Supporting information for

**A straightforward Synthesis of Ynones by Reaction of Dimethylalkynylaluminum
Reagents with Acid Chlorides**

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General methods

Silica gel (230-400 mesh) was used for product purification by flash column chromatography. Solvents were purified and dried by standard techniques, and distilled prior to use. All organic extracts were dried over MgSO_4 or Na_2SO_4 . IR spectra were recorded on a FTIR spectrometer as thin film. ^1H and ^{13}C NMR spectra were recorded on a 300 or 400 MHz spectrometer (H value) with TMS as internal standard and CDCl_3 as solvent. HRMS were determined on a Q Tof spectrometer.

Oil. ¹H NMR (400 MHz, CDCl₃) δ 8.13 (d, *J* = 8.25 Hz, 2H), 7.59 (td, *J* = 7.6, 1.1 Hz, 1H), 7.4 (m, 2H), 2.49 (t, *J* = 7.1 Hz, 2H), 1.68 (m, 2H), 1.34-1.48 (m, 4H), 0.93 (t, *J* = 7.2 Hz, 3H).

Oil. ¹H NMR (400 MHz, CDCl₃) δ 8.10 (d, *J* = 8.9 Hz, 2H), 6.94 (d, *J* = 8.9 Hz, 2H), 3.88 (s, 3H), 2.48 (t, *J* = 7.1 Hz, 2H), 1.67 (m, 2H), 1.34-1.47 (m, 4H), 0.93 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 177.0, 164.4, 132.0 (2C), 130.4, 113.8 (2C), 95.1, 79.7, 55.6, 31.2, 27.6, 22.2, 19.2, 14.0; IR (cm⁻¹) 2956, 2952, 2237, 2199, 1638, 1597, 1574, 1508, 1257, 1167; HRMS (ES⁺) for C₁₅H₁₈O₂Na: calcd.: 253.1204, found: 253.1194.

Oil. ¹H NMR (400 MHz, CDCl₃) δ 7.99 (dd, *J* = 7.7, 1.8 Hz, 1H), 7.48 (ddd, *J* = 8.3, 7.4, 1.8 Hz, 1H), 6.97 (m 2H), 3.89 (s, 3H), 2.43 (t, *J* = 7.1 Hz, 2H), 1.62 (m 2H), 1.30-1.44 (m, 4H), 0.90 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 177.3, 159.7, 134.8, 133.0, 126.9, 120.2, 112.2, 95.5, 81.9, 55.9, 31.2, 27.6, 22.2, 19.3, 14.0.

Oil. ¹H NMR (400 MHz, CDCl₃) δ 8.08 (d, *J* = 8.6 Hz, 2H), 7.45 (d, *J* = 8.6 Hz, 2H), 2.50 (t, *J* = 7.1 Hz, 2H), 1.68 (m, 2H), 1.34-1.47 (m, 4H), 0.93 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 177.0, 140.5, 135.5, 131.0 (2C), 128.9 (2C), 97.6, 79.5, 31.2, 27.6, 22.2, 19.3, 14.0; IR (cm⁻¹) 2956, 2931, 2860, 2237, 2201, 1648, 1586, 1262; HRMS (ES⁺) for C₁₄H₁₅ONaCl: calcd.: 257.0709, found: 257.0707.

Oil. ¹H NMR (400 MHz, CDCl₃) δ 7.88 (dd, *J* = 3.8, 1.0 Hz, 1H), 7.67 (dd, *J* = 4.9, 1.0 Hz, 1H), 7.14 (t, *J* = 3.9 Hz, 1H), 2.46 (t, *J* = 7.1 Hz, 2H), 1.66 (m, 2H), 1.33-1.46 (m, 4H), 0.92 (t, *J* = 7.2 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 170.2, 145.2, 135.0 (2C), 128.3, 95.6, 79.4, 31.2, 27.5, 22.2, 19.2, 14.0.

Amorphous solid. ¹H NMR (400 MHz, CDCl₃) δ 7.25-7.36 (m, 5H), 3.82 (s, 2H), 2.31 (t, *J* = 7.1 Hz, 2H), 1.51 (m, 2H), 1.30 (m, 4H), 0.90 (t, *J* = 7.1 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 185.5, 133.4, 129.9 (2C), 128.7 (2C), 127.4, 96.7, 80.8, 52.3, 31.0, 27.4, 22.2, 19.1, 14.0; IR (cm⁻¹) 2957, 2236, 1700, 1285; HRMS (ES⁺) for C₁₅H₁₈ONa: calcd.: 237.1255, found: 237.1249.

Undec-5-yn-4-one⁴

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.49 (t, *J* = 7.3 Hz, 2H), 2.34 (t, *J* = 7.1 Hz, 2H), 1.67 (m, 2H), 1.56 (m, 2H), 1.31-1.41 (m, 4H), 0.93 (m, 6H); ¹³C NMR (100 MHz, CDCl₃) δ 188.5, 94.3, 81.0, 47.5, 31.1, 27.5, 22.2, 19.0, 17.7, 13.9, 13.6.

Tricos-6-yn-8-one

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.51 (t, *J* = 7.4 Hz, 2H), 2.35 (t, *J* = 7.1 Hz, 2H), 1.56-1.66 (m, 4H), 1.25-1.40 (m, 28H), 0.89 (m, 6H); ¹³C NMR (100 MHz, CDCl₃) δ 188.7, 94.3, 81.0, 45.6, 32.0, 31.1, 29.8, 29.5, 29.1, 27.5, 24.3, 22.8, 19.0, 14.2, 14.0; IR (cm⁻¹) 2925, 2853, 2361, 2212, 1676, 1465; HRMS (ES⁺) for C₂₃H₄₂ONa: calcd.: 357.3133, found: 357.3135.

2-Methyl-undec-5-yn-4-one⁵

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.40 (d, *J* = 7.0 Hz, 2H), 2.34 (t, *J* = 7.1 Hz, 2H), 2.23 (m, 1H), 1.57 (m, 2H), 1.29-1.41 (m, 4H), 0.95 (d, *J* = 6.6 Hz, 6H), 0.89 (t, *J* = 7.0 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 188.4, 94.3, 81.2, 54.6, 31.1, 27.5, 25.3, 22.5 (2C), 22.2, 19.0, 14.0.

2-Methyl-dec-4-yn-3-one⁶

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.61 (hept, *J* = 7.0 Hz, 1H), 2.37 (t, *J* = 7.1 Hz, 2H), 1.59 (m, 2H), 1.30-1.42 (m, 4H), 1.18 (d, *J* = 7.0 Hz, 6H), 0.90 (t, *J* = 7.1 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 192.7, 95.4, 79.9, 43.1, 31.1, 27.3, 22.2, 19.0, 18.1 (2C), 14.0.

2,2-Dimethyl-dec-4-yn-3-one⁶

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.38 (d, *J* = 7.1 Hz, 2H), 1.60 (m, 2H), 1.31-1.42 (m, 4H), 1.19 (s, 9H), 0.91 (t, *J* = 7.1 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 194.6, 95.9, 78.9, 44.7, 31.1, 27.6, 26.2 (3C), 22.2, 19.0, 14.0.

1-Cyclopropyl-oct-2-yn-1-one

Oil. ¹H NMR (400 MHz, CDCl₃) δ 2.34 (t, *J* = 7.1 Hz, 2H), 2.01 (m 1H), 1.57 (m, 2H), 1.29-1.39 (m, 4H), 1.20 (m, 2H), 1.01 (m, 2H), 0.90 (t, *J* = 7.1 Hz, 3H); ¹³C NMR (100 MHz, CDCl₃) δ 188.9, 94.1, 78.9, 31.1, 27.5, 24.5, 22.2, 18.9, 14.0, 10.8 (2C); IR (cm⁻¹) 2933, 2861, 2217, 1658, 1377, 1261, 1173; HRMS (ES⁺) for C₁₁H₁₆ONa: calcd.: 187.1099, found: 187.1092.

1,3-Diphenyl-propynone⁷

Oil. ¹H NMR (400 MHz, CDCl₃) δ 8.23 (dd, *J* = 8.5, 1.3 Hz, 2H), 7.69 (dd, *J* = 8.5, 1.5 Hz, H), 7.65 (t, *J* = 7.4 Hz, 1H), 7.42-7.55 (m, 5H); ¹³C NMR (100 MHz, CDCl₃) δ 178.2, 137.0, 134.3, 133.2, 130.9, 129.7, 128.8, 120.2, 93.2, 87.0.

1-Cyclopropyl-3-phenyl-propynone

Oil. ^1H NMR (400 MHz, CDCl_3) δ 7.56 (m, 2H), 7.35-7.44 (m, 3H), 2.16 (m, 1H), 1.32 (m, 2H), 1.10 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.5, 133.1 (2C), 130.7, 128.7 (2C), 120.1, 90.5, 86.3, 24.7, 11.3 (2C); IR (cm^{-1}) 3058, 3011, 2205, 1654, 1489, 1079; HRMS (ES+) for $\text{C}_{12}\text{H}_{10}\text{ONa}$: calcd.: 193.0629, found: 193.0626.

5-Methyl-1-phenyl-hex-1-yn-3-one⁸

Oil. ^1H NMR (400 MHz, CDCl_3) δ 7.57 (m 2H), 7.36-7.44 (m, 3H), 2.55 (d, $J = 7.1$ Hz, 2H), 2.33 (m, 1H), 1.01 (d, $J = 6.7$ Hz, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.0, 133.1 (2C), 130.8, 128.7 (2C), 120.1, 90.5, 88.2, 54.6, 25.4, 22.6 (2C).

6-Chloro-1-phenyl-hex-2-yn-1-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 8.12 (m, 2H), 7.60 (m, 1H), 7.48 (m, 2H), 3.71 (t, $J = 6.2$ Hz, 2H), 2.72 (t, $J = 6.9$ Hz, 2H), 2.13 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 178.1, 136.8, 134.2, 129.7 (2C), 128.7 (2C), 94.3, 80.3, 43.5, 30.6, 16.7; IR (cm^{-1}) 2960, 2235, 2202, 1644, 1597, 1449, 1312, 1265; HRMS (ES+) for $\text{C}_{12}\text{H}_{11}\text{ONaCl}$: calcd.: 229.0396, found: 229.0398.

6-Chloro-1-cyclopropyl-hex-2-yn-1-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 3.62 (t, $J = 6.2$ Hz, 2H), 2.54 (t, $J = 6.9$ Hz, 2H), 2.00 (m, 3H), 1.18 (m, 2H), 1.00 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.4, 91.4, 79.6, 43.4, 30.5, 24.5, 16.4, 11.0 (2C); IR (cm^{-1}) 3012, 2963, 2220, 1655, 1379, 1262, 1174; HRMS (ES+) for $\text{C}_9\text{H}_{11}\text{ONaCl}$: calcd.: 193.0396, found: 193.0394.

9-Chloro-2-methyl-non-5-yn-4-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 3.63 (t, $J = 6.2$ Hz, 2H), 2.56 (t, $J = 6.9$ Hz, 2H), 2.39 (d, $J = 7.1$ Hz, 2H), 2.22 (m, 1H), 2.02 (m, 2H), 0.95 (d, $J = 6.7$ Hz, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 187.9, 91.5, 81.8, 54.5, 43.4, 30.5, 25.2, 22.5 (2C), 16.4; IR (cm^{-1}) 2959, 2214, 1672; HRMS (ES+) for $\text{C}_{10}\text{H}_{16}\text{OCl}$: calcd.: 187.0890, found: 187.0889.

1-Phenyl-undeca-2,10-diyn-1-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 8.13 (m, 2H), 7.46-7.61 (m, 3H), 2.51 (t, $J = 7.1$ Hz, 2H), 2.20 (td, $J = 6.9, 2.6$ Hz, 2H), 1.95 (t, $J = 2.6$ Hz, 1H), 1.70 (m, 2H), 1.48-1.58 (m, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 178.3, 137.0, 134.0, 129.7 (2C), 128.6 (2C), 96.7, 84.5, 79.9, 68.5, 28.5, 28.3, 28.2, 27.8, 19.3, 18.4; IR (cm^{-1}) 3299, 2936, 2859, 2234, 2201, 1643, 1265; HRMS (ES+) for $\text{C}_{17}\text{H}_{18}\text{ONa}$: calcd.: 261.1255, found: 261.1259.

1-(4-Methoxy-phenyl)-undeca-2,10-diyn-1-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 8.10 (d, $J = 8.9$ Hz, 2H), 6.94 (d, $J = 8.9$ Hz, 2H), 3.87 (s, 3H), 2.48 (t, $J = 7.1$ Hz, 2H), 2.19 (td, $J = 6.8, 2.6$ Hz, 2H), 1.94 (t, $J = 2.6$ Hz, 1H), 1.67 (m, 2H), 1.46-1.56 (m, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 177.0, 164.4, 132.0 (2C), 130.4, 113.8 (2C), 95.8, 84.5, 79.8, 68.5, 55.7, 28.5, 28.3, 28.2, 27.8, 19.2, 18.4; IR (cm^{-1}) 3296, 2937, 2859, 2236, 2199, 1637, 1597, 1508, 1258, 1167; HRMS (ES+) for $\text{C}_{18}\text{H}_{21}\text{O}_2$: calcd.: 269.1542, found: 269.1539.

1-Cyclopropyl-undeca-2,10-diyn-1-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 2.34 (t, $J = 7.0$ Hz, 2H), 2.17 (td, $J = 6.9, 2.6$ Hz, 2H), 2.00 (m, 1H), 1.93 (t, $J = 2.6$ Hz, 1H), 1.49-1.58 (m, 4H), 1.41 (m, 4H), 1.18 (m, 2H), 1.00 (m, 2H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.7, 93.8, 84.5, 79.0, 68.4, 28.4, 28.3, 28.1, 27.7, 24.5, 18.9, 18.4, 10.8 (2C); IR (cm^{-1}) 3295, 2937, 2860, 2217, 1655, 1377, 1262, 1174; HRMS (ES+) for $\text{C}_{14}\text{H}_{18}\text{ONa}$: calcd.: 225.1255, found: 225.1266.

Tetradeca-5,13-diyn-4-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 2.50 (t, $J = 7.3$ Hz, 2H), 2.36 (t, $J = 7.1$ Hz, 2H), 2.19 (td, $J = 6.9, 2.6$ Hz, 2H), 1.94 (t, $J = 2.6$ Hz, 1H), 1.69 (m, 2H), 1.55 (m, 4H), 1.43 (m, 4H), 0.94 (t, $J = 7.4$ Hz, 3H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.5, 94.1, 84.5, 81.1, 68.4, 47.5, 28.4, 28.3, 28.2, 27.7, 19.0, 18.4, 17.7, 13.6; IR (cm^{-1}) 3301, 2936, 2861, 2211, 1673; HRMS (ES+) for $\text{C}_{14}\text{H}_{20}\text{ONa}$: calcd.: 227.1412, found: 227.1414.

1,12-Bis-(4-methoxy-phenyl)-dodeca-2,10-diyn-1,12-dione

Amorphous solid. ^1H NMR (400 MHz, CDCl_3) δ 8.10 (d, $J = 8.9$ Hz, 4H), 6.94 (d, $J = 8.9$ Hz, 4H), 3.87 (s, 6H), 2.50 (t, $J = 7.0$ Hz, 4H), 1.70 (m, 4H), 1.54 (m, 4H); ^{13}C NMR (100 MHz, CDCl_3) δ 177.0, 164.4, 132.0, 130.4, 113.9, 95.6, 79.9, 55.7, 28.5, 27.8, 19.2; IR (cm^{-1}) 3054, 2940, 2364, 2225, 2199, 1636, 1597, 1265; HRMS (ES+) for $\text{C}_{26}\text{H}_{27}\text{O}_4$: calcd.: 403.1909, found: 403.1904.

1,12-Dicyclopropyl-dodeca-2,10-diyn-1,12-dione

Oil. ^1H NMR (400 MHz, CDCl_3) δ 2.34 (t, $J = 7.0$ Hz, 4H), 2.00 (m, 2H), 1.57 (m, 4H), 1.41 (m, 4H), 1.19 (m, 4H), 1.00 (m, 4H); ^{13}C NMR (100 MHz, CDCl_3) δ 188.7, 93.6, 79.1, 28.3, 27.6, 24.5, 18.9, 10.9; IR (cm^{-1}) 2937, 2860, 2217, 1655, 1377, 1262, 1174; HRMS (ES+) for $\text{C}_{18}\text{H}_{23}\text{O}_2$: calcd.: 271.1698, found: 271.1693.

pentadeca-6,9-diyn-8-one

Oil. ^1H NMR (400 MHz, CDCl_3) δ 2.39 (t, $J = 7.1$ Hz, 4H), 1.60 (m, 4H), 1.30-1.43 (m, 8H), 0.91 (t, $J = 7.1$ Hz, 6H); ^{13}C NMR (100 MHz, CDCl_3) δ 161.6, 94.9, 82.4, 31.1, 27.3, 22.2, 19.2, 14.0; IR(cm^{-1}) 2937, 2861, 2207, 1628, 1244; HRMS (ES+) for $\text{C}_{15}\text{H}_{23}\text{O}$: calcd.: 219.1749, found: 219.1758.

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CDCl₃
59-19

CDCl₃
24-55

bm-B4
COC13

S11

BM-B7
CDCl₃

S13

51.113
51.113
51.113

S14

EB-12
EB-12

613013
65-74

ppm

186.52

133.39
129.87
128.73
127.37

98.72

80.84
77.48
77.16
76.84

52.33

30.98
27.36
22.19
19.05
13.99

CDCl₃
101.3

61-86
 CDCl₃
 98-MQ

13C NMR
CDCl₃-Me₂C

94.33	
80.96	
77.46	
77.14	
76.82	
47.47	
31.07	
27.49	
22.17	
18.97	
17.72	
13.96	
13.89

61303
 28-Mg

E 13103
 1B-MQ

Chemical shift (ppm):

84.31
84.21
77.47
77.16
76.83
54.56
31.06
27.49
25.25
22.49
22.19
18.99
14.00

E 13103
 97-Mg

E 13103
 E7-MQ

CDCl3
77.14

31.07
27.52
24.48
22.17
18.94
13.97
10.79

78.93
77.46
77.14
76.83

94.13

188.85
ppm

611-74
CDCl₃

612113
EDF-MQ

ppm

178.16

136.99
134.25
133.20
130.83
129.70
128.77

120.24

93.24
86.99

77.45
77.43
76.82

CDCl₃
72.01-74.00

31003
B5-MD

188.46
ppm

139.06
130.72
128.72
120.40

90.52
86.87
77.50
77.46
76.87

24.70

11.85

CDCl₃
64-96°C

bm-101
CHCl₃

169.02
ppm

133.44
130.77
128.73
120.13

90.53
88.20
77.50
77.46
76.87

54.56

25.36
22.56

CDCl₃
77.01-77.49

δ 131.3
 δ 45.4
 δ 45.4

ppm

178.08

136.81

134.20

129.85

128.69

94.30

80.31

77.51

77.19

76.87

43.51

30.56

18.74

CDCl₃
77.19

61213
1-1
CDCl₃

S39

ppm
188.43

81.44

79.64
77.52
77.20
75.88

43.38

30.48

24.48

15.39

11.00

CDCl₃
77.6-Mg

DM-1014
CDCl₃

S41

ETD
55-MQ

S43

ppm 178.33

137.00
134.01
130.88
129.85
128.99
128.61

84.82
79.86
77.48
77.16
76.85
58.46

28.52
28.31
28.20
27.77
19.27
18.43

CDCl₃
90-91C

DM-91
CDCl₃
16-MQ

ppm
188.74

28.36
28.27
28.14
27.87
24.47
18.90
18.39
10.80

DM-g11
CDCl₃

EW-903

188,54
word

188,54

S51

bm-94
CDCl₃

BM-94
COC13

S52

ETD03
26-MQ

ppm

188.74

93.02

79.13

77.49

77.17

76.86

10.88

18.90

24.48

27.01

28.30

CDCl₃
126.3

61.0103
 CDCl₃
 64-72

ppm

94.063

82.390
77.443
77.126
76.809

31.088
27.321
22.189
19.170
13.977

CDCl₃
72.6