H), 7.17 (d, $J$ = 3.8 Hz, 1H), 2.45 (s, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$) $\delta$: 181.9, 162.0, 142.8, 137.5, 135.1, 132.8, 131.2, 130.8, 129.8, 129.5, 128.5, 127.6, 123.2, 117.6, 21.7; HRMS (ESI) calculated [M+H]$^+$ for C$_{23}$H$_{18}$O$_2$NBrS: 424.0001, found: 424.0002.

(4-(3-bromophenyl)-2-(p-tolyl)oxazol-5-yl)(phenyl)methanone (6c)

Rf: 0.30 (Pet. ether /EtOAc = 90/10); Yield: 72 mg, 76%; White Solid; $^1$H NMR (500 MHz, CDCl$_3$) $\delta$: 8.08 (3H, m), 7.87 (1H, d, $J$ = 7.6 Hz), 7.70 (1H, d, $J$ = 8.0 Hz), 7.43 (3H, m), 7.34 (3H, m), 7.26 (2H, s), 2.45 (3H, s); $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$: 181.3, 162.6, 149.7, 142.9, 142.6, 139.4, 135.5, 132.6, 130.5, 130.1, 129.9, 129.8, 129.4, 128.3, 128.0, 127.5, 123.4, 122.5, 21.7; HRMS (ESI) calculated [M+H]$^+$ for C$_{23}$H$_{18}$O$_2$NBr: 418.0437, found 418.0437.
4. NMR Spectra

![NMR Spectra Diagram]

2',4'-di-p-tolyl-3,4-dihydro-1H,4'H-spiro[naphthalene-2,5'-oxazol]-1-one (2a)
4'-{(o-tolyl)}-2'-(p-tolyl)-3,4-dihydro-1H,4'H-spiro[naphthalene-2,5'-oxazol]-1-one (2b)
2′-phenyl-4′-(p-tolyl)-3,4-dihydro-1H,4′H-spiro[naphthalene-2,5′-oxazol]-1-one (2c)
4-(o-tolyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2e)
4-(3,4-dimethoxyphenyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2f)
9-(tert-butyl)-4-(4-methoxyphenyl)-2-(p-tolyl)-1-oxa-3-azaspiro[4.5]dec-2-en-6-one (2g)
4-(4-fluorophenyl)-2-phenyl-1-oxa-3-azaspiro[4.6]undec-2-en-6-one (2h)
Naphthalen-1-yl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4a)
Naphthalen-2-yl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4b)
Phenyl(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4c)
(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4d)
(4-methoxyphenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4e)
(4-bromophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4f)
(4-chlorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4g)
(4-fluorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4h)
(4-iodophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4i)
(3-bromophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4j)
(3-nitrophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4k)
(2,4-dichlorophenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4l)
(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(thiophen-2-yl)methanone (4m)
(S-bromothiophen-2-yl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4n)
(4-(naphthalen-1-yl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4o)
(4-(4-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4p)
(4-(4-nitrophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4q)
Phenyl(2-(p-tolyl)-4-(4-(trifluoromethyl)phenyl)-4,5-dihydrooxazol-5-yl)methanone (4r)
(4-(3-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4s)
(4-(3-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4t)
phenyl(4-(o-tolyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4u)
(4-(2-fluorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4v)
(4-(2-bromophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4w)
(4-(2,4-difluorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(phenyl)methanone (4x)
(4-(2-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4y)
(4-chlorophenyl)(4-(2-chlorophenyl)-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4z)
(2-(2-bromo-4-methoxyphenyl)-4-phenyl-4,5-dihydrooxazol-5-yl)(4-isopropylphenyl)methanone (4za)
(2-bromo-4-methoxyphenyl)(4-phenyl-2-(p-tolyl)-4,5-dihydrooxazol-5-yl)methanone (4zb)
(2-bromo-4-methoxyphenyl)(2,4-diphenyl-4,5-dihydrooxazol-5-yl)methanone (4zc)
(2-bromo-4-methoxyphenyl)(4-(naphthalen-1-yl)-2-phenyl-4,5-dihydrooxazol-5-yl)methanone (4zd)
(2-(4-bromophenyl)-4-phenyl-4,5-dihydrooxazol-5-yl)(p-tolyl)methanone (4ze)
N-(1,3-diphenylpropyl)-4-methylbenzamide (5a)
phenyl(4-phenyl-2-(p-tolyl)oxazol-5-yl)methanone (6a)
(5-bromothiophen-2-yl)(4-phenyl-2-(p-tolyl)oxazol-5-yl)methanone (6b)
(4-(3-bromophenyl)-2-(p-tolyl)oxazol-5-yl)(phenyl)methanone (6c)