Supporting Information
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Synthesis and Photochemistry of New Photolabile Protecting Group for Propargylic Alcohols

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Supporting Information

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General: All chemicals and solvents were of analytical grade and were used without further purifications. All reactions were conducted in oven-dried (135 °C) glassware under an inert atmosphere of dry nitrogen. The progress of reactions was monitored by silica gel thin layer chromatography (TLC) plates (mesh size 60Å, MERCK). Products were purified by flash column chromatography (FCC) on 40-63 m silica gel 60 (MERCK). Proton nuclear magnetic resonance spectra (1H NMR) were recorded on Bruker AV-400(400 MHz). Chemical shifts are reported in ppm relative to tetramethylsilane (TMS) as the internal standard. Data is reported as follows: chemical shift, integration, coupling constants (Hz), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, sept = septet, br = broad, m = multiplet). Carbon nuclear magnetic resonance spectra (13C NMR) were recorded on Bruker AV-400 (100 MHz). Chemical shifts are reported in ppm relative to tetramethylsilane (TMS) as the internal standard (0 ppm in 1H NMR) or the middle peak of chloroform-d (77.0 ppm in 13C NMR). Mass spectra were measured on HP-1100 LC-MS spectrometer. UV-vis spectra were recorded on Hitachi UV 3310 spectrometer. Fluorescence
spectra were recorded on a Hitachi FL-4500 fluorometer. The solvents used for UV-vis and fluorescence measurements are of HPLC grade. The reversed-phase (RP) HPLC system consisted of a LC-10ATVP pump and SPD-10AVP UV–vis detector (Shimadzu, Kyoto, Japan) with an injector (20 μL sample loop). The analysis was performed on an Unitary C<sub>18</sub> column (5 μm, 250 × 4.6 mm<sup>2</sup>, Huapu, China) and Chromatography Data System N2000 (Surwit Technology, Hangzhou, China).

SI-1 Synthesis and Characterization of propargylic alcohols 1a-1f

Propargylic alcohols were synthesized according to published procedures in a slightly modified procedure.<sup>1-9</sup>

2-methyl-4-phenylbut-3-yn-2-ol (1a)

![Structural formula of 2-methyl-4-phenylbut-3-yn-2-ol (1a)](attachment:image)

To a solution of bromobenzene (500 mg, 3.18 mmol), CuI (21.83 mg, 114.64 μmol), PPh<sub>3</sub> (100 mg, 382.15 μmol), and PdCl<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub> (80.47 mg, 114.64 μmol) in 1.5 mL NEt<sub>3</sub> under nitrogen atmosphere was added 2-methylbut-3-yn-2-ol (321 mg, 3.82 mmol) at ambient temperature. Then the reaction mixture was heated to 80 °C for 12 h. The reaction was quenched with water (30 mL), extracted with dichloromethane (DCM) (3×30 mL). Drying collected organic layer over magnesium sulfate followed by concentration, the product was obtained as yellow oil by column chromatography (silica, hexane/ethyl acetate (5:1), R<sub>f</sub> = 0.4) (yield: 480 mg, 78%).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>): δ = 7.44-7.39 (2H, m), 7.32-7.27 (3H, m), 1.62 (6H, s).

<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>) δ = 131.5, 128.1, 122.6, 93.6, 81.9, 65.4, 31.3.

4-(4-bromophenyl)-2-methylbut-3-yn-2-ol (1b)

![Structural formula of 4-(4-bromophenyl)-2-methylbut-3-yn-2-ol (1b)](attachment:image)

To a solution of 1,4-dibromobenzene (900 mg, 3.82 mmol), CuI (43.67 mg, 229.29 μmol), PPh<sub>3</sub> (60.14 mg, 229.29 μmol), and PdCl<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub> (80.47 mg, 114.64 μmol) in NEt<sub>3</sub> (1.5 mL), and THF (1.5 mL) under nitrogen atmosphere was added 2-methylbut-3-yn-2-ol (3.21 g, 38.16 mmol) at ambient temperature. Then the reaction mixture was heated to 80 °C for 16 h. The reaction was quenched with water (30 mL), extracted with dichloromethane (DCM) (3×30 mL). Drying collected organic layer over magnesium sulfate followed by concentration, the product was obtained as yellow oil by column chromatography (silica, hexane/ethyl acetate (4:1), R<sub>f</sub> = 0.48) (yield: 374.63 mg, 41%).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ = 7.43 (m, 2H), 7.27 (m, 2H), 1.61 (s, 6H).
\(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 133.2, 131.6, 122.6, 121.8, 95.1, 81.2, 65.7, 31.5\).

2-methyl-4-(p-tolyl)but-3-yne-2-ol (1c)

To a solution of 1-bromo-4-methylbenzene (675.06 g, 3.95 mmol), CuI (22.64 mg, 188.88 \(\mu\)mol), PPh\(_3\) (99.78 mg, 380.43 \(\mu\)mol), and PdCl\(_2\)(PPh\(_3\))\(_2\) (100.13 mg, 142.66 \(\mu\)mol) in \(\text{NEt}_3\) (3 mL) under nitrogen atmosphere was added 2-methylbut-3-yne-2-ol (400 mg, 4.76 mmol) at ambient temperature. Then the reaction mixture was heated to 75 °C for 12 h. The reaction was quenched with water (50 mL), extracted with dichloromethane (DCM) (3 \(\times\) 50 mL). Drying collected organic layer over magnesium sulfate followed by concentration, the product was obtained as yellow oil by column chromatography (silica, hexane/ethyl acetate (10:1), \(R_f = 0.15\)) (yield: 350.88 mg, 51%).

\(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.31\ (2\ H, d, J = 8.1\ Hz), 7.11\ (2\ H, d, J = 8.1\ Hz), 2.35\ (3\ H, s), 2.08\ (1\ H, s), 1.62\ (6\ H, s)\).

\(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 138.5, 131.7, 129.1, 119.8, 93.2, 82.4, 65.8, 31.7, 21.6\).

2-methyloct-3-yne-2-ol (1d)

To a solution of 1-hexyne (0.28 mL, 2.43 mmol in THF (18 mL) was added dropwise n-butyllithium in hexane at –78 °C. After 30 minutes, acetone (0.13 mL, 1.75 mmol) was added at the same temperature and the mixture was gradually warmed up to room temperature. Checking the consumption of acetone, saturated ammonium chloride aqueous solution was added. The mixture was extracted with ethyl acetate and washed with saturated ammonium chloride aqueous solution and brine. Drying collected organic layer over magnesium sulfate followed by concentration, the product was obtained as yellow oil by column chromatography (silica, hexane/ethyl acetate (10:1), \(R_f = 0.3\)) (yield: 654.8 mg, 90%).

\(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 2.17\ (2\ H, t, J = 6.9\ Hz), 2.08-2.03\ (1\ H, m), 1.44\ (6\ H, s), 1.39-1.32\ (4\ H, m), 0.90\ (3\ H, t, J = 7.1\ Hz)\).

\(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 85.1, 82.5, 65.2, 31.7, 30.7, 21.9, 18.2, 13.6\).

1,1-diphenylept-2-yne-1-ol (1e)

To a solution of 1-hexyne (0.28 mL, 2.43 mmol) in THF (18 mL) was added dropwise n-butyllithium in hexane at –78 °C. After 30 minutes, benzophenone (315 mg, 1.73
mmol) was added at the same temperature and the mixture was gradually warmed up to room temperature. Checking the consumption of benzophenone, saturated ammonium chloride aqueous solution was added. The mixture was extracted with ethyl acetate and washed with saturated ammonium chloride aqueous solution and brine. Drying collected organic layer over magnesium sulfate followed by concentration, the product was obtained as a yellow oil by column chromatography (silica, hexane/ethyl acetate (10:1), Rf = 0.4) (yield: 654.8 mg, 90%).

$^1$H NMR (400 MHz, CDCl$_3$) δ = 7.55 (4H, d, J = 8.0 Hz), 7.27-7.23(4H, m), 7.19-7.13(2H, m), 2.65-2.61(1H, m), 2.29(2H, t, J = 7.0 Hz), 1.54-1.51(2H, m), 1.40-1.36(2H, m), 0.87(3H, t, J = 7.5 Hz).

$^{13}$C NMR(100 MHz, CDCl$_3$) δ = 145.5, 128.1, 127.4, 125.9, 88.3, 82.9, 74.4, 30.6, 22.0, 18.6, 13.6.

HRMS (ESI) calcd for C$_{19}$H$_{20}$O $[\text{M}]^+$: 264.1514, found 264.1516.

4,4'-(1,4-phenylene)bis(2-methylbut-3-yn-2-ol) (1f)

To a solution of 1,4-Dibromobenzene (450 mg, 1.91 mmol), CuI (21.80 mg, 114.45 μmol), Pd(PPh$_3$)$_4$ (132.26 mg, 114.45 μmol) in NEt$_3$ (10 mL) under nitrogen atmosphere was added 2-methylbut-3-yn-2-ol (481.37 mg, 5.72 mmol) at ambient temperature. Then the reaction mixture was vigorously refluxed at 95 °C for 4 h. The reaction was quenched with water (50 mL), extracted with dichloromethane (DCM) (3×50 mL). Drying collected organic layer over magnesium sulfate followed by concentration, The product was obtained as a light yellow solid by column chromatography (silica, hexane/ethyl acetate (2:1), Rf = 0.5) (yield: 420.09 mg, 91%).

$^1$H NMR (400 MHz, CDCl$_3$) δ = 7.35-7.34 (4H, m), 2.05 (2H, s), 1.61 (12H, s).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ = 131.9, 122.5, 95.5, 81.6, 65.4, 31.4.

SI-2 Synthesis and Characterization of the protection products 2a-2f

2-(((2-methyl-4-phenylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2a)

2-(hydroxymethyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (PLPG 1) (37.5 mg, 0.125 mmol) and CuBr₂ (7 mg, 30 μmol) were successively added to a stirred solution of 2-methyl-4-phenylbut-3-yn-2-ol (1a) (16 mg, 0.1 mmol) in nitromethane (2 mL) at room temperature for 12 h in the dark. The mixture was extracted with DCM (3×10 mL), the combined organic phase was washed with water and brine (3×10 mL), dried over MgSO₄, filtered off and concentrated under reduced pressure. The residue was purified by flash chromatography on silica gel (hexane/ethyl acetate (5:1), Rf = 0.38) to give 2a (38.5 mg, 87%). Yellow oil.

¹H NMR (400 MHz, CDCl₃) δ = 8.18 (1H, dd, J = 8.0, 0.8 Hz), 8.12 (1H, dd, J = 8.0, 0.8 Hz), 7.87 (1H, ddd, J = 8.0, 7.6, 1.2 Hz), 7.75 (1H, ddd, J = 8.0, 7.6, 1.2 Hz), 7.43-7.38 (3H, m), 7.36-7.34 (2H, m), 7.30-7.27 (5H, m), 4.61 (2H, s), 1.53 (6H, s).

¹³C NMR (100 MHz, CDCl₃) δ = 179.0, 147.3, 144.2, 141.0, 134.5, 132.9, 131.7, 131.4, 129.5, 129.33, 129.30, 128.8, 128.3, 128.1, 128.0, 123.2, 122.5, 89.8, 85.6, 72.0, 58.1, 28.5.


2-(((4-(4-bromophenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2b)

See 2a for reaction procedure. Reagents: PLPG 1 (37.5 mg, 0.125 mmol), 4-(4-bromophenyl)-2-methylbut-3-yn-2-ol (1b) (24 mg, 0.1 mmol), CuBr₂ (7 mg, 30 μmol) and nitromethane (2 mL). Product: 2b (44.0 mg, 85%, Rf = 0.18 (hexane/ethyl acetate (10:1)), yellowish oil).

¹H NMR (400 MHz, CDCl₃) δ = 8.18 (1H, dd, J = 8.0, 0.8 Hz), 8.12 (1H, dd, J = 8.0, 0.8 Hz), 7.88 (1H, ddd, J = 8.0, 7.6, 1.2 Hz), 7.76 (1H, ddd, J = 8.0, 7.6, 1.2 Hz), 7.42-7.39 (5H, m), 7.36-7.34 (2H, m), 7.17-7.13 (2H, m), 4.58 (2H, s), 1.51 (6H, s).

¹³C NMR (100 MHz, CDCl₃) δ = 178.9, 147.1, 144.3, 140.9, 134.5, 133.1, 133.0, 131.38, 131.36, 129.5, 129.3, 128.8, 128.0, 123.2, 122.5, 121.4, 91.0, 84.6, 72.0, 58.1, 28.4.

2-(((2-methyl-4-(p-tolyl)but-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2c)

See 2a for reaction procedure. Reagents: **PLPG 1** (37.5 mg, 0.125 mmol), 2-methyl-4-(p-tolyl)but-3-yn-2-ol (1c) (17.5 mg, 0.1 mmol), CuBr$_2$ (7 mg, 30 μmol) and nitromethane (2 mL). Product: **2c** (37.4 mg, 82%, $R_f$ = 0.3 (hexane/ethyl acetate (5:1)), yellowish oil).

$^1$H NMR (400 MHz, CDCl$_3$) δ = 8.17 (1H, dd, $J$ = 8.0, 0.8 Hz), 8.12 (1H, dd, $J$ = 7.6, 0.8 Hz), 7.87 (1H, d, $J$ = 7.6, 7.6, 1.2 Hz), 7.75 (1H, d, $J$ = 7.6, 7.6, 1.2 Hz), 7.43-7.34 (5H, m), 7.17 (2H, $d$, $J$ = 8.0 Hz), 7.07 (2H, $d$, $J$ = 8.0 Hz), 4.60 (2H, s), 2.34 (3H, s), 1.52 (6H, s).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ = 179.0, 147.4, 144.2, 141.0, 138.3, 134.5, 132.9, 131.7, 131.6, 131.4, 129.5, 129.3, 129.3, 128.9, 128.8, 128.1, 128.0, 123.2, 119.4, 89.0, 85.8, 72.0, 58.1, 28.6, 21.4.

HRMS (ESI) calcd for C$_{28}$H$_{25}$O$_5$S [M-H]$^-$: 455.1317; found: 455.1318.

2-((2-methyloct-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2d)

See 2a for reaction procedure. Reagents: **PLPG 1** (37.5 mg, 0.125 mmol), 2-methyloct-3-yn-2-ol (1d) (14.0 mg, 0.1 mmol), CuBr$_2$ (7 mg, 30 μmol) and nitromethane (2 mL). Product: **2d** (38.0 mg, 90%, $R_f$ = 0.25 (hexane/ethyl acetate (10:1)), yellowish oil).

$^1$H NMR (400 MHz, CDCl$_3$) δ = 8.17 (1H, d, $J$ = 7.6 Hz), 8.11 (1H, d, $J$ = 8.0 Hz), 7.87 (1H, d, $J$ = 7.6, 7.6 Hz), 7.75 (1H, d, $J$ = 7.6, 7.6 Hz), 7.46-7.44 (3H, m), 7.36-7.34 (2H, m), 4.49 (2H, s), 2.08 (2H, $t$, $J$ = 8.0 Hz), 1.40 (6H, s), 1.37-1.26 (4H, m), 0.87 (3H, $t$, $J$ = 8.0 Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ = 179.0, 147.5, 144.1, 141.0, 134.5, 132.9, 131.4, 129.6, 129.3, 129.2, 128.7, 127.9, 123.2, 86.2, 80.8, 71.7, 57.8, 30.7, 28.8, 21.9, 18.2, 13.6.

2-(((1,1-diphenyleth-2-yn-1-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2e)

See 2a for reaction procedure. Reagents: PLPG 1 (37.5 mg, 0.125 mmol), 1,1-diphenyleth-2-yn-1-ol (1e) (14.0 mg, 0.1 mmol), CuBr₂ (7 mg, 30 μmol) and nitromethane (2 mL). Product: 2e (43.0 mg, 80%, Rf = 0.25 (hexane/ethyl acetate (5:1)), yellowish oil).

^H NMR (400 MHz, CDCl₃) δ = 8.19 (1H, dd, J = 8.0, 0.8 Hz), 8.14 (1H, dd, J = 7.6, 0.8 Hz), 7.88 (1H, ddd, J = 7.6, 7.6, 1.2 Hz), 7.76 (1H, t, J = 7.6, 7.6, 1.2 Hz), 7.54 (4H, d, J = 8.0 Hz), 7.45-7.38 (3H, m), 7.31-7.27 (6H, m), 7.23-7.19 (2H, m), 4.47 (2H, s), 2.21 (2H, t, J = 6.8 Hz), 1.48-1.42 (2H, m), 1.40-1.33 (2H, m), 0.90 (3H, t, J = 7.2 Hz).

^13C NMR (100 MHz, CDCl₃) δ = 179.0, 147.3, 144.3, 143.0, 141.2, 134.5, 132.9, 131.5, 129.5, 129.3, 129.1, 128.8, 128.1, 128.1, 127.6, 126.8, 123.2, 91.9, 81.6, 78.4, 58.5, 30.6, 22.1, 18.6, 13.6.

HRMS (ESI) calcd for C₃₅H₂₉O₃S [M-H]: 545.1786; found: 545.1788.

2-(((4-(4-(3-hydroxy-3-methylbut-1-yn-1-yl)phenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2f)

See 2a for reaction procedure. Reagents: PLPG 1 (37.5 mg, 0.125 mmol), 4,4’-(1,4-phenylene)bis(2-methylbut-3-yn-2-ol) (1f) (24.0 mg, 0.1 mmol), CuBr₂ (7 mg, 30 μmol) and nitromethane (2 mL). Product: 2f (39.3 mg, 75%, Rf = 0.41 (hexane/ethyl acetate (2:1)), yellowish oil).

^H NMR (400 MHz, CDCl₃) δ = 8.18 (1H, d, J = 8.0 Hz), 8.12 (1H, d, J = 7.6 Hz), 7.88 (1H, dd, J = 8.0, 7.6 Hz), 7.76 (1H, dd, J = 8.0, 7.6 Hz), 7.42-7.31 (7H, m), 7.22-7.19 (2H, m), 4.59 (2H, s), 1.62 (6H, s), 1.52 (6H, s).

^13C NMR (100 MHz, CDCl₃) δ = 179.0, 147.2, 144.3, 140.9, 134.5, 133.0, 131.5, 131.3, 129.5, 129.3, 128.8, 128.0, 123.2, 122.6, 122.3, 95.5, 91.5, 85.2, 81.7, 72.0, 65.6, 58.1, 31.4, 28.4.

SI-3 Selectivity reactions of PLPG 1 for alcohols

Firstly, the mixture of propargylic alcohol 1a and EtOH reacted with PLPG 1 under the same reaction condition.

\[
\text{PLPG 1 (75.0 mg, 0.25 mmol) and CuBr}_2 (14 mg, 60 \mu\text{mol}) were successively added to a stirred solution of propargylic alcohol 1a (0.1 mmol) and EtOH (0.1 mmol) in nitromethane (2 mL) at room temperature. The reaction time was prolonged to 15 h in the dark. The reactions were quenched and were purified by column chromatography. The 2a was obtained (85%), but the protection product of EtOH 5 was not observed.}
\]

Then, the protection reactions with more alcohols were studied. Compared with the above table, the same three substrates were chosen to study the possibility for alcohols and were shown below.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Alcohol</th>
<th>Time(h)</th>
<th>Yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EtOH</td>
<td>15</td>
<td>n.r.</td>
</tr>
<tr>
<td>2</td>
<td>OH</td>
<td>15</td>
<td>n.r.</td>
</tr>
<tr>
<td>3</td>
<td>OH</td>
<td>15</td>
<td>n.r.</td>
</tr>
</tbody>
</table>

**PLPG 1** (37.5 mg, 0.125 mmol) and CuBr₂ (7 mg, 30 μmol) were successively added to a stirred solution of alcohols (0.1 mmol) in nitromethane (2 mL) at room temperature. The reaction time was prolonged to 15 h in the dark. The reactions were quenched and were purified by column chromatography. ¹H NMR analysis showed that, there were no desired products.

Therefore, the selectivity of the **PLPG 1** for the propargylic alcohol and non-propargylic alcohol has been verified preliminarily.

About the study of the protecting groups for alcohols, in our previous report, we have studied. In our previous study, the chloroformate group was designed as the linker group to protect alcohols.
<table>
<thead>
<tr>
<th>Entry</th>
<th>Alcohol</th>
<th>Time (h)</th>
<th>Protection yield (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EtOH</td>
<td>3.0</td>
<td>98</td>
</tr>
<tr>
<td>2</td>
<td>C₈H₁₇OH</td>
<td>3.0</td>
<td>91</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>3.0</td>
<td>84</td>
</tr>
<tr>
<td>4</td>
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<td>67</td>
</tr>
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<td>5</td>
<td></td>
<td>8.0</td>
<td>68</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>8.0</td>
<td>71</td>
</tr>
</tbody>
</table>


About photodeprotection reactions, all the photoproducts derived from the thiochromone derivatives following Paternò-Büchi type photo-cycloaddition to recover corresponding protected substrates under the similar irradiation conditions.
Synthesis and Characterization of triazole 4

(1-Benzyl-5-butyl-1H-1,2,3-triazol-4-yl)diphenylmethanol (4)

To a solution of 2e (55.0 mg, 0.1 mmol) in CH$_2$Cl$_2$ (2 mL), 1.5 W UV-LED lamps (365 nm) was as light source to irradiate at room temperature. After 15 minutes, benzylazide (20.1 mg, 0.15 mmol) under nitrogen atmosphere was added. Then BF$_3$·OEt$_2$ (31.7 μL, 0.12 mmol) was added at room temperature dropwise. After five minutes, the reaction was quenched with saturated sodium bicarbonate aqueous solution, and was washed with brine. Drying the organic layer over magnesium sulfate followed by concentration in vacuo and silica gel column chromatography afforded 4 (38.1 mg, 95%). Colorless oil; $R_f$ = 0.19 (ethyl acetate/hexane = 1/4).

$^1$H NMR (400 MHz, CDCl$_3$) δ = 7.31-7.34 (3H, m), 7.24-7.30 (10H, m), 7.13 (2H, d, $J$ = 7.5 Hz), 5.45 (2H, s), 4.29 (1H, s, OH), 1.92 (2H, m), 0.86 (2H, qt, $J$ = 8.0, 7.5 Hz), 0.71 (2H, m), 0.58 (3H, t, $J$ = 7.5 Hz).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ = 148.9, 145.4, 135.1, 134.9, 128.9, 128.3, 127.9, 127.5, 127.0, 76.7, 51.9, 30.3, 22.7, 22.6, 13.3.

HRMS (EI) calcd for C$_{26}$H$_{27}$N$_3$O [M]$^+$ 397.2154, found 397.2155.
2-(((2-methyl-4-phenylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2a)
2-(((2-methyl-4-phenylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2a)
2-(((4-(4-bromophenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2b)
2-(((4-(4-bromophenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2b)
2-(((2-methyl-4-(p-toly)but-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2c)
2-(((2-methyl-4-(p-tolyl)but-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2c)
2-(((2-methyloct-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2d)
2-(((2-methyloct-3-yn-2-yl)oxy)methyl)-3-phenyl-4\textit{H}-thiochromen-4-one 1,1-dioxide (2d)
2-(((1,1-diphenylhept-2-yn-1-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2e)
2-(((1,1-diphenylhept-2-yn-1-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2e)
2-(((4-(4-(3-hydroxy-3-methylbut-1-yn-1-yl)phenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2f)
2-(((4-(4-(3-hydroxy-3-methylbut-1-yn-1-yl)phenyl)-2-methylbut-3-yn-2-yl)oxy)methyl)-3-phenyl-4H-thiochromen-4-one 1,1-dioxide (2f)