α,β-Diaryl Unsaturated Ketones via Palladium-Catalyzed Ring-Opening of Cyclopropenones with Organoboronic Acids

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General information

All chemicals were purchased from energy chemical company, sukailu company. All reagents and solvents were purchased from commercial suppliers and used without further purification. Unless otherwise stated, all experiments were conducted in a Schlenk tube under N₂ atmosphere. Reactions were monitored by TLC or GC-MS analysis. Flash column chromatography was performed over silica gel (300-400 mesh). ¹H-NMR and ¹³C-NMR spectra were recorded in CDCl₃ on a Bruker Avance 500 spectrometer (500 MHz ¹H, 125 MHz ¹³C) at room temperature. Chemical shifts were reported in ppm on the scale relative to ¹H-NMR, δ = 77.00 for ¹³C-NMR) as an internal CDCl₃ (δ = 7.26 for reference. High resolution mass spectra were recorded using a Thermo Fisher Scientific LTQ FT Ultra or Waters Micromass GCT Premier instrument. Coupling constants (J) were reported in Hertz (Hz).
General Experimental Procedures:

General Procedure for Palladium-Catalyzed Ring-Opening of Cyclopropenones with Orgnoboronic Acids: In a 25 mL Schlenk tube equipped with a stir bar were placed 2,3-diphenylcycloprop-2-enone (0.2 mmol), phenylboronic acid (0.3 mmol), Pd(PPh$_3$)$_4$ (1 mol %), in dioxane (2 mL). The tube was evacuated and refilled with N$_2$ three times. The reaction mixture was stirred at room temperature for 3 h. After it was cooled, the reaction mixture was diluted with 10 mL of ethyl ether, and filtered through a pad of silica gel, followed by washing the pad of silica gel with the same solvent (20 mL). The filtrate was washed with water (3×15 mL). The organic phase was dried over Na$_2$SO$_4$, filtered, and concentrated under reduced pressure. The residue was then purified by flash chromatography on silica gel to provide the corresponding product.
Characterization of Products in Details:

(E)-1,2,3-triphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a pale-yellow solid (92% yield), mp 98-99°C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): δ 7.86 (d, \(J = 5.0\) Hz, 2H), 7.56-7.53 (m, 1H), 7.46-7.43 (m, 2H), 7.37-7.33 (m, 3H), 7.29-7.28 (m, 2H), 7.24-7.17 (m, 4H), 7.09 (d, \(J = 10.0\) Hz, 2H); \(^{13}\)C NMR (125 MHz, CDCl\(_3\)): δ 197.6, 141.0, 140.1, 138.2, 136.5, 135.0, 132.2, 130.4, 130.0, 129.7, 129.0, 128.8, 128.3, 128.2, 128.0. HRMS (ESI): calcd for C\(_{21}\)H\(_{17}\)O [M+H]\(^+\): 285.1274, found: 285.1275.

(E)-1-(4-(tert-butyl)phenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (67% yield), mp 102-103°C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): δ 7.84 (d, \(J = 5.0\) Hz, 2H), 7.46 (d, \(J = 5.0\) Hz, 2H), 7.35-7.27 (m, 5H), 7.21-7.16 (m, 4H), 7.09 (m, 1H) 1.28-1.27 (d, \(J = 5.0\) Hz 2H), 1.35 (s 9H); \(^{13}\)C NMR (125 MHz, CDCl\(_3\)): δ 197.2, 156.0, 141.0, 139.0, 137.0, 135.3, 135.0, 130.2, 130.0, 129.6, 128.7, 128.2, 128.0, 125.3, 35.1, 31.1. HRMS (ESI): calcd for C\(_{25}\)H\(_{25}\)O [M+H]\(^+\): 341.1900, found: 341.1902.

(E)-1-(4-isopropylphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (79% yield), mp 115-116°C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): δ 7.85 (d, \(J = 10.0\) Hz, 2H), 7.38-7.30 (m, 7H), 7.24-7.17 (m, 4H), 7.11 (d, \(J = 10.0\) Hz, 2H),
2.99 (dd, $J = 10.0, 5.0$ Hz, 1H), 1.29 (d, $J = 5.0$ Hz, 6H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 197.3, 154.0, 141.0, 139.0, 137.0, 136.0, 135.0, 130.3, 130.2, 130.0, 129.0, 128.2, 128.0, 127.8, 126.5, 34.25, 23.72. HRMS (ESI): calcd for C$_{24}$H$_{23}$O [M+H]$^+$: 327.1744, found 327.1445.

(E)-1-(phenanthren-9-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (74% yield), $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.82 (d, $J = 5.0$ Hz, 2H), 7.36-7.32 (m, 3H), 7.30-7.29 (m, 2H), 7.22-7.20 (m, 2H), 7.20-7.17 (m, 4H), 7.10 (d, $J = 5.0$ Hz, 2H), 2.65 (t, $J = 5.0$ Hz, 2H), 1.68 (dd, $J = 10.0, 5.0$ Hz, 2H), 0.98-0.95 (m, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 197.3, 148.0, 141.3, 139.0, 137.0, 136.0, 135.0, 130.3, 130.1, 130.0, 129.0, 128.4, 128.2, 128.0, 127.2, 38.1, 24.2, 14.0. HRMS (ESI): calcd for C$_{24}$H$_{23}$O [M+H]$^+$: 327.1744, found 327.1445.

(E)-1-(4-methoxyphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (75% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.18 (d, $J = 10.0$ Hz, 1H), 8.01 (d, $J = 10.0$ Hz, 1H), 7.95-7.94 (m, 1H), 7.61-7.53 (m, 3H), 7.42-7.37 (m, 3H), 7.25-7.20 (m 2H), 7.11-7.08 (m 1H), 7.00 (s 1H), 6.86 (d, $J = 10.0$ Hz, 1H), 3.72 (s 3H). $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 196.2, 163.1, 141.0, 137.7, 136.8, 135.1, 132.3, 130.5, 130.1, 129.6, 128.7, 128.6, 128.2, 127.8, 113.6, 55.5. HRMS (ESI): calcd for C$_{22}$H$_{19}$O$_2$ [M+H]$^+$: 315.1380, found: 315.1381.

(E)-1-(4-phenoxyphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a pale-yellow solid (76% yield), mp 123-124 °C. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.89 (d, $J = 5.0$ Hz 2H), 7.42-7.38 (m, 2H), 7.35-7.32 (m, 3H), 7.30-7.28 (m, 2H),
7.22-7.17 (m, 5H), 7.12-7.08 (m, 4H), 6.99 (d, J = 10.0 Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 196.2, 161.5, 155.5, 141.0, 138.4, 137.0, 135.0, 132.3, 132.2, 130.2, 130.0, 129.6, 129.0, 128.7, 128.2, 128.0, 124.5, 120.2, 117.2. HRMS (ESI): calcd for C$_{27}$H$_{21}$O$^+$: 377.1536, found: 377.1534.

(E)-1-[[1,1'-biphenyl]-4-yl]-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (84% yield). $^1$H NMR (500 MHz, CDCl$_3$): δ 8.47 (s, 1H), 8.21-8.19 (m, 1H), 8.01-7.99 (m, 1H), 7.54-7.51 (m, 1H), 7.40-7.32 (m, 3H), 7.24-7.17 (m, 3H), 7.09 (d, J = 10.0 Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 197.1, 145.0, 141.0, 140.0, 139.5, 137.0, 136.6, 136.0, 135.0, 130.4, 130.3, 130.0, 129.0, 128.8, 128.3, 128.1, 128.0, 127.3, 127.0. HRMS (ESI): calcd for C$_{27}$H$_{21}$O$^+$: 361.1587, found: 361.1588.

(E)-1-(4-fluorophenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (90% yield), mp 108-109 °C. $^1$H NMR (500 MHz, CDCl$_3$): δ 7.90-7.87 (m, 2H), 7.35-7.33 (m, 3H), 7.27 (m, 1H), 7.23-7.17 (m, 5H), 7.13-7.09 (m, 4H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 197.5, 140.4 (d, J = 123.8 Hz), 138.2, 136.5, 134.8, 132.1, 130.3, 129.7 (d, J = 11.3 Hz), 128.9 (d, J = 6.3 Hz), 128.8, 128.7, 128.4, 128.2 (d, J = 2.5 Hz), 127.9, 126.4. $^{19}$F NMR (470 MHz, CDCl$_3$): δ -108.16 (s, 1F). HRMS (ESI): calcd for C$_{21}$H$_{16}$FO$^+$: 303.1180, found: 303.1181.

(E)-1-(4-chlorophenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant
afford a yellow solid (91% yield), mp 115-116 °C. \textit{\textsuperscript{1}H NMR} (500 MHz, CDCl$_3$): $\delta$ 7.78 (d, $J = 5.0$ Hz, 2H), 7.40 (d, $J = 5.0$ Hz, 2H), 7.37-7.31 (m, 4H), 7.23-7.18 (m, 5H), 7.09 (m, 2H), 7.18-7.16 (m, 2H), 7.10-7.09 (m, 2H), 6.78-6.72 (m, 1H), 5.86 (d, $J = 10.0$ Hz, 2H); \textit{\textsuperscript{13}C NMR} (125 MHz, CDCl$_3$): $\delta$ 196.2, 140.5, 140.2, 138.5, 136.5, 136.3, 134.6, 131.2, 130.4, 129.6, 129.1, 129.0, 128.6, 128.3, 128.1. \textbf{HRMS} (ESI): calcd for C$_{21}$H$_{16}$ClO [M+H$^+$]: 319.0885, found: 319.0882.

\textbf{(E)-1-(4-bromophenyl)-2,3-diphenylprop-2-en-1-one}

\textbf{3j}

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a Pale-yellow solid (91% yield), mp 83-84 °C. \textit{\textsuperscript{1}H NMR} (500 MHz, CDCl$_3$): $\delta$ 7.71 (d, $J = 10.0$ Hz, 2H), 7.57 (d, $J = 10.0$ Hz, 2H), 7.36-7.33 (m, 3H), 7.25-7.22 (m, 4H), 7.20-7.17 (m, 2H), 7.09 (d, $J = 10.0$ Hz, 2H); \textit{\textsuperscript{13}C NMR} (125 MHz, CDCl$_3$): $\delta$ 196.4, 140.5, 140.4, 137.0, 136.3, 134.6, 132.0, 131.3, 130.4, 130.0, 129.2, 129.0, 128.3, 128.1, 127.1. \textbf{HRMS} (ESI): calcd for C$_{21}$H$_{16}$BrO [M+H$^+$]: 363.0380, found: 363.0382

\textbf{(E)-2,3-diphenyl-1-(4-(trifluoromethyl)phenyl)prop-2-en-1-one}

\textbf{3K}

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a Pale-yellow solid (90% yield), mp 100-101 °C. \textit{\textsuperscript{1}H NMR} (500 MHz, CDCl$_3$): $\delta$ 8.25 (d, $J = 7.0$ Hz, 3H), 7.91 (d, $J = 8.0$ Hz, 1H), 7.76-7.70 (m, 2H), 7.62-7.60 (m, 1H), 7.53-7.50 (m, 3H), 7.42-7.37 (m, 2H), 7.29-7.27 (m, 1H), 7.19 (t, $J = 10.0$ Hz, 1H), 7.09 (s, 1H); \textit{\textsuperscript{13}C NMR} (125 MHz, CDCl$_3$): $\delta$ 196.3, 141.6 (q, $J = 25.0$ Hz), 140.4, 136.0, 134.4, 133.4 (q, $J = 32.5$ Hz), 130.5, 129.8, 129.7, 129.4, 128.9, 128.4, 128.2, 126.4, 125.3 (q, $J = 3.75$ Hz), 123.7 (q, $J = 275.0$ Hz). \textit{\textsuperscript{19}F NMR} (470 MHz, CDCl$_3$): $\delta$ -62.96 (s, 3F). \textbf{HRMS} (ESI): calcd for C$_{22}$H$_{16}$F$_3$O [M+H$^+$]: 353.1148, found: 353.1145.

\textbf{(E)-1-(4-nitrophenyl)-2,3-diphenylprop-2-en-1-one}
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (95% yield), mp 125-126 ºC. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.27 (d, $J = 5.0$ Hz, 1H), 8.17 (d, $J = 5.0$ Hz, 2H), 7.91 (d, $J = 5.0$ Hz, 1H), 7.44 (d, $J = 5.0$ Hz, 1H), 7.40-7.36 (m, 3H), 7.33 (s, 1H), 7.25-7.23 (m, 2H), 7.22-7.18 (m, 3H), 7.09 (d, $J = 10.0$ Hz, 1H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 195.6, 149.5, 143.9, 142.6, 140.1, 135.7, 134.2, 131.0, 130.3, 129.7, 129.1, 128.4, 128.3, 126.5, 123.5. HRMS (ESI): calcd for C$_{21}$H$_{16}$NO$_3$ [M+H]$^+$: 330.1125, found: 33.1127.

(E)-4-(2,3-diphenylacryloyl)benzaldehyde

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (60% yield), mp 144-145 ºC. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 10.08 (s, 1H), 7.93 (s, 4H), 7.36-7.35 (m, 3H), 7.29 (s, 1H), 7.25-7.22 (m, 3H), 7.19-7.16 (m, 2H), 7.07 (d, $J = 5.0$ Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 195.6, 149.5, 143.9, 142.6, 140.1, 135.7, 134.2, 131.0, 130.3, 129.7, 129.1, 128.4, 128.3, 126.5, 123.5. HRMS (ESI): calcd for C$_{22}$H$_{17}$O$_2$ [M+H]$^+$: 313.1223, found: 313.1222.

(E)-4-(2,3-diphenylacryloyl)benzonitrile

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (87% yield), mp 105-106 ºC. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.85 (d, $J = 10.0$ Hz, 2H), 7.71 (d, $J = 10.0$ Hz, 2H), 7.35 (s, 3H), 7.28 (s, 3H), 7.25-7.22 (m, 3H), 7.20-7.17 (m, 2H), 7.08 (d, $J = 10.0$ Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 196.0, 142.1, 140.1, 136.0, 134.3, 132.1, 131.0, 130.0, 129.7, 129.6, 129.0, 128.4, 128.3, 118.0, 115.3. HRMS (ESI): calcd for C$_{22}$H$_{16}$ON [M+H]$^+$: 310.1227, found: 310.12265.

methyl(E)-4-(2,3-diphenylacryloyl)benzoate
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (76% yield). mp 105-106 °C. ¹H NMR (500 MHz, CDCl₃): δ 8.18-8.13(m, 2H), 7.89 (d, J = 10.0 Hz, 1H), 7.41-7.38 (m, 2H), 7.32-7.28 (m, 5H), 7.25-7.21 (m, 3H), 7.12 (d, J = 10.0 Hz, 2H), 3.98 (s, 3H); ¹³C NMR (125 MHz, CDCl₃): δ 197.0, 166.3, 142.2, 141.5, 140.5, 136.1, 134.5, 133.0, 130.5, 130.0, 129.5, 129.4, 129.3, 129.0, 128.3, 128.1, 52.35. HRMS (ESI): calcd for C₂₃H₁₉O₃ [M+H]⁺: 343.1329, found: 343.1328.

(E)-1-(4-acetylphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (81% yield), mp 116-117 °C. ¹H NMR (500 MHz, CDCl₃): δ 8.25 (d, J = 5.0 Hz, 1H), 8.00 (d, J = 5.0 Hz, 2H), 7.87 (d, J = 5.0 Hz, 2H), 7.53-7.50 (m, 2H), 7.37-7.35 (m, 3H), 7.29(s, 1H), 7.20-7.17 (m, 2H), 7.08 (d, J = 10.0 Hz, 2H), 2.64 (s, 3H); ¹³C NMR (125 MHz, CDCl₃): δ 197.4, 197.0, 141.3, 139.3, 136.1, 134.5, 130.5, 130.0, 129.7, 129.3, 129.0, 128.7, 128.3, 128.1, 127.2, 127.1, 27.0. HRMS (ESI): calcd for C₂₃H₁₉O₂ [M+H]⁺: 327.1380, found 327.1381.

(E)-1-(3-methoxyphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (80% yield), mp 121-122 °C. ¹H NMR (500 MHz, CDCl₃): δ 8.47 (s, 1H), 8.20 (d, J = 10.0 Hz, 1H), 7.54-7.51 (m, 1H), 7.40-7.32 (m, 3H), 7.29-7.27 (m, 3H), 7.20-7.17 (m, 3H), 7.09 (d, J = 10.0 Hz, 2H), 3.93 (s, 3H); ¹³C NMR (125 MHz, CDCl₃): δ 197.0, 166.3, 141.1, 141.0, 139.0, 136.2, 136.0, 135.0, 134.0, 133.0, 131.0, 130.5, 130.0, 129.2, 129.0, 128.5, 128.3, 52.36. HRMS (ESI): calcd for C₂₂H₁₉O₂ [M+H]⁺: 315.1380, found: 315.1381.
(E)-1-(3-acetylphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (85% yield), mp 117-118 °C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): \(\delta\) 8.35 (s, 1H), 8.11 (d, \(J = 10.0 \) Hz, 1H), 8.01 (d, \(J = 10.0 \) Hz, 1H), 7.54 (t, \(J = 10.0 \) Hz, 1H), 7.46 (d, \(J = 10.0 \) Hz, 1H), 7.38-7.33 (m, 3H), 7.30-7.27 (m, 3H), 7.23 (d, \(J = 5.0 \) Hz, 1H), 7.19-7.17 (m, 2H), 7.10 (d, \(J = 10.0 \) Hz, 1H), 2.60 (s, 3H);

\(^1^3\)C NMR (125 MHz, CDCl\(_3\)): \(\delta\) 197.2, 196.4, 141.0, 139.0, 137.2, 136.3, 135.0, 134.0, 131.3, 130.5, 130.0, 129.5, 129.2, 129.0, 128.7, 128.3, 128.1, 126.5. HRMS (ESI): calcd for C\(_{23}\)H\(_{19}\)O\(_2\) [M+H]\(^+\): 327.1380, found: 327.1384.

(E)-1-(2-chlorophenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (71% yield), mp 110-111 °C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): \(\delta\) 8.07 (s, 1H), 7.42-7.35 (m, 6H), 7.24-7.20 (m, 2H), 7.18-7.13 (m, 4H), 7.10 (d, \(J = 10.0 \) Hz, 2H); \(^1^3\)C NMR (125 MHz, CDCl\(_3\)): \(\delta\) 197.1, 166.0, 165.0, 163.4, 163.0, 141.3, 132.3, 132.2, 130.2, 130.1, 129.0, 127.3, 127.2, 116.3, 116.1, 116.0, 115.6. HRMS (ESI): calcd for C\(_{21}\)H\(_{16}\)ClO [M+H]\(^+\): 319.0885, found: 319.0882.

(E)-1-(2-fluorophenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (73% yield), mp 120-121 °C. \(^1\)H NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.62 (d, \(J = 5.0 \) Hz, 1H), 7.53 (d, \(J = 10.0 \) Hz, 1H), 7.46-7.40 (m, 1H), 7.39-7.33 (m, 3H), 7.27 (s, 1H), 7.25 (s, 1H), 7.24-7.21 (m, 2H), 7.20-7.17 (m, 2H), 7.09 (d, \(J = 10.0 \) Hz, 2H); \(^1^3\)C NMR (125 MHz, CDCl\(_3\)): \(\delta\) 194.8, 159.7 (d, \(J = 250.0 \) Hz), 143.0, 141.8, 135.4, 134.6, 132.5 (d, \(J = 7.5 \) Hz), 130.7, 130.3 (d, \(J = 3.7 \) Hz), 129.9, 129.5, 128.7, 128.3, 128.0, 124.3, 124.2, 116.1 (d, \(J = 21.3 \) Hz).\(^{19}\)F NMR (470 MHz,
CDCl$_3$): $\delta$ -117.18 (s, 1F). HRMS (ESI): calcd for C$_{21}$H$_{16}$FO [M+H]: 303.1180, found: 303.1181.

(E)-2,3-diphenyl-1-(o-tolyl)prop-2-en-1-one

![Chemical Structure](3u)

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (70% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.44 (d, $J$ = 5.0 Hz, 1H), 7.42 (s, 1H), 7.41-7.36 (m, 3H), 7.29-7.27 (m, 4H), 7.25 (s, 1H), 7.17-7.14 (m, 2H), 7.02 (d, $J$ = 10.0 Hz, 2H), 2.45 (s, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 200.0, 144.0, 142.0, 140.0, 136.2, 136.0, 135.0, 131.0, 130.6, 130.0, 129.4, 129.0, 128.3, 128.1, 128.0, 127.0, 125.3, 20.0. HRMS (ESI): calcd for C$_{22}$H$_{19}$O [M+H]: 299.1431, found: 299.1432.

(E)-1-(naphthalen-2-yl)-2,3-diphenylprop-2-en-1-one

![Chemical Structure](3v)

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (89% yield), mp 109-110 °C. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.40 (s, 1H), 7.97-7.89 (m, 4H), 7.62-7.52 (m, 2H), 7.40-7.32 (m, 5H), 7.32 (s, 1H), 7.25-7.19 (m, 3H), 7.13 (d, $J$=10.0Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 197.5, 141.0, 140.0, 136.6, 135.5, 135.2, 135.0, 132.4, 131.3, 130.4, 130.0, 129.4, 129.0, 128.8, 128.3, 128.2, 128.1, 128.0, 127.7, 126.7, 126.0. HRMS (ESI): calcd for C$_{25}$H$_{19}$O [M+H]: 335.1431, found 335.1433.

(E)-1-(anthracen-2-yl)-2,3-diphenylprop-2-en-1-one

![Chemical Structure](3w)

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (64% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.28-8.27 (m,
1H), 8.58 (s, 1H), 8.53 (s, 1H), 8.45 (s, 1H), 8.06-8.02 (m, 3H), 7.94-7.92 (m, 1H),
7.55-7.49 (m, 2H), 7.39-7.38 (m, 4H), 7.35 (s, 2H), 7.25-7.19 (m, 3H), 7.15 (d, J =
10.0 Hz, 2H); $\text{^{13}C NMR (125 MHz, CDCl}_3$: $\delta$ 197.4, 141.0, 139.5, 136.7, 135.0,
133.2, 133.0, 132.5, 130.4, 130.0, 129.0, 128.4, 128.3, 128.2, 128.0, 126.6, 126.3,

(E)-1-(phenanthren-9-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant
afford a yellow liquid (94% yield). $\text{^1H NMR (500 MHz, CDCl}_3$: $\delta$ 876 (dd, J = 5.0,
10.0 Hz, 1H), 8.22 (d, J = 10.0 Hz, 1H), 7.98-7.94 (m, 2H), 7.87-7.64 (m, 5H), 7.48-
7.40 (m, 6H), 7.21-7.14 (m, 3H), 7.04-7.00 (m, 2H); $\text{^13C NMR (125 MHz, CDCl}_3$: $\delta$
199.2, 144.5, 142.5, 136.3, 136.0, 134.6, 131.1, 131.0, 130.7, 130.6, 130.3, 130.0,
129.6, 129.5, 129.4, 129.0, 128.2, 128.1, 128.0, 127.2, 127.1, 127.1, 126.3, 123.0,

(E)-1-(2,5-dimethylphenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant
afford a colorless liquid (61% yield), $\text{^1H NMR (500 MHz, CDCl}_3$: $\delta$ 7.42-7.40 (m,
1H), 7.39-7.35 (m, 2H), 7.27 (s, 1H), 7.25 (s, 1H), 7.23-7.19 (m, 3H), 7.16-7.13 (m,
4H), 7.01 (d, J = 10.0 Hz, 2H), 2.38 (s, 3H), 2.34 (s, 3H); $\text{^13C NMR (125 MHz, CDCl}_3$: $\delta$
200.2, 144.0, 142.0, 140.0, 136.0, 135.0, 134.7, 133.0, 131.0, 130.6, 130.5,

(E)-1-(9,9-dimethyl-9H-fluoren-2-yl)-2,3-diphenylprop-2-en-1-one
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a Pale-yellow liquid (82% yield), mp 120-121 °C. \( ^1H \text{ NMR} \) (500 MHz, CDCl\(_3\)): \( \delta \) 7.91 (s, 1H), 7.87 (d, \( J = 5.0 \) Hz, 1H), 7.75-7.71 (m, 2H), 7.44-7.42 (m, 1H), 7.35-7.32 (m, 3H), 7.31-7.28 (m, 5H), 7.22-7.15 (m, 3H), 7.10 (d, \( J = 5.0 \) Hz, 2H), 1.45 (s, 6H); \( ^{13}C \text{ NMR} \) (125 MHz, CDCl\(_3\)): \( \delta \) 197.3, 155.0, 154.0, 143.5, 141.2, 139.0, 138.0, 137.0, 136.7, 135.0, 130.3, 130.0, 129.7, 129.0, 128.5, 128.3, 128.0, 127.2, 126.5, 124.2, 123.0, 121.0, 119.5, 67.1, 47.0, 27.0. HRMS (ESI): calcd for C\(_{30}\)H\(_{25}\)O \([\text{M+H}]^+\): 401.1900, found 401.1902.

\((E)-2,3\text{-diphenyl}-1-(4\text{-vinylphenyl})\text{prop-2-en-1-one}\)

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (87% yield), mp 133-134 °C. \( ^1H \text{ NMR} \) (500 MHz, CDCl\(_3\)): \( \delta \) 7.85 (d, \( J = 10.0 \) Hz, 2H), 7.47 (d, \( J = 5.0 \) Hz, 2H), 7.38-7.33 (m, 3H), 7.30-7.28 (m, 2H), 7.24-7.22 (m, 2H), 7.21-7.17 (m, 2H), 7.10 (d, \( J = 5.0 \) Hz, 2H), 6.76 (dd, \( J = 10.0, 5.0 \) Hz, 1H), 5.88 (d, \( J = 20.0 \) Hz, 1H), 5.39 (d, \( J = 15.0 \) Hz, 1H); \( ^{13}C \text{ NMR} \) (125 MHz, CDCl\(_3\)): \( \delta \) 197.0, 141.3, 141.0, 140.0, 140.0, 137.2, 137.0, 136.0, 135.6, 135.0, 133.0, 130.3, 130.0, 129.0, 128.3, 128.0, 126.1, 116.5. HRMS (ESI): calcd for C\(_{23}\)H\(_{19}\)O \([\text{M+H}]^+\): 311.1431, found: 311.1433.

\((1E,4E)-1,2,5\text{-triphenylpenta-1,4-dien-3-one}\)

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow oil (63% yield). \( ^1H \text{ NMR} \) (500 MHz, CDCl\(_3\)): \( \delta \) 8.26 (d, \( J = 5.0 \) Hz, 2H), 7.78-7.75 (m, 1H), 7.63-7.60 (m, 1H), 7.54-7.51 (m, 2H), 7.47-7.40 (m, 4H), 7.36-7.35 (m, 2H), 7.25-7.22 (m, 2H), 7.12 (d, \( J = 10.0 \) Hz, 1H), 6.94 (d, \( J = 15.0 \) Hz, 1H); \( ^{13}C \text{ NMR} \) (125 MHz, CDCl\(_3\)): \( \delta \) 191.0, 144.0, 141.3, 139.0, 137.0, 136.0, 135.0, 133.0, 131.0, 130.4, 130.0, 129.2, 129.0, 128.4, 128.3, 128.0, 123.3. HRMS (ESI): calcd for C\(_{23}\)H\(_{19}\)O \([\text{M+H}]^+\): 311.1431, found: 311.1432.
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (68% yield). \(^{1}H\)\ NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.63 (s, 1H), 7.39-7.36 (m, 3H), 7.20-7.14 (m, 5H), 7.06 (d, \(J = 5.0\) Hz, 2H), 7.01-6.95 (m, 1H), 6.30 (d, \(J = 15.0\) Hz, 1H), 2.06-2.03 (m, 2H), 1.76-1.70 (m, 1H), 0.88 (d, \(J = 5.0\) Hz, 6H); \(^{13}C\)\ NMR (125 MHz, CDCl\(_3\)): \(\delta\) 191.2, 148.0, 141.1, 138.2, 137.0, 135.0, 132.5, 131.0, 130.0, 129.0, 128.2, 128.0, 126.5, 42.0, 28.0, 22.4. \textbf{HRMS} (ESI): calcd for C\(_{21}\)H\(_{23}\)O [M+H]\(^+\): 291.1744, found: 291.1743.

(E)-1-(cyclohex-1-en-1-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid, (75% yield). mp 110-111 °C. \(^{1}H\)\ NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.33-7.30 (m, 1H), 7.29-7.27 (m, 2H), 7.24-7.21 (m, 2H), 7.20-7.14 (m, 3H), 7.09-7.06 (m, 2H), 6.94 (s, 1H), 2.35-2.24 (m, 4H), 1.71-1.61 (m, 4H); \(^{13}C\)\ NMR (125 MHz, CDCl\(_3\)): \(\delta\) 198.7, 143.0, 141.0, 139.1, 137.0, 135.2, 130.0, 129.3, 128.6, 128.2, 128.1, 127.6, 126.2, 24.0, 22.0, 21.7. \textbf{HRMS} (ESI): calcd for C\(_{21}\)H\(_{21}\)O [M+H]\(^+\): 289.1587, found: 289.1582.

(E)-1-(benzofuran-2-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (86% yield), mp 111-112 °C. \(^{1}H\)\ NMR (500 MHz, CDCl\(_3\)): \(\delta\) 8.25 (d, \(J = 5.0\)Hz, 1H), 7.68 (s, 1H), 7.62-7.58 (m, 2H), 7.53-7.44 (m, 2H), 7.42-7.38 (m, 3H), 7.36-7.32 (m, 2H), 7.25-7.19 (m, 3H), 7.15 (d, \(J = 10.0\)Hz, 1H), 6.92 (s, 1H); \(^{13}C\)\ NMR (125 MHz, CDCl\(_3\)): \(\delta\) 185.0, 156.0, 152.4, 140.0, 137.0, 136.0, 133.0, 131.0, 130., 129.2, 129.0, 128.4, 128.3, 128.0, 127.0, 124.0, 123.3, 116.1, 112.5. \textbf{HRMS} (ESI): calcd for C\(_{23}\)H\(_{17}\)O\(_2\) [M+H]\(^+\): 325.1224, found: 325.1221.
(E)-1-(phenanthren-9-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow-solid (91% yield), mp 113-114 °C. \(^1H\) NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.86 (d, \(J = 10.0\) Hz, 1H), 7.78 (d, \(J = 10.0\) Hz, 1H), 7.66 (s, 1H), 7.54-7.51 (m, 1H), 7.44 (t, \(J = 10.0\) Hz, 1H), 7.39-7.34 (m, 6H), 7.23-7.19 (m, 3H), 7.16-7.14 (m, 2H); \(^{13}C\) NMR (125 MHz, CDCl\(_3\)): \(\delta\) 190.0, 144.0, 143.0, 140.3, 139.0, 138.6, 136.5, 135.0, 131.4, 130.5, 130.0, 129.0, 128.9, 128.3, 128.2, 127.3, 126.1, 125.0, 123.0. HRMS (ESI): calcd for C\(_{23}\)H\(_{17}\)OS [M+H]\(^+\): 341.0095, found: 341.0093.

(E)-1-(furan-3-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (72% yield). \(^1H\) NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.56 (s, 1H), 7.39-7.35 (m, 5H), 7.28-7.27 (m, 2H), 7.22-7.17 (m, 3H), 7.11 (d, \(J = 10.0\) Hz, 2H), 7.44-7.41 (m, 1H); \(^{13}C\) NMR (125 MHz, CDCl\(_3\)): \(\delta\) 190.0, 148.0, 143.2, 141.0, 138.4, 137.0, 135.0, 131.0, 130.1, 129.0, 128.4, 128.2, 127.1, 126.4, 110.4. HRMS (ESI): calcd for C\(_{19}\)H\(_{15}\)O\(_2\) [M+H]\(^+\): 275.1067, found: 275.1065.

(E)-2,3-diphenyl-1-(thiophen-2-yl)prop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (68% yield), mp 126-127 °C. \(^1H\) NMR (500 MHz, CDCl\(_3\)): \(\delta\) 7.61 (d, \(J = 10.0\) Hz, 1H), 7.46 (s, 1H), 7.43 (s, 1H), 7.37-7.36 (m, 3H), 7.33-7.31 (m, 2H), 7.23-7.18 (m, 3H), 7.13 (d, \(J = 10.0\) Hz, 2H), 7.03 (t, \(J = 5.0\) Hz, 1H); \(^{13}C\) NMR (125 MHz, CDCl\(_3\)): \(\delta\) 188.1, 144.26, 140.5, 138.0, 137.0, 135.0, 134.2, 134.1, 130.4, 130.0, 129.0, 128.8, 128.3, 128.0, 126.4. HRMS (ESI): calcd for C\(_{21}\)H\(_{15}\)O [M+H]\(^+\): 291.0839, found: 291.0838.
(E)-1-(dibenzo[b,d]thiophen-4-yl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow solid (78% yield), mp 122-123 °C. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.32 (d, $J = 10.0$ Hz, 1H), 8.15 (d, $J = 10.0$ Hz, 1H), 8.08 (d, $J = 5.0$ Hz, 1H), 7.91 (d, $J = 10.0$ Hz, 1H), 7.49-7.43 (m, 4H), 7.37-7.36 (m, 2H), 7.34-7.31 (m, 3H), 7.24-7.15 (m, 3H), 7.12 (d, $J = 5.0$ Hz, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 196.4, 141.0, 140.3, 138.0, 137.4, 136.5, 135.0, 134.1, 131.0, 130.2, 130.0, 129.0, 128.8, 128.3, 128.1, 127.2, 126.4, 126.0, 124.5, 124.0, 123.0, 121.4. HRMS (ESI): calcd for C$_{27}$H$_{19}$OS $[M+H]^+$: 391.1152, found: 391.1150.

(E)-1-(4-(9H-carbazol-9-yl)phenyl)-2,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a pale-yellow liquid (66% yield), mp 130-131 °C. $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.25 (d, $J = 5.0$ Hz, 2H), 8.19-8.12 (m, 3H), 7.69 (d, $J = 10.0$ Hz, 1H), 7.62-7.59 (m, 1H), 7.53-7.50 (m, 4H), 7.45-7.31 (m, 9H), 7.25-7.21 (m, 2H), 7.17 (d, $J = 10.0$Hz, 1H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 196.4, 141.5, 140.3, 140.0, 136.4, 136.0, 135.0, 133.5, 132.7, 131.6, 130.4, 130.0, 129.0, 128.3, 128.0, 126.3, 126.2, 124.0, 120.6, 120.4, 110.0. HRMS (ESI): calcd for C$_{27}$H$_{20}$ON $[M+H]^+$: 374.1540, found 374.1545.

(E)-2,3-bis(4-(tert-butyl)phenyl)-1-phenylprop-2-en-1-one
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (71% yield). $^1$H NMR (500 MHz, CDCl$_3$): δ 7.87 (d, $J = 10.0$ Hz, 2H), 7.56-7.53 (m, 1H), 7.46-7.37 (m, 5H), 7.24-7.18 (m, 4H), 7.06 (d, $J = 10.0$ Hz, 2H), 1.37 (s, 9H), 1.28 (s, 9H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 198.1, 152.5, 151.0, 140.4, 140.0, 138.6, 133.6, 132.0, 132.0, 130.3, 130.0, 129.2, 128.2, 125.8, 125.3, 34.7, 34.6, 31.4, 31.2. HRMS (ESI): calcd for C$_{29}$H$_{33}$O [M+H]$^+$: 397.2526, found: 397.2524.

(E)-1-phenyl-2,3-di-p-tolylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (70% yield). $^1$H NMR (500 MHz, CDCl$_3$): δ 7.85 (d, $J = 10.0$ Hz, 2H), 7.55-7.52 (m, 1H), 7.46-7.43 (m, 2H), 7.22 (s, 1H), 7.19 (s, 1H), 7.02 (s, 1H), 2.39 (s, 3H), 2.30 (s, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 198.0, 140.3, 140.0, 139.2, 138.5, 137.6, 133.7, 132.1, 132.0, 130.4, 129.7, 129.5, 129.0, 128.2, 126.2, 21.4, 21.3. HRMS (ESI): calcd for C$_{23}$H$_{21}$O [M+H]$^+$: 313.1587, found: 313.1583.

(E)-2,3-bis(4-fluorophenyl)-1-phenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a white solid (83% yield), mp 150-151 °C. $^1$H NMR (500 MHz, CDCl$_3$): δ 7.83 (d, $J = 10.0$ Hz, 2H), 7.57-7.52 (m, 1H), 7.47-7.44 (m, 2H), 7.24-7.22 (m, 3H), 7.08-7.05 (m, 4H), 6.89 (t, $J = 10.0$ Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): δ 197.3, 163.7 (d, $J = 43.8$ Hz), 161.7 (d, $J = 41.3$ Hz), 139.5 (d, $J = 7.5$ Hz), 137.9, 132.3 (d, $J = 7.5$ Hz), 132.2, 132.1 (d, $J = 2.5$ Hz), 131.5, 131.4, 130.7 (d, $J = 3.8$ Hz), 129.7, 128.4, 116.0 (d, $J = 21.3$ Hz), 115.5 (d, $J = 22.5$ Hz). $^{19}$F NMR (470 MHz, CDCl$_3$): δ -109.53 (s, 1F), -113.1 (s, 1F). HRMS (ESI): calcd for C$_{21}$H$_{15}$OF$_2$ [M+H]$^+$: 321.1085, found: 321.1089.
(E)-2,3-bis(4-chlorophenyl)-1-phenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (75% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.82 (d, $J = 10.0$ Hz, 2H), 7.58-7.55 (m, 1H), 7.34 (d, $J = 10.0$ Hz, 2H), 7.47-7.44 (m, 2H), 7.21-7.18 (m, 5H), 7.02 (d, $J = 10.0$ Hz, 2H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 197.0, 140.1, 139.1, 137.7, 135.1, 134.5, 133.0, 132.4, 131.4, 131.0, 129.7, 129.2, 128.7, 128.4. HRMS (ESI): calcd for C$_{21}$H$_{15}$OCl$_2$ [M+H]$^+$: 353.0495, found: 353.0496.

(E)-2,3-bis(5-methylthiophen-2-yl)-1-phenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (63% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 7.77 (d, $J = 10.0$ Hz, 1H), 7.54-7.51 (m, 2H), 7.46-7.43 (m, 2H), 7.01 (d, $J = 10.0$ Hz, 1H), 6.89 (d, $J = 10.0$ Hz, 1H), 6.80 (s, 1H), 6.64 (d, $J = 5.0$ Hz, 1H), 2.56 (s, 3H), 2.41 (s, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 195.8, 147.0, 142.8, 138.6, 138.1, 136.4, 134.9, 133.1, 131.6, 129.9, 129.3, 129.1, 128.2, 125.6, 125.4, 15.7, 15.5. HRMS (ESI): calcd for C$_{21}$H$_{21}$O [M+H]$^+$: 325.0715, found: 325.0719.

(E)-2,3-bis(3-chlorophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (71% yield). $^1$H NMR (500 MHz, CDCl$_3$): $\delta$ 8.31 (d, $J = 5.0$ Hz, 2H), 7.93 (d, $J = 5.0$ Hz, 2H), 7.39-7.32 (m, 3H), 7.23 (s, 1H), 7.17-7.11 (m, 3H), 7.09 (s, 1H), 3.71 (s, 3H); $^{13}$C NMR (125 MHz, CDCl$_3$): $\delta$ 194.7, 149.8, 143.1, 141.3,
140.0, 136.7, 135.4, 135.0, 134.6, 130.5, 130.4, 130.3, 130.0, 129.8, 129.6, 129.0, 128.3, 127.8, 123.7. **HRMS** (ESI): calcd for C_{21}H_{17}OCl _2 [M+H]^+: 383.0600, found: 383.0603.

(E)-1-(4-nitrophenyl)-2,3-di-p-tolylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (85% yield). **\(^1\)H NMR** (500 MHz, CDCl\(_3\)): \(\delta\) 8.25 (d, \(J = 10.0\) Hz, 2H), 7.88 (d, \(J = 10.0\) Hz, 2H), 7.28 (s, 1H), 7.18 (d, \(J = 10.0\) Hz, 2H), 7.12 (d, \(J = 10.0\) Hz, 2H), 7.01 (s, 4H), 2.38 (s, 3H), 2.30 (s, 3H); \(^{13}\)C NMR (125 MHz, CDCl\(_3\)): \(\delta\) 190.7, 144.1, 139.1, 137.7, 135.0, 134.0, 132.9, 127.7, 126.3, 125.5, 125.0, 124.6, 124.4, 124.0, 118.2, 16.2, 16.1. **HRMS** (ESI): calcd for C_{21}H_{21}O [M+H]^+: 358.1438, found: 358.1433.

(E)-2,3-bis(3-chlorophenyl)-1-(4-nitrophenyl)prop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a colorless oil (78% yield). **\(^1\)H NMR** (500 MHz, CDCl\(_3\)): \(\delta\) 7.95 (d, \(J = 5.0\) Hz, 1H), 7.82 (d, \(J = 5.0\) Hz, 1H), 7.56-7.49 (m, 1H), 7.47-7.41 (m, 2H), 7.39-7.36 (m, 1H), 7.25-7.22 (m, 2H), 7.10-7.02 (m, 3H), 6.91-6.85 (m, 2H); \(^{13}\)C NMR (125 MHz, CDCl\(_3\)): \(\delta\) 194.7, 149.8, 143.1, 141.3, 140.0, 137.0, 135.5, 135.0, 134.6, 130.5, 130.4, 130.3, 130.0, 129.7, 129.6, 129.0, 128.3, 128.0, 123.7. **HRMS** (ESI): calcd for C_{21}H_{17}O_{3}NCl _2 [M+H]^+: 398.0345, found: 398.0342.

(E)-2,3-bis(3-chlorophenyl)-1-phenylprop-2-en-1-one
Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow liquid (70% yield). \textbf{H NMR} (500 MHz, CDCl$_3$): \(\delta\) 7.85 (d, \(J = 10.0\) Hz, 2H), 7.59-7.56 (m, 1H), 7.49-7.46 (m, 2H), 7.35-7.29 (m, 3H), 7.17-7.09 (m, 4H), 6.93 (d, \(J = 5.0\) Hz, 1H); \textbf{C NMR} (125 MHz, CDCl$_3$): \(\delta\) 196.5, 140.6, 138.7, 137.6, 137.5, 136.1, 134.8, 134.4, 132.6, 130.2, 130.1, 129.8, 129.6, 129.5, 129.1, 128.5, 128.4, 128.1, 128.0. \textbf{HRMS} (ESI): calcd for C$_{21}$H$_{15}$Cl$_2$O [M+H]$^+$: 353.0495, found: 353.0499.

(E)-2,3-bis(3-chlorophenyl)-1-(cyclohex-1-en-1-yl)prop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a yellow oil (52% yield). \textbf{H NMR} (500 MHz, CDCl$_3$): \(\delta\) 7.33-7.30 (m, 1H), 7.30 (d, \(J = 10.0\) Hz, 1H), 7.28-7.27 (m, 1H), 7.24 (s, 3H), 7.13-7.10 (m, 3H), 6.93-6.91 (m, 1H), 6.87 (s, 1H), 2.36-2.29 (m, 4H), 1.72-1.64 (m, 4H); \textbf{C NMR} (125 MHz, CDCl$_3$): \(\delta\) 197.6, 144.0, 140.7, 139.0, 138.0, 136.5, 134.6, 134.1, 130.0, 129.8, 129.5, 129.1, 128.5, 128.2, 127.7, 127.5, 26.3, 23.8, 22.0, 21.6, 21.0. \textbf{HRMS} (ESI): calcd for C$_{21}$H$_{19}$OCl$_2$ [M+H]$^+$: 357.0808, found: 357.0812.

(E)-2-methyl-1,3-diphenylprop-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a colourless oil (40% yield). \textbf{H NMR} (500 MHz, CDCl$_3$): \(\delta\) 7.74 (d, \(J = 5.0\) Hz, 2H), 7.55-7.52 (m, 1H), 7.47-7.39 (m, 6H), 7.33 (d, \(J = 5.0\) Hz, 1H), 7.18 (s, 1H), 2.27 (s, 3H); \textbf{C NMR} (125 MHz, CDCl$_3$) \(\delta\) 199.4, 142.0, 138.5, 136.9, 135.8, 131.6, 129.6, 129.5, 128.5, 128.4, 128.2, 14.4. \textbf{HRMS} (ESI): calcd for C$_{16}$H$_{15}$O [M+Na]$^+$:
245.0937, found: 245.0940.

(E)-1,2-diphenylbut-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a colourless oil (30% yied). $^1$H NMR (500 MHz, CDCl₃): $\delta$ 7.75 (d, $J = 5.0$ Hz, 2H), 7.50-7.47 (m, 1H), 7.41-7.36 (m, 4H), 7.30 (t, $J = 5.0$ Hz, 1H), 7.25 (d, $J = 5.0$ Hz, 2H), 6.60-6.56 (m, 1H), 1.87 (d, $J = 5.0$ Hz, 3H); $^{13}$C NMR (125 MHz, CDCl₃): $\delta$ 197.1, 142.9, 139.4, 138.5, 135.8, 131.8, 129.6, 128.2, 128.1, 127.5, 125.9, 15.5. HRMS (ESI): calcd for C₁₆H₁₅O [M+Na]$^+$: 245.0937, found: 245.0940.

(E)-2-benzylidene-3-methyl-1-phenylbutan-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a colourless oil (34% yied). $^1$H NMR (500 MHz, CDCl₃): $\delta$ 7.92-7.86 (m, 2H), 7.55-7.36 (m, 8H), 6.82 (t, $J = 5.0$ Hz, 1H), 3.33-3.28 (m, 1H), 1.32 (d, $J = 10.0$ Hz, 6H); $^{13}$C NMR (125 MHz, CDCl₃): $\delta$ 199.5, 146.6, 139.1, 136.6, 135.8, 132.3, 129.8, 128.9, 128.5, 128.2, 127.9, 28.8, 21.6. HRMS (ESI): calcd for C₁₈H₁₉O [M+H]$^+$: 251.1430, found: 251.1438.

(E)-4-methyl-1,2-diphenylpent-2-en-1-one

Following the genera procedure, using 25 / 1 petroleum ether / EtOAc as the eluant afford a colourless oil (28% yied). $^1$H NMR (500 MHz, CDCl₃): $\delta$ 7.77 (d, $J = 5.0$ Hz, 2H), 7.52-7.47 (m, 1H), 7.43-7.22 (m, 7H), 6.25-6.20 (m, 1H), 2.67-2.59 (m, 1H),
1.03 (d, J = 5.0 Hz, 6H); \textbf{13C NMR} (125 MHz, CDCl\textsubscript{3}): \(\delta\) 197.3, 151.2, 139.3, 138.5, 136.3, 131.9, 129.7, 129.4, 128.2, 128.1, 127.4, 28.7, 22.4. \textbf{HRMS} (ESI): calcd for C\textsubscript{18}H\textsubscript{19}O [M+H]\textsuperscript{+}: 251.1430, found: 251.1438.

\textbf{1H, 13C and 19F NMR spectra of products}