Supporting Information

Iodine(III) Mediated Oxidative Rearrangement of Enamines: Efficient Synthesis of \(\alpha\)-Aminoketones

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1. General Comments:

All reactions were carried out under an atmosphere of dry nitrogen using reaction tubes. Dry DCM was prepared by distilling over CaH$_2$ and stored over molecular sieves 4Å under N$_2$ atmosphere. All the enamines were synthesized employing literature procedure.$^{1,2}$ PIDA and PIFA were obtained from Spectrochem and TEMPO was purchased from Sigma Aldrich and they were used as received.

Column chromatography was performed using Rankem Silicagel (100-200 mesh) and the solvent system used unless otherwise specified, was ethylacetate-hexanes with various percentage of polarity depending on the nature of the substrate.

It is important to note that purity of enamines significantly affects the reactions and synthesized $\alpha$-amino ketones all are move very slow in column chromatography.

2. Analytical Methods:

NMR data were recorded on Bruker DPX 400 and AVC 500 MHz spectrometers. $^{13}$C and $^1$H NMR spectra were referenced to signals of deutero solvents and residual protiated solvents, respectively. Infrared spectra were recorded on a Thermo Nicolet iS10 FT spectrometer. HRMS were recorded by electron spry ionization (ESI) method on a Q-TOF Micro with lock spray source. Melting points are corrected. The crystal data were collected and integrated using a Bruker Axs kappa apex2 CCD diffractometer, with graphite monochromated Mo-K$\alpha$ radiation.

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3. Typical procedure for the synthesis of $\alpha$-amino ketones via oxidative rearrangement of enamines:

![Diagram of oxidative rearrangement of enamines]

To an over dried 10 mL reaction tube equipped with stir bar, enamine $1a$ (50 mg, 0.12 mmol) was dissolved in dichloromethane (1 mL). To this solution oxidizing agent (X equiv) was added under nitrogen atmosphere. The reaction tube was sealed and stirred at room temperature. After the TLC analysis, the reaction mixture was diluted with 5 mL dichloromethane and washed with saturated sodium bicarbonate solution. The combined organic layer was dried over Na$_2$SO$_4$. The crude product was purified by column chromatography using hexane/ethyl acetate mixture as eluent to afford $\alpha$-amino ketones $2a$.

**Optimization table:**

<table>
<thead>
<tr>
<th>Entry</th>
<th>Oxidizing agent (X equiv)</th>
<th>Solvent</th>
<th>Time</th>
<th>Yield (%)$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PIFA (1)</td>
<td>DCM</td>
<td>5 min</td>
<td>61%</td>
</tr>
<tr>
<td>2</td>
<td>PIFA (1)</td>
<td>Toluene</td>
<td>5 min</td>
<td>40</td>
</tr>
<tr>
<td>3</td>
<td>PIFA (1)</td>
<td>THF</td>
<td>5 min</td>
<td>42</td>
</tr>
<tr>
<td>4</td>
<td>PIFA (1)</td>
<td>CHCl$_3$</td>
<td>5 min</td>
<td>39</td>
</tr>
<tr>
<td>5</td>
<td>PIFA (1.2)</td>
<td>DCM</td>
<td>5 min</td>
<td>81</td>
</tr>
<tr>
<td>6</td>
<td>PIDA (1.2)</td>
<td>DCM</td>
<td>0.5 h</td>
<td>26$^c$</td>
</tr>
<tr>
<td>7</td>
<td>Ph$_2$IOTf (1.2)</td>
<td>DCM</td>
<td>48 h</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>PIFA (1.2)</td>
<td>DCM</td>
<td>30 min</td>
<td>76$^d$</td>
</tr>
<tr>
<td>9</td>
<td>TEMPO (1.2)</td>
<td>DCM</td>
<td>12 h</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>IBX (1.2)</td>
<td>DCM</td>
<td>12 h</td>
<td>0</td>
</tr>
</tbody>
</table>

$^a$ Enamine (0.12 mmol, 1 equiv), oxidizing agent (X equiv), solvent (1 mL); $^b$ Isolated yields; $^c$ 12 h. $^d$ Portion wise addition of PIFA over 15 min.
4. General procedure for the synthesis of $\alpha$-amino ketones 2.

![Chemical structure diagram]

To an over dried 10 mL reaction tube equipped with stir bar, enamine 1 (50 mg, 0.12 mmol) was dissolved in dichloromethane (1 mL). To this solution [bis(trifluoroacetoxyiodo)]benzene (PIFA) (1.2 equiv) was added under nitrogen atmosphere. The reaction tube was sealed and stirred at room temperature for 5 min. After the TLC analysis, the reaction mixture was diluted with 5 mL dichloromethane, washed with saturated sodium bicarbonate solution. The combined organic layer was dried over Na$_2$SO$_4$. The crude product was purified by column chromatography using hexane/ethyl acetate mixture as eluent to afford $\alpha$-amino ketones in high yield and purity.

5. Properties of isolated $\alpha$-amino ketones:

$\text{N-}$(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2a):

According to the general procedure the product was isolated in 81% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

M.p: 112-114 °C

FTIR (KBr): 3313, 3056, 2984, 1685, 1595, 1431, 1267, 1159, 1088, 896, 813, 742, 555 cm$^{-1}$.

$^1$H NMR (500 MHz, CDCl$_3$, 24 °C): $\delta$ 7.81 (d, 2H, $J = 8.4$ Hz), 7.51 (d, 2H, $J = 8.3$ Hz), 7.48-7.45 (m, 1H), 7.36-7.33 (m, 2H), 7.03 (d, 2H, $J = 7.9$ Hz), 6.95 (d, 2H, $J = 8.8$ Hz), 6.40 (d, 2H, $J = 8.9$ Hz),
6.11 (d, 1H, $J = 7.4$ Hz), 5.90 (d, 1H, $J = 7.5$ Hz), 3.24 (q, 4H, $J = 7.0$ Hz), 2.28 (s, 3H), 1.08 (t, 6H, $J = 6.9$ Hz).

$^{13}$C$\{^1$H$\}$ NMR (100 MHz, CDCl$_3$, 24 °C): δ 194.7, 147.7, 142.7, 137.9, 134.3, 133.6, 129.4, 129.2, 129.0, 128.6, 127.1, 121.2, 111.7, 61.5, 44.3, 21.5, 12.5.

HRMS: calcd. for C$_{25}$H$_{28}$N$_2$O$_3$S+H: 437.1893; found: 437.1888.

N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)methanesulfonamide (2b):

\[
\begin{align*}
&\text{According to the general procedure the product was isolated in 75% yield using the mixture of hexanes/} \\
&\text{ethyl acetate (81:19) as an eluent for column chromatography.}
\end{align*}
\]

FTIR: 3271, 3058, 2976, 1686, 1605, 1521, 1411, 1325, 1267, 1190, 1147, 1085, 985, 730, 517, 419 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): δ 7.94 (d, 2H, $J = 8.56$ Hz), 7.50-7.37 (m, 3H), 7.16 (d, 2H, $J = 8.9$ Hz), 6.58 (d, 2H, $J = 8.9$ Hz), 6.02 (d, 1H, $J = 6.5$ Hz), 5.93 (d, 1H, $J = 6.5$ Hz), 3.29 (q, 4H, $J = 7.0$Hz), 2.59 (s, 3H), 1.10 (t, 6H, $J = 7.1$ Hz).

$^{13}$C$\{^1$H$\}$ NMR (100 MHz, CDCl$_3$, 24 °C): δ 194.4, 148.1, 133.8, 129.5, 129.2, 128.8, 127.8, 121.5, 112.2, 61.8, 44.3, 42.3, 12.5.

HRMS: calcd. for C$_{19}$H$_{24}$N$_2$O$_3$S+H: 361.1580; found: 361.1570.
N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)ethanesulfonamide (2c):

According to the general procedure the product was isolated in 77% yield using the mixture of hexanes/ethyl acetate (81:19) as an eluent for column chromatography.

FTIR: 3302, 3066, 2978, 2931, 1686, 1601, 1522, 1419, 1329, 1267, 1143, 1070, 895, 830, 741, 509 cm\(^{-1}\).

\(^1\)H NMR (400 MHz, CDCl\(_3\), 24 °C): \(\delta\) 7.93 (d, 2H, \(J = 8.50\) Hz), 7.51-7.47 (m, 1H), 7.40-7.36 (m, 2H), 7.14 (d, 2H, \(J = 8.8\) Hz), 6.56 (d, 2H, \(J = 8.8\) Hz), 6.00 (d, 1H, \(J = 6.3\) Hz), 5.84 (d, 1H, \(J = 6.3\) Hz), 3.29 (q, 4H, \(J = 7.0\) Hz), 2.74 (dt, 1H, \(J = 14.6, 6.9\) Hz), 2.53 (dt, 1H, \(J = 14.6, 6.9\) Hz), 1.18 (t, 3H, \(J = 7.3\) Hz), 1.10 (t, 6H, \(J = 6.9\) Hz).

\(^{13}\)C\{\(^1\)H\} NMR (100 MHz, CDCl\(_3\), 24 °C): \(\delta\) 194.7, 148.1, 134.1, 133.7, 129.4, 129.2, 128.7, 121.8, 112.0, 61.6, 48.5, 44.3, 42.3, 12.5, 8.2.

HRMS: calcd. for C\(_{20}\)H\(_{26}\)N\(_2\)O\(_3\)S+H: 375.1737; found: 375.1749.

N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(p-tolyl)ethyl)-4-methylbenzenesulfonamide (2d):

According to the general procedure the product was isolated in 63% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3300, 2965, 2923, 2851, 1674, 1605, 1520, 1399, 1338, 1267, 1158, 1086, 1024, 912, 803, 733, 666, 559, 431 cm\(^{-1}\).
$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.72 (d, 2H, $J = 8.3$ Hz), 7.50 (d, 2H, $J = 8.3$ Hz), 7.14 (d, 2H, $J = 8.0$ Hz), 7.03 (d, 2H, $J = 8.0$ Hz), 6.94 (d, 2H, $J = 8.8$ Hz), 6.39 (d, 2H, $J = 8.9$ Hz), 6.11 (d, 1H, $J = 7.4$ Hz), 5.88 (d, 1H, $J = 7.4$ Hz), 3.25 (q, 4H, $J = 7.0$ Hz), 2.33 (s, 3H), 2.28 (s, 3H), 1.09 (t, 6H, $J = 7.0$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 194.3, 148.1, 144.6, 142.6, 138.1, 131.8, 130.3, 129.4, 129.3, 129.2, 127.1, 111.8, 61.4, 44.3, 21.8, 21.5, 12.6.

HRMS: calcd. for $C_{26}H_{30}N_2O_3S+H$: 451.2050; found: 451.2063.

$N$-(2-(4-(Tert-butyl)phenyl)-1-(4-(diethylamino)phenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2e):

According to the general procedure the product was isolated in 61% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3346, 2928, 2857, 1667, 1523, 1495, 1471, 1463, 1159, 913, 745, 550 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.76 (d, 2H, $J = 8.6$ Hz), 7.50 (d, 2H, $J = 8.2$ Hz), 7.35 (d, 2H, $J = 8.6$ Hz), 7.02 (d, 2H, $J = 8.0$ Hz), 6.96 (d, 2H, $J = 8.9$ Hz), 6.40 (d, 2H, $J = 8.9$ Hz), 6.11 (d, 1H, $J = 7.2$ Hz), 5.88 (d, 1H, $J = 7.2$ Hz), 3.25 (q, 4H, $J = 7.0$ Hz), 2.27 (s, 3H), 1.27 (s, 9H), 1.09 (t, 6H, $J = 7.0$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 194.4, 157.5, 147.8, 142.6, 138.1, 131.7, 129.4, 129.2, 129.0, 127.1, 125.6, 121.8, 111.8, 61.4, 44.3, 35.2, 33.1, 21.5, 12.6.

HRMS: calcd. for $C_{29}H_{36}N_2O_3S+H$: 493.2519; found: 493.2538.
**N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(m-tolyl)ethyl)-4-methylbenzenesulfonamide (2f):**

According to the general procedure the product was isolated in 81% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3302, 2965, 2945, 2851, 1668, 1606, 1520, 1399, 1338, 1324, 1266, 1148, 1124, 1090, 909, 800, 736, 559 cm⁻¹.

¹H NMR (400 MHz, CDCl₃, 24 °C): δ 7.62-7.59 (m, 2H), 7.50 (d, 2H, J = 8.3 Hz), 7.29-7.22 (m, 1H), 7.24-7.22 (m, 1H), 7.03 (d, 2H, J = 8.0 Hz), 6.94 (d, 2H, J = 8.9 Hz), 6.39 (d, 2H, J = 8.9 Hz), 6.08 (d, 1H, J = 7.6 Hz), 5.89 (d, 1H, J = 7.5 Hz), 3.25 (q, 4H, J = 7.1 Hz), 2.32 (s, 3H), 2.28 (s, 3H), 1.09 (t, 6H, J = 7.1 Hz).

¹³C{¹H} NMR (100 MHz, CDCl₃, 24 °C): δ 195.0, 147.8, 142.7, 138.1, 138.5, 134.4, 133.6, 129.5, 129.4, 129.3, 128.5, 127.1, 126.3, 121.5, 111.9, 61.5, 44.3, 21.5, 21.4, 12.6.


**N-(2-(3-Fluorophenyl)-2-oxo-1-(4-(pentan-3-yl)phenyl)ethyl)-4-methylbenzenesulfonamide (2g):**

According to the general procedure the product was isolated in 66% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3286, 2952, 2859, 1682, 1605, 1519, 1455, 1335, 1290, 1159, 1089, 916, 810, 733, 674, 560, 428 cm⁻¹.¹H NMR (400 MHz, CDCl₃, 24 °C): δ 7.59 (d, 1H, J = 7.76 Hz), 7.50 (d, 2H, J = 7.78 Hz),
7.47 (d, 1H, $J = 9.40$ Hz), 7.32-7.27 (m, 2H), 7.18-7.17 (m, 1H), 7.04 (d, 2H, $J = 7.9$ Hz), 6.93-6.92 (m, 2H), 6.41-6.39 (m, 2H), 6.05 (d, 1H, $J = 6.5$ Hz), 5.84 (d, 1H, $J = 6.5$ Hz), 3.25 (q, 4H, $J = 7.0$ Hz), 2.29 (s, 3H), 1.09 (t, 6H, $J = 7.0$ Hz).

$^{13}$C\{^1H\} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 193.6, 162.7 (d, $J = 248.0$ Hz), 142.8, 137.8, 130.4, 130.3 (d, $J = 7.02$ Hz), 129.4, 129.3, 127.1, 127.1, 124.7, 124.7, 120.8, 120.6, 115.8, 115.6 (d, $J = 22.9$ Hz), 111.8, 61.7, 44.3, 21.5, 12.5.

HRMS: calcd. for C$_{25}$H$_{27}$N$_2$O$_3$S+H: 455.1799; found: 437.1820.

$N$-(2-(4-Fluorophenyl)-2-oxo-1-(4-(pentan-3-yl)phenyl)ethyl)-4-methylbenzenesulfonamide (2h):

According to the general procedure the product was isolated in 74% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3285, 2965, 2925, 2961, 1681, 1601, 1520, 1457, 1402, 1334, 1272, 1197, 1087, 993, 812, 667, 563, 527, 427 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.86-7.85 (m, 2H), 7.50 (d, 2H, $J = 8.3$ Hz), 7.05-6.99 (m, 4H), 6.92 (d, 2H, $J = 8.9$ Hz), 6.40 (d, 2H, $J = 8.9$ Hz), 6.06 (d, 1H, $J = 7.4$ Hz), 5.85 (d, 1H, $J = 7.4$ Hz), 3.25 (q, 4H, $J = 7.0$ Hz), 2.28 (s, 3H), 1.09 (t, 6H, $J = 7.0$ Hz).

$^{13}$C\{^1H\} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 193.2, 165.9 (d, $J = 256.0$ Hz), 147.8, 142.7, 138.0, 131.7 (d, $J = 9.4$ Hz), 130.7(4), 130.7, 129.3 (d, $J = 8.7$ Hz), 127.1, 121.1, 115.9 (d, $J = 22.0$ Hz), 111.8, 61.5, 44.3, 21.5, 12.5.

HRMS: calcd. for C$_{25}$H$_{27}$N$_2$O$_3$S+H: 455.1799; found: 455.1796.
N-(1-(4-(Diethylamino)phenyl)-2-(4-methoxyphenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2i):

According to the general procedure the product was isolated in 65% yield using the mixture of hexanes/ethyl acetate (81:19) as an eluent for column chromatography.

FTIR: 3280, 3057, 2971, 2930, 1672, 1603, 1518, 1456, 1409, 1333, 1263, 1163, 1085, 1023, 986, 815, 738, 670, 564, 434 cm\(^{-1}\).

\(^1\)H NMR (500 MHz, CDCl\(_3\), 24 °C): \(\delta\) 7.80 (d, 2H, \(J = 8.9\) Hz), 7.49 (d, 2H, \(J = 8.3\) Hz), 7.03 (d, 2H, \(J = 8.0\) Hz), 6.94 (d, 2H, \(J = 8.9\) Hz), 6.81 (d, 2H, \(J = 9.0\) Hz), 6.39 (d, 2H, \(J = 8.9\) Hz), 6.13 (d, 1H, \(J = 7.4\) Hz), 5.84 (d, 1H, \(J = 7.4\) Hz), 3.80 (s, 3H), 3.24 (q, 4H, \(J = 7.0\) Hz), 2.28 (s, 3H), 1.08 (t, 6H, \(J = 7.0\) Hz).

\(^{13}\)C\{\(^1\)H\} NMR (100 MHz, CDCl\(_3\), 24 °C): \(\delta\) 193.1, 163.9, 142.6, 137.9, 132.3, 131.4, 129.7, 129.3, 129.2, 127.0, 126.5, 113.9, 113.8, 61.1, 55.5, 44.6, 21.5, 21.4, 12.4.

HRMS: calcd. for C\(_{26}\)H\(_{30}\)N\(_2\)O\(_4\)S+Na: 489.1818; found: 489.1801.

N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(thiophen-3-yl)ethyl)-4-methylbenzenesulfonamide (2j):

According to the general procedure the product was isolated in 68% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3275, 3056, 2972, 2929, 1672, 1610, 1519, 1404, 1340, 1267, 1159, 1083, 738, 563 cm\(^{-1}\).
$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): δ 7.95-7.94 (m, 1H), 7.49 (d, 2H, $J = 8.3$ Hz), 7.39-7.38 (m, 1H), 7.20-7.18 (m, 1H), 7.03 (d, 2H, $J = 8.1$ Hz), 6.94 (d, 2H, $J = 8.8$ Hz), 6.41 (d, 2H, $J = 8.8$ Hz), 6.04 (d, 1H, $J = 7.0$ Hz), 5.65 (d, 1H, $J = 7.0$ Hz), 3.25 (q, 4H, $J = 7.0$ Hz), 2.29 (s, 3H), 1.09 (t, 6H, $J = 7.0$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): δ 188.8, 147.9, 142.7, 139.2, 138.1, 133.8, 129.4, 129.2, 127.1, 126.3, 121.6, 111.9, 62.9, 44.3, 21.5, 12.6.

HRMS: calcd. for C$_{23}$H$_{26}$N$_2$O$_3$S$_2$+H: 443.1458; found: 443.1477.

$N$-(1-(4-(Dipropylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2k):

![Chemical Structure]

According to the general procedure the product was isolated in 72% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3289, 2930, 2871, 1681, 1606, 1519, 1335, 1293, 1159, 1089, 810, 732, 677, 546, 415 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): δ 7.81 (d, 2H, $J = 8.3$ Hz), 7.51-7.44 (m, 3H), 7.36-7.32 (m, 2H), 7.02 (d, 2H, $J = 8.0$ Hz), 6.93 (d, 2H, $J = 8.9$ Hz), 6.35 (d, 2H, $J = 8.9$ Hz), 6.09 (d, 1H, $J = 7.5$ Hz), 5.90 (d, 1H, $J = 7.5$ Hz), 3.12 (t, 4H, $J = 7.7$ Hz), 2.28 (s, 3H), 1.56-1.47 (m, 4H), 0.88 (t, 6H, $J = 7.4$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): δ 194.7, 148.2, 142.6, 138.1, 134.8, 133.6, 129.3, 129.2, 129.0, 128.6, 127.1, 121.2, 111.8, 61.5, 52.8, 21.4, 20.4, 11.4.

HRMS: calcd. for C$_{27}$H$_{32}$N$_2$O$_3$S$^+$H: 465.2206; found: 465.2225.
**N-(1-(4-(Dibutylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2l):**

![Chemical Structure Image]

According to the general procedure the product was isolated in 63% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3286, 2952, 2859, 1682, 1605, 1519, 1455, 1335, 1159, 1089, 810, 733, 674, 560, 428 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.81 (d, 2H, $J = 7.5$ Hz), 7.51-7.45 (m, 3H), 7.34 (t, 2H, $J = 7.5$ Hz), 7.03 (d, 2H, $J = 8.1$ Hz), 6.94 (d, 2H, $J = 8.7$ Hz), 6.36 (d, 2H, $J = 8.7$ Hz), 6.11 (d, 1H, $J = 7.5$ Hz), 5.90 (d, 1H, $J = 7.5$ Hz), 3.15 (t, 4H, $J = 7.7$ Hz), 2.28 (s, 3H), 1.51-1.43 (m, 4H), 1.35-1.24 (m, 4H), 0.93 (t, 6H, $J = 7.3$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 194.7, 148.1, 142.6, 137.9, 134.3, 133.6, 129.3, 129.2, 129.0, 128.6, 127.1, 121.0, 111.7, 61.5, 50.7, 29.3, 21.5, 20.3, 14.0.

HRMS: calcd. for C$_{29}$H$_{36}$N$_2$O$_3$S+H: 493.2519; found: 493.2512.

**N-(1-(4-(Diallylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2m):**

![Chemical Structure Image]

According to the general procedure the product was isolated in 68% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3296, 3057, 2983, 2925, 2856, 1683, 1608, 1519, 1447, 1394, 1334, 1265, 1159, 1089, 990, 812, 702, 561 cm$^{-1}$.
\( ^1 \text{H NMR} \) (400 MHz, CDCl\(_3\), 24 °C): \( \delta \) 7.80 (d, 2H, \( J = 8.3 \) Hz), 7.52-7.46 (m, 3H), 7.36-7.33 (m, 2H), 7.04 (d, 2H, \( J = 8.1 \) Hz), 6.95 (d, 2H, \( J = 8.8 \) Hz), 6.44 (d, 2H, \( J = 8.8 \) Hz), 6.09 (d, 1H, \( J = 7.5 \) Hz), 5.90 (d, 1H, \( J = 7.5 \) Hz), 5.81-5.72 (m, 2H), 5.14-5.07 (m, 4H), 3.82-3.80 (m, 4H), 2.29 (s, 3H).

\( ^{13} \text{C}\{^1 \text{H}\} \) NMR (100 MHz, CDCl\(_3\), 24 °C): \( \delta \) 194.7, 148.8, 142.7, 137.9, 134.3, 133.7, 133.5, 129.3, 129.2, 129.0, 128.7, 127.1, 122.5, 116.3, 112.5, 61.4, 52.7, 21.5.


\( \text{N-(1-(4-(Allyl(ethyl)amino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2n):} \)

\[
\begin{array}{c}
\text{O} \\
\text{N} \\
\text{Ts}
\end{array}
\]

According to the general procedure the product was isolated in 64% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3271, 3046, 2969, 1685, 1615, 1521, 1325, 1267, 1190, 1147, 1097, 1085, 730, 517, 419 cm\(^{-1}\).

\( ^1 \text{H NMR} \) (400 MHz, CDCl\(_3\), 24 °C): \( \delta \) 7.80 (d, 2H, \( J = 7.5 \) Hz), 7.51-7.46 (m, 3H), 7.33 (t, 2H, \( J = 7.7 \) Hz), 7.03 (d, 2H, \( J = 8.0 \) Hz), 6.94 (d, 2H, \( J = 8.7 \) Hz), 6.40 (d, 2H, \( J = 8.7 \) Hz), 6.11 (d, 1H, \( J = 7.5 \) Hz), 5.89 (d, 1H, \( J = 7.5 \) Hz), 5.80-5.70 (m, 1H), 5.11-5.06 (m, 2H), 3.78 (d, 2H, \( J = 4.5 \) Hz), 3.27 (q, 2H, \( J = 7.0 \) Hz), 2.28 (s, 3H), 1.08 (t, 3H, \( J = 7.0 \) Hz).

\( ^{13} \text{C}\{^1 \text{H}\} \) NMR (100 MHz, CDCl\(_3\), 24 °C): \( \delta \) 194.7, 148.1, 142.6, 137.9, 134.2, 133.9, 133.6, 129.3, 129.2, 129.0, 128.9, 128.8, 128.6, 127.1, 121.8, 116.0, 112.1, 61.4, 52.5, 44.7, 21.5, 12.2.

HRMS: calcd. for C\(_{26}\)H\(_{28}\)N\(_2\)O\(_3\)S+H: 449.1893; found: 449.1902.
N-(1-(5-Ethyl-10,11-dihydro-5H-dibenzo[b,f]azepin-2-yl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2o):

According to the general procedure the product was isolated in 47% yield using the mixture of hexanes/ethyl acetate (83:17) as an eluent for column chromatography.

FTIR:  3346, 3056, 2984, 2925, 2847, 1684, 1595, 1488, 1431, 1330, 1266, 1159, 1095, 989, 900, 743, 551.5, 419 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.81 (d, 2H, $J = 8.1$ Hz), 7.50-7.46 (m, 1H), 7.39 (d, 2H, $J = 8.3$ Hz), 7.37-7.33 (m, 2H), 7.14-7.07 (m, 2H), 7.0 (d, 1H, $J = 7.3$ Hz), 6.95-6.88 (m, 4H), 6.80-6.76 (m, 2H), 6.10 (d, 1H, $J = 7.0$ Hz), 5.92 (d, 1H, $J = 7.1$ Hz), 3.67 (q, 2H, $J = 7.0$ Hz), 3.05-3.01 (m, 2H), 2.91-2.86 (m, 2H), 2.13 (s, 3H), 1.06 (t, 3H, $J = 7.0$ Hz).

$^{13}$C{$^1$H} NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 194.4, 148.2, 148.0, 142.9, 137.9, 135.5, 134.0, 133.9, 133.5, 130.0, 129.3, 129.1, 129.1, 128.8, 128.0, 126.9, 126.6, 126.4, 123.1, 120.7, 120.1, 61.4, 45.4, 32.8, 31.6, 21.4, 13.9.

HRMS: calcd.for C$_{31}$H$_{30}$N$_2$O$_3$S+H: 511.2050; found: 511.2052.

N-(1,2-Bis(4-methoxyphenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2p):
According to the general procedure the product was isolated in 61% yield using the mixture of hexanes/ethyl acetate (82:18) as an eluent for column chromatography.

FTIR: 3286, 2952, 2859, 1682, 1519, 1455, 1335, 1290, 1156, 1164, 1090, 909, 736, 520 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.77 (d, 2H, $J = 9.0$ Hz), 7.51 (d, 2H, $J = 8.3$ Hz), 7.09-7.03 (m, 4H), 6.80 (d, 2H, $J = 9.0$ Hz), 6.66 (d, 2H, $J = 8.8$ Hz), 6.30 (d, 1H, $J = 7.4$ Hz), 5.89 (d, 1H, $J = 7.4$ Hz), 3.78 (s, 3H), 3.68 (s, 3H), 2.28 (s, 3H).

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 193.0, 164.1, 159.6, 143.0, 137.7, 131.4, 129.7, 129.4, 129.3, 127.0, 126.5, 114.5, 114.0, 60.9, 55.6, 55.3, 21.4.

HRMS: calcd. for C$_{23}$H$_{23}$NO$_5$S+Na: 448.1189; found: 448.1172.

$N$-(2-(2-(Allyloxy)phenyl)-1-(4-methoxyphenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2q):

According to the general procedure the product was isolated in 34% yield using the mixture of hexanes/ethyl acetate (81:19) as an eluent for column chromatography.

FTIR: 3288, 3061, 2850, 1675, 1599, 1507, 1449, 1338, 1259, 1165, 1090, 997, 937, 817, 742, 673, 557 cm$^{-1}$.

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C): $\delta$ 7.60 (d, 2H, $J = 8.3$ Hz), 7.47 (dd, 1H, $J = 1.8$ Hz), 7.35-7.31 (m, 1H), 7.10 (d, 2H, $J = 8.0$ Hz), 7.01 (d, 2H, $J = 8.8$ Hz), 6.87-6.83 (m, 1H), 6.79 (d, 1H, $J = 8.5$ Hz), 6.64 (d, 2H, $J = 8.3$ Hz), 6.25-6.21 (m, 2H), 6.04-5.95 (m, 1H), 5.40-5.35 (m, 2H), 4.55 (d, 2H, $J = 5.4$ Hz), 3.78 (s, 3H), 3.69 (s, 3H), 2.31 (s, 3H).

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C): $\delta$ 196.5, 159.4, 157.1, 143.0, 137.6, 134.4, 132.2, 131.5, 129.5, 129.4, 128.1, 127.2, 125.1, 121.0, 119.0, 114.1, 112.7, 69.6, 64.4, 55.3, 21.5.
HRMS: calcd. for C_{25}H_{25}NO_{5}S+H: 452.1526; found: 452.1515.

\( N-(1-(4-Methoxyphenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2r): \)

\[
\begin{align*}
\text{O} & \quad \text{H} & \quad \text{N} & \quad \text{Ts} \\
\text{OMe} & & & \\
\end{align*}
\]

According to the general procedure the product was isolated in 61% yield using the mixture of hexanes/ethyl acetate (83:17) as an eluent for column chromatography.

FTIR: 3280, 3057, 2971, 2930, 1672, 1603, 1518, 1407, 1376, 1263, 1163, 1124, 1090, 909, 521 cm\(^{-1}\).

\(^1\)H NMR (400 MHz, CDCl\(_3\), 24 °C): \( \delta \) 7.78 (d, 2H, \( J = 8.1 \text{ Hz} \)), 7.52 (d, 2H, \( J = 8.3 \text{ Hz} \)), 7.48-7.46 (m, 1H), 7.36-7.32 (m, 2H), 7.09-7.04 (m, 4H), 6.67 (d, 2H, \( J = 8.8 \text{ Hz} \)), 6.23 (d, 1H, \( J = 4.0 \text{ Hz} \)), 5.95 (d, 1H, \( J = 7.3 \text{ Hz} \)), 3.69 (s, 3H), 2.29 (s, 3H).

\(^{13}\)C\(^{\text{\sp{1}H}}\) NMR (100 MHz, CDCl\(_3\), 24 °C): \( \delta \) 194.7, 159.7, 143.1, 137.6, 133.9, 133.9, 129.5, 129.4, 129.0, 128.7, 127.7, 127.0, 114.5, 61.2, 55.3, 21.5.

HRMS: calcd. for C\(_{22}\)H\(_{21}\)NO\(_4\)S+Na: 418.1083; found: 418.1072.

\( 4\)-Methyl-\( N-(2\text{-oxo-1,2-diphenylethyl})\)benzenesulfonamide (2s):

\[
\begin{align*}
\text{O} & \quad \text{H} & \quad \text{N} & \quad \text{Ts} \\
\text{O} & & & \\
\end{align*}
\]

According to the general procedure the product was isolated in 47% yield (12 h) using the mixture of hexanes/ethyl acetate (85:15) as an eluent for column chromatography.

FTIR: 3286, 3057, 2926, 2854, 1687, 1597, 1450, 1336, 1283, 1263, 1161, 1092, 1164, 986, 813, 700, 539 cm\(^{-1}\).
\( ^1H \) NMR (400 MHz, CDCl\(_3\), 24 °C): \( \delta \) 7.79 (d, 2H, \( J = 8.3 \) Hz), 7.52 (d, 2H, \( J = 8.3 \) Hz), 7.48 (d, 1H, \( J = 7.5 \) Hz), 7.37-7.33 (m, 2H), 7.17 (s, 5H), 7.05 (d, 2H, \( J = 8.1 \) Hz), 6.23 (d, 1H, \( J = 7.3 \) Hz), 5.99 (d, 1H, \( J = 7.4 \) Hz), 2.29 (s, 3H).

\( ^{13}C\{^1H\} \) NMR (100 MHz, CDCl\(_3\), 24 °C): \( \delta \) 194.7, 143.2, 137.5, 135.8, 134.0, 133.9, 129.4, 129.2, 129.0, 128.8, 128.5, 128.2, 127.0, 61.8, 21.5.

HRMS: calcd. for C\(_{21}\)H\(_{19}\)NO\(_3\)S+Na: 388.0978; found: 388.0985.

**Synthesis of (4-fluorophenyl)(4-(trifluoromethyl)phenyl)methanone:**

![Chemical Structure](image)

According to the general procedure the product was isolated in 60% yield using the mixture of hexanes/ethyl acetate (96:4) as an eluent for column chromatography.

FTIR: 2925, 2854, 1716, 1627, 1596, 1505, 1385, 1350, 1130, 1067, 862, 770 cm\(^{-1}\).

\( ^1H \) NMR (500 MHz, CDCl\(_3\), 24 °C): \( \delta \) 7.87-7.83 (m, 4H), 7.76 (d, 2H, \( J = 8.1 \) Hz), 7.20-7.17 (m, 2H).

\( ^{13}C\{^1H\} \) NMR (125 MHz, CDCl\(_3\), 24 °C): \( \delta \) 194.2, 165.9 (d, \( J = 255.6 \) Hz), 140.7, 133.9 (q, \( J = 32.6 \) Hz), 133.1 (d, \( J = 3.2 \) Hz), 132.9 (d, \( J = 9.3 \) Hz), 125.5 (q, \( J = 3.6 \) Hz), 123.7 (q, \( J = 272.5 \) Hz), 115.9 (d, \( J = 22.0 \) Hz).

**6. Synthesis of 1-(4-(dimethylamino)phenyl)-1-phenylethane-1,2-diol :**

![Chemical Structure](image)

**Preparation of Grignard:** To an oven dried 50 mL two-neck round bottom flask equipped with stir bar, activated magnesium turnings (4.2 equiv) was added followed by 1 mL of dry THF. To the mixture
1M solution of 4-bromo-\(N,N\)-dimethyl aniline (4 equiv) in THF was added slowly (for initiating the reaction 1,2-dibromoethane was used) at room temperature and the temperature of the reaction was mentioned around 35-40 °C.

After preparation of Grignard reagent, \(\alpha\)-hydroxyacetophenone (408 mg, 3 mmol, 1 equiv) was dissolved in dry THF (3 mL) to that Grignard reagent was added slowly at room temperature. The reaction mixture was stirred for another 12 h at room temperature for the complete consumption of starting material. After 12 h, the reaction mixture was quenched with the addition of saturated \(\text{NH}_4\text{Cl}\) solution and extracted with ethyl acetate. The combined organic layer was dried over \(\text{Na}_2\text{SO}_4\) and solvent was under reduced pressure. The crude compound obtained was purified by column chromatography to afford the product in 70% yield using the mixture of hexanes/ethyl acetate (81:19) as an eluent for column chromatography.

FTIR: 3414, 2803, 1603, 1513, 1452, 1352, 1274, 1221, 1121, 1054, 942, 820, 711, 559 cm\(^{-1}\).

\(^1\)H NMR (400 MHz, CDCl\(_3\), 24 °C): \(\delta\) 7.40 (d, 2H, \(J = 7.5\) Hz), 7.30 (t, 2H, \(J = 7.0\) Hz), 7.25-7.23 (m, 3H), 6.67 (d, 2H, \(J = 7.5\) Hz), 4.08 (q, 2H, \(J = 11.5\) Hz), 2.90 (s, 6H), 2.44 (bs, 2H).

\(^13\)C\({^1\text{H}}\) NMR (100 MHz, CDCl\(_3\), 24 °C): \(\delta\) 149.9, 144.4, 131.6, 128.4, 127.5, 127.3, 126.5, 112.4, 78.5, 69.7, 40.6.

HRMS: calcd. for \(\text{C}_{16}\text{H}_{19}\text{NO}_2\)+H: 258.1489; found: 258.1507.


\[
\begin{align*}
\text{OH} & \quad \text{N} & \quad \Downarrow \quad \text{IBX} \\
\text{OH} & \quad \text{EtOAc, 80 °C, 3 h} & \quad \text{OH} \\
\text{Ph} & \quad \text{N} & \quad \text{H} \\
\end{align*}
\]

To an oven dried 25 mL round bottom flask equipped with stir bar, 1,2-diol (257mg, 1 mmol, 1 equiv) was added and dissolved in 10 mL of dry EtOAc. Next, IBX (1.2 equiv) was added under the nitrogen atmosphere and the reaction mixture was stirred at 80 °C for 3 h. After the complete consumption of starting material, the reaction mixture was cool to room temperature and filtered through the short pad
of Celite using EtOAc. Evaporation of solvent followed by purification of the crude compound by column chromatography furnished the product in 60% yield using the mixture of hexanes/ethyl acetate (98:02) as an eluent for column chromatography.

$^1$H NMR (500 MHz, CDCl$_3$, 24 °C): $\delta$ 9.79 (s, 1H), 7.32-7.27 (m, 4H), 7.25-7.23 (m, 1H), 7.06 (d, 2H, $J = 8.8$ Hz), 6.60 (d, 2H, $J = 8.8$ Hz), 2.96 (s, 1H), 2.84 (s, 6H).

$^{13}$C{$^1$H} NMR (125 MHz, CDCl$_3$, 24 °C): $\delta$ 198.2, 150.4, 139.6, 132.8, 128.7, 128.5, 128.2, 127.5, 112.4, 83.3, 40.4.

HRMS: calcd. for C$_{16}$H$_{18}$NO$_2$+H: 256.1332; found: 256.1332.

8. Synthesis of $N$-(1-(4-(dimethylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2v):

![Chemical Structure](image)

To an oven dried 25 mL round bottom flask equipped with stir bar, $\alpha$-hydroxyaldehyde (128mg, 0.5 mmol, 1 equiv) was added followed by 10 mL of dry DCM and TsNH$_2$ (1.1 equiv) under the nitrogen atmosphere. The mixture was stirrer at room temperature for 5 mins, subsequently trifluoroacetic anhydride (TFAA, 1.1 equiv) was added and stirred at the same temperature for 8 h. The reaction mixture was diluted with DCM (10 mL) and washed with saturated sodium bicarbonate solution. After the evaporation of solvent, the crude product was purified by column chromatography to give the product in 56% yield using the mixture of hexanes/ethyl acetate (85:15) as an eluent for column chromatography.

Mp: 108-110 °C

FTIR (KBr): 3265, 3057, 2982, 2927, 1684, 1606, 1523, 1336, 1269, 1160,986, 813, 736, 559 cm$^{-1}$. 
1H NMR (400 MHz, CDCl₃, 24 °C): δ 7.79 (d, 2H, J = 8.52 Hz), 7.52 (d, 2H, J = 8.32 Hz), 7.48-7.44 (m, 1H), 7.35-7.31 (m, 2H), 7.04 (d, 2H, J = 8.1 Hz), 6.99 (d, 2H, J = 8.8 Hz), 6.46 (d, 2H, J = 8.8 Hz), 6.11 (d, 1H, J = 7.5 Hz), 5.90 (d, 1H, J = 7.5 Hz), 2.85 (s, 6H), 2.29 (s, 3H).

13C{¹H} NMR (100 MHz, CDCl₃, 24 °C): δ 194.8, 150.5, 142.8, 137.8, 134.2, 133.7, 129.3, 129.1, 129.0, 128.7, 127.1, 122.6, 112.6, 61.5, 40.3, 21.5.


9. Synthesis of N-(2-hydroxy-1,2-diphenylethyl)-4-methylbenzenesulfonamide:

To an oven dried 25 mL round bottom flask equipped with stir bar, α-amino ketone (40mg, 0.1 mmol, 1 equiv) was added followed by 2 mL of dry MeOH under the nitrogen atmosphere. The mixture was cooled to 0 °C in an ice bath and stirrer for 5 mins. Subsequently, NaBH₄ (3 equiv) was added at the same temperature. After the addition, the reaction mixture was slowly warmed to room temperature and stirred for 2 h. The reaction mixture was quenched by saturated NH₄Cl solution, extracted with ethyl acetate and dried over Na₂SO₄. Evaporation of solvent followed by purification of the crude compound by column chromatography afforded the product in 81% yield using the mixture of hexanes/ ethyl acetate (81:19) as an eluent for column chromatography.

Mp: 208-210 °C

FTIR (KBr): 3472, 3323, 2923, 2854, 1627, 1406, 1313, 1120, 700, 566, 542 cm⁻¹.

1H NMR (400 MHz, DMSO-d₆, 24 °C): δ 8.15 (d, 1H, J = 9.3 Hz), 7.35 (d, 2H, J = 8.2 Hz), 7.25-7.24 (m, 2H), 7.19-7.18 (m, 2H), 7.13-7.08 (m, 8H), 5.42 (d, 1H, J = 4.8 Hz), 4.68 (dd, 1H, J = 5.2, 6.2 Hz), 4.34 (dd, 1H, J = 6.8, 9.0 Hz), 2.32 (s, 3H).

13C{¹H} NMR (100 MHz, DMSO-d₆, 24 °C): δ 142.6, 141.6, 138.8, 138.6, 128.8, 128.2, 127.5, 127.0, 126.9, 126.7, 126.4, 126.1, 75.3, 63.3, 20.8.
HRMS: calcd. for C_{21}H_{21}NO_{3}S+Na: 390.1134; found: 390.1126.
10. NMR spectra of isolated α-amino ketones:

N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide (2a):

$^1$H NMR (500 MHz, CDCl$_3$, 24 ºC)

$^{13}$C$^1$H NMR (100 MHz, CDCl$_3$, 24ºC)
N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)ethanesulfonamide (2c):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)

N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-phenylethyl)ethanesulfonamide (2c):
$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(p-tolyl)ethyl)-4-methylbenzenesulfonamide (2d):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C ($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(2-(4-(Tert-butyl)phenyl)-1-(4-(diethylamino)phenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2e):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C ($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(m-tolyl)ethyl)-4-methylbenzenesulfonamide(2f):

**^1H NMR (400 MHz, CDCl$_3$, 24 °C)**

![^1H NMR spectrum](image)

**[^13C] NMR (100 MHz, CDCl$_3$, 24 °C)**

![[^13C] NMR spectrum](image)
N-(2-(3-Fluorophenyl)-2-oxo-1-(4-(pentan-3-yl)phenyl)ethyl)-4-methylbenzenesulfonamide (2g):

1H NMR (400 MHz, CDCl₃, 24 °C)

13C{¹H} NMR (100 MHz, CDCl₃, 24 °C)
N-(2-(4-Fluorophenyl)-2-oxo-1-(4-(pentan-3-yl)phenyl)ethyl)-4-methylbenzenesulfonamide(2h):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Diethylamino)phenyl)-2-(4-methoxyphenyl)-2-oxoethyl)-4-methylbenzenesulfonamide(2i):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C{${^1}$H} NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Diethylamino)phenyl)-2-oxo-2-(thiophen-3-yl)ethyl)-4-methylbenzenesulfonamide(2):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C{H} NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Dipropylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2k):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-(Dibutylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(21):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)

**Current Data Parameters**
- NAME: spa1213
- EXPRNO: 407
- PROCNO: 1

**F2 - Acquisition Parameters**
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- TIME: 20131214
- INSTREND: spacet
- FTSP: 5 mm PABBO BB-
- POL: 400 MHz
- TR: 1500 sec
- TD: 512
- T: 4
- T1: 24038.461 Hz
- T2: 1.445113 Hz
- T3: 0.946147 sec
- T4: 200.34
- T5: 20.300 usec
- T6: 6.50 usec
- T7: 201.0
- T8: 1 00000000 sec
- T9: 0 00000000 sec
- T10: 1

**F2 - Processing parameters**
- S1: 16340
- SF: 400.132000 MHz
- SW: 512
- DM: 0
- LB: 0 0.30 Hz
- OB: 1.00

**Current Data Parameters**
- NAME: spa1213
- EXPRNO: 407
- PROCNO: 1

**F2 - Acquisition Parameters**
- DATA: spa1213
- TIME: 20131214
- INSTREND: spacet
- FTSP: 5 mm PABBO BB-
- POL: 400 MHz
- TR: 1500 sec
- TD: 512
- T: 4
- T1: 24038.461 Hz
- T2: 1.445113 Hz
- T3: 0.946147 sec
- T4: 200.34
- T5: 20.300 usec
- T6: 6.50 usec
- T7: 201.0
- T8: 1 00000000 sec
- T9: 0 00000000 sec
- T10: 1

**F2 - Processing parameters**
- S1: 16340
- SF: 400.132000 MHz
- SW: 512
- DM: 0
- LB: 0 0.30 Hz
- OB: 1.00
N-(1-(4-(Diallylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2m):

^1H NMR (400 MHz, CDCl₃, 24 °C)

^13C(^1H) NMR (100 MHz, CDCl₃, 24 °C)
N-(1-(4-(Allyl(ethyl)amino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2n): 

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C$^1$H NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(5-Ethyl-10,11-dihydro-5H-dibenzo[b,f]azepin-2-yl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2o):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1,2-bis(4-methoxyphenyl)-2-oxoethyl)-4-methylbenzenesulfonamide (2p):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
N-(1-(4-Methoxyphenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2r):

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

![NMR Spectrum Image]

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)

![NMR Spectrum Image]
4-Methyl-N-(2-oxo-1,2-diphenylethyl)benzenesulfonamide(2s): 
$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (100 MHz, CDCl$_3$, 24 °C)
(4-Fluorophenyl)(4-(trifluoromethyl)phenyl)methanone:

$^1$H NMR (500 MHz, CDCl$_3$, 24 °C)

$^{13}$C($^1$H) NMR (125 MHz, CDCl$_3$, 24 °C)
1-(4-(Dimethylamino)phenyl)-1-phenylethane-1,2-diol:

$^1$H NMR (400 MHz, CDCl$_3$, 24 °C)

$^{13}$C$^1$H NMR (125 MHz, CDCl$_3$, 24 °C)
2-(4-(Dimethylamino)phenyl)-2-hydroxy-2-phenylacetaldehyde:

**¹H NMR (500 MHz, CDCl₃, 24 °C)**

![NMR Spectrum](image)

**¹³C{¹H} NMR (125 MHz, CDCl₃, 24 °C)**

![NMR Spectrum](image)
N-(1-(4-(Dimethylamino)phenyl)-2-oxo-2-phenylethyl)-4-methylbenzenesulfonamide(2v):

\[ \text{\(^1H\) NMR (400 MHz, CDCl}_3, 24 \, ^\circ \text{C}} \]

\[ \text{\(^13C\{\text{\(^1H\)}\) NMR (100 MHz, CDCl}_3, 24 \, ^\circ \text{C}} \]
N-(2-Hydroxy-1,2-diphenylethyl)-4-methylbenzenesulfonamide:

**¹H NMR (400 MHz, DMSO-d₆, 24 °C)**

**¹³C{¹H} NMR (100 MHz, DMSO-d₆, 24 °C)**

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