Supporting Information

Cyclopropanation and Carbonyl Olefination Utilizing 2-(Alk-1-yn-1-yl)-2-(trialkylsilyl)-1,3-dithianes via Regioselective Generation of Titanium Alkynylcarbene Complexes

Takeshi Takeda, Makoto Ozaki, Shuichi Kuroi, and Akira Tsubouchi

Department of Applied Chemistry, Graduate School of Engineering,

Tokyo University of Agriculture and Technology, Koganei, Tokyo 184-8588, Japan

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General Methods. Tetrahydrofuran (THF) was distilled from sodium and benzophenone. Aluminium chloride was purified by sublimation at 150 °C (2 mmHg). Preparative thin-layer chromatography (PTLC) was carried out using Wakogel B-5F. Column chromatography was performed on Merck Si 60 or Merk aluminum oxide 90 deactivated by addition of water (5 wt%). ^1H (300 MHz) and ^{13}C (75 MHz) NMR spectra were recorded in CDCl_3 and chemical shifts (δ) were quoted in parts per million from tetramethylsilane for ^1H and CDCl_3 for ^{13}C spectroscopy. IR absorptions are reported in cm^{-1} .

2-(Hex-1-yn-1-yl)-1,3-dithiane (4b): IR (neat) 2931, 2230, 1422, 1275, 1158, 910, 760, 670; ^1H NMR δ 0.92 (t, $J = 7.2$ Hz, 3H), 1.37-1.59 (m, 4H), 1.99-2.08 (m, 2H), 2.29 (dt, $J = 2.2, 7.0$ Hz, 2H), 2.80 (ddd, $J = 5.4, 5.4, 13.4$ Hz, 2H), 3.16 (ddd $J = 5.6, 5.6, 13.9$ Hz, 2H), 4.63 (s, 1H); ^{13}C NMR δ 13.6, 18.6, 21.9, 25.7, 28.4, 30.6, 33.7, 76.1, 86.9. Anal. Calcd for $\text{C}_{10}\text{H}_{16}\text{S}_2$: C, 59.94; H, 8.05. Found: C, 60.04; H, 8.32.

2-(Prop-1-yn-1-yl)-1,3-dithiane (4c): IR (neat) 2910, 2236, 1411, 1276, 1231, 1154, 876, 904, 757, 665 cm^{-1} ; ^1H NMR δ 1.93 (d, $J = 2.4$ Hz, 3H), 2.00-2.08 (m, 2H), 2.80 (ddd, $J = 5.4, 5.4, 13.6$ Hz, 2H), 3.16 (ddd, $J = 5.9, 5.9, 13.6$ Hz, 2H), 4.61 (q, $J = 2.2$ Hz, 1H); ^{13}C NMR δ 3.7, 25.4, 28.2, 33.5, 75.1, 82.0. Anal. Calcd for $\text{C}_7\text{H}_{10}\text{S}_2$: C, 53.12; H, 6.37. Found: C, 53.20; H, 6.60.

2-(5-Phenylpent-1-yn-1-yl)-2-(trimethylsilyl)-1,3-dithiane (2a): IR (neat) 3024, 2902, 2210, 1496, 1454, 1248, 1007, 920, 846, 699 cm^{-1} ; ^1H NMR δ 0.30 (s, 3H), 1.80-2.06 (m, 1H), 1.88 (tt, $J = 7.4, 7.4$ Hz, 2H), 2.08-2.20 (m, 1H), 2.38 (t, $J = 7.1$ Hz), 2.64 (ddd, $J = 3.5, 3.5, 13.4$ Hz, 2H), 2.76 (t, $J = 7.7$ Hz, 2H), 3.48 (ddd, $J = 2.4, 13.4, 13.4$ Hz, 2H), 7.15-7.33 (m, 5H); ^{13}C NMR δ -4.2, 18.7, 25.9, 26.3, 31.0, 33.7, 35.0, 80.0, 85.2, 125.9, 128.3, 128.5, 141.6. Anal. Calcd for $\text{C}_{18}\text{H}_{26}\text{S}_2\text{Si}$: C, 64.61; H, 7.83. Found: C, 64.58; H, 7.65.

2-(Hex-1-yn-1-yl)-2-(trimethylsilyl)-1,3-dithiane (2b): IR (neat) 2904, 2211, 1422, 1378, 1325, 1250, 1008, 921, 845, 733 cm^{-1} ; ^1H NMR δ 0.28 (s, 3H), 0.93 (t, $J = 7.2$ Hz, 3H), 1.39-1.61 (m, 4H), 1.96 (dtt, $J = 12.6, 3.0, 13.6$ Hz, 1H), 2.09-2.19 (m, 1H), 2.36 (t, $J = 7.0$ Hz, 2H), 2.63 (ddd, $J = 3.1, 4.0, 14.2$ Hz, 2H), 3.47 (ddd, $J = 2.6, 12.5, 14.2$ Hz, 2H); ^{13}C NMR δ -4.2, 13.6, 18.8, 22.0, 26.0, 26.3, 31.3, 33.8, 79.3, 85.8. Anal. Calcd for $\text{C}_{13}\text{H}_{24}\text{S}_2$ Si: C, 57.29; H, 8.88. Found: C, 57.39; H, 8.79.

2-(Prop-1-yn-1-yl)-2-(trimethylsilyl)-1,3-dithiane (2c): IR (neat) 2902, 2214, 1421, 1249, 1007, 845, 732, 625 cm^{-1} ; ^1H NMR δ 0.28 (s, 9H), 1.88-2.18 (m, 2H), 2.00 (s, 3H), 2.63 (ddd, $J = 3.6, 2.6, 13.4$ Hz, 2H), 3.47 (ddd, $J = 2.7, 12.8, 14.0$ Hz, 2H); ^{13}C NMR δ -4.2, 4.0, 25.9, 26.3, 33.7, 78.4, 81.0. Anal. Calcd for $\text{C}_{10}\text{H}_{18}\text{S}_2$ Si: C, 52.11; H, 7.87. Found: C, 52.13; H, 7.99.

2-(tert-Butyldimethylsilyl)-2-(hex-1-yn-1-yl)-1,3-dithiane (2e): IR (neat) 2930, 2210, 1463, 1249, 918, 824, 670 cm^{-1} ; ^1H NMR δ 0.27 (s, 6H), 0.93 (t, $J = 7.2$ Hz, 3H), 1.09 (s, 9H), 1.39-1.60 (m, 4H), 2.36 (t, $J = 6.9$ Hz, 2H), 2.59 (ddd, $J = 3.5, 3.5, 13.6$ Hz, 2H), 3.51 (ddd, $J = 2.4, 13.1, 13.3$ Hz, 2H); ^{13}C NMR δ -7.3, 13.6, 18.9, 19.6, 22.1, 26.0, 26.3, 28.0, 31.2, 79.5, 86.8. Anal. Calcd for $\text{C}_{15}\text{H}_{27}\text{S}_2\text{Si}$: C, 61.08; H, 9.61. Found: C, 61.35; H, 9.84.

2-(tert-Butyldimethylsilyl)-2-(prop-1-yn-1-yl)-1,3-dithiane (2f): IR (neat) 2929, 2216, 1470, 1420, 1250, 919, 827, 767, 670 cm^{-1} ; ^1H NMR δ 0.27 (s, 6H), 1.09 (s, 9H), 1.88-2.17 (m, 2H), 1.98 (s, 3H), 2.59 (ddd, $J = 3.6, 3.6, 14.1$ Hz, 2H), 3.50 (ddd, $J = 2.7, 13.4$ Hz, 2H); ^{13}C NMR δ -7.4, 4.0, 19.5, 25.8, 26.3, 27.9, 34.2, 78.8, 81.7. Anal. Calcd for $\text{C}_{13}\text{H}_{24}\text{S}_2\text{Si}$: C, 57.29; H, 8.88. Found: C, 57.64; H, 9.01.

1-(3-Phenylpropy)-1-(trimethylsilylethynyl)cyclopropane (11a): IR (neat) 3086, 3026, 2937, 2859, 2160, 1604, 1496, 1454, 1250, 841, 759, 698 cm^{-1} ; ^1H NMR δ 0.20 (s, 9H), 0.61 (dd, $J = 4.1, 6.5$ Hz, 2H), 0.96 (dd, $J = 4.1, 6.5$ Hz, 2H), 1.40-1.45 (m, 2H), 1.90-2.02 (m, 2H), 2.73 (t, $J =$

7.8 Hz, 2H), 7.21-7.27 (m, 3H), 7.32-7.37 (m, 2H); ^{13}C NMR δ 0.0, 12.2, 15.5, 29.1, 35.2, 37.1, 80.2, 111.7, 125.3, 128.0, 128.1, 142.3. Anal. Calcd for $\text{C}_{17}\text{H}_{24}\text{Si}$: C, 79.62; H, 9.43. Found: C, 79.32; H, 9.84.

2-Butyl-1-(3-phenylpropyl)-1-(trimethylsilylethynyl)cyclopropane (11b): IR (neat) 3064, 3026, 2956, 2930, 2858, 2158, 1604, 1496, 1454, 1249, 1031, 841, 759, 698, 634 cm^{-1} ; ^1H NMR δ 0.12 (s, 5.1H), 0.13 (s, 3.9H), 0.22 (dd, $J = 6.1, 4.1$ Hz, 0.57H), 0.53 (dd, $J = 2.2, 4.3$ Hz, 0.43H), 0.63-0.74 (m, 0.86H), 0.86-0.92 (m, 3.57H), 1.02 (dd, $J = 4.0, 8.6$ Hz, 0.57H), 1.06-1.53 (m, 8H), 1.80-1.96 (m, 2H), 2.57-2.75 (m, 2H), 7.14-7.20 (m, 3H), 7.24-7.30 (m, 2H); ^{13}C NMR δ -0.03, 0.00, 13.7, 13.8, 16.1, 18.0, 21.6, 21.7, 22.2, 22.3, 26.1, 27.1, 27.9, 29.0, 29.2, 30.3, 31.1, 31.2, 31.4, 35.2, 35.3, 37.8, 79.3, 82.3, 109.7, 113.3, 124.9, 125.3, 127.88, 127.89, 128.03, 128.04, 142.3. Anal. Calcd for $\text{C}_{21}\text{H}_{32}\text{Si}$: C, 80.70; H, 10.32. Found: C, 80.97; H, 10.57.

2-Benzyl-1-(3-phenylpropyl)-1-(trimethylsilylethynyl)cyclopropane (11d): IR (neat) 3027, 2937, 2157, 1604, 1496, 1454, 1248, 840, 758 cm^{-1} ; ^1H NMR δ 0.13 (s, 5.58H), 0.16 (s, 3.42H), 0.44 (dd, $J = 4.4, 6.6$ Hz, 0.62H), 0.73 (dd, $J = 4.6, 6.1$ Hz, 0.38H), 0.78 (dd, $J = 4.3, 8.2$ Hz, 0.38H), 0.98-1.04 (m, 0.38H), 1.14 (dd, $J = 4.6, 8.9$ Hz, 0.62H), 1.27-1.32 (m, 0.62H), 1.40-1.60 (m, 2H), 1.79-1.97 (m, 2H), 2.39 (dd, $J = 8.9, 15.3$ Hz, 0.62H), 2.57-2.74 (m, 2.38H), 2.85-2.90 (m, 1H), 7.11-7.33 (m, 10H); ^{13}C NMR δ 0.0, 16.8, 18.8, 21.7, 21.8, 27.4, 27.5, 28.8, 29.2, 31.5, 34.1, 35.0, 35.3, 36.4, 37.6, 80.0, 83.7, 109.5, 112.5, 125.3, 125.4, 125.6, 125.7, 127.9, 128.0, 128.1, 128.3, 140.8, 141.5, 142.2. Anal. Calcd for $\text{C}_{24}\text{H}_{30}\text{Si}$: C, 83.17; H, 8.72. Found: C, 83.46; H, 8.81.

2-Phenyl-1-(3-phenylpropyl)-1-(trimethylsilylethynyl)cyclopropane (11e): IR (neat) 3061, 3027, 2955, 2859, 2157, 1604, 1497, 1453, 1249, 842, 760, 698; ^1H NMR δ 0.20 (s, 9H), 1.09 (ddd, $J = 5.8, 10.2, 13.9$ Hz, 1H), 1.16 (dd, $J = 4.9, 7.0$ Hz, 1H), 1.22 (ddd, $J = 4.7, 9.8, 14.1$ Hz,

1H), 1.40 (dd, $J = 5.0, 8.7$ Hz, 1H), 1.68-1.86 (m, 2H), 2.43 (ddd, $J = 6.2, 8.6, 14.2$ Hz, 1H), 2.51 (ddd, $J = 5.6, 8.7, 14.1$ Hz, 1H), 2.59 (dd, $J = 7.8, 7.8$ Hz, 1H), 7.05-7.06 (d, $J = 7.6$ Hz, 2H), 7.16-7.35 (m, 8H); ^{13}C NMR δ 0.0, 19.2, 19.4, 28.4, 31.3, 31.5, 35.1, 80.4, 112.1, 125.1, 126.1, 127.7, 127.8, 127.9, 128.7, 136.7, 142.1. Anal. Calcd for $\text{C}_{23}\text{H}_{28}\text{Si}$: C, 83.07; H, 8.49. Found: C, 83.09; H, 8.85.

1-(*tert*-Butyldimethylsilylethynyl)-2-phenyl-1-(3-phenylpropyl)cyclopropane (11f): IR (neat) 3026, 2928, 2155, 1603, 1496, 1454, 1249, 835, 774, 697 cm^{-1} ; ^1H NMR δ 0.16 (s, 6H), 0.98-1.04 (m, 10H), 1.06-1.34 (m, 3H), 1.44 (dd, $J = 5.1, 8.7$ Hz, 1H), 1.71-1.98 (m, 2H), 2.41-2.65 (m, 2H), 7.07-7.09 (m, 2H), 7.20-7.34 (m, 8H); ^{13}C NMR δ -4.4, 16.7, 19.5, 19.7, 26.2, 28.8, 31.7, 31.8, 35.4, 78.8, 113.0, 125.5, 126.4, 128.0, 128.1, 128.2, 129.0, 137.0, 142.4. Anal. Calcd for $\text{C}_{26}\text{H}_{34}\text{Si}$: C, 83.36; H, 9.15. Found: C, 83.56; H, 8.85.

1-Butyl-2-phenethyl-1-(trimethylsilylethynyl)cyclopropane (11g): IR (neat) 3064, 2957, 2158, 1604, 1496, 1454, 1248, 841, 635 cm^{-1} ; ^1H NMR δ 0.12 (s, 7.29H), 0.15 (s, 1.71H), 0.25 (dd, $J = 4.2, 6.4$ Hz, 0.81H), 0.56 (dd, $J = 3.6, 6.6$ Hz, 0.19H), 0.68-0.78 (m, 0.38H), 0.90 (t, $J = 7.2$ Hz, 3H), 1.03 (dd, $J = 4.0, 8.8$ Hz, 0.81H), 1.13-1.56 (m, 7.81H), 1.79-1.91 (m, 1H), 2.71 (t, $J = 7.7$ Hz, 2H), 7.18-7.30 (m, 5H); ^{13}C NMR (major isomer) δ 0.0, 13.8, 16.6, 21.4, 22.3, 26.8, 29.8, 30.5, 31.5, 35.6, 79.3, 113.2, 125.5, 128.0, 128.1, 141.8. Anal. Calcd for $\text{C}_{20}\text{H}_{30}\text{Si}$: C, 80.46; H, 10.13. Found: C, 80.27; H, 10.01.

2-Benzyl-1-butyl-1-(trimethylsilylethynyl)cyclopropane (11h): IR (neat) 3064, 2957, 2159, 1603, 1496, 1454, 1249, 841, 758, 697 cm^{-1} ; ^1H NMR δ 0.12 (s, 6.21H), 0.15 (s, 2.79H), 0.45 (dd, $J = 4.4, 6.4$ Hz, 0.69H), 0.73 (dd, $J = 4.6, 5.9$ Hz, 0.31H), 0.77-1.04 (m, 0.62H), 0.86 (t, $J = 7.2$ Hz, 0.93H), 0.92 (t, $J = 7.3$ Hz, 2.07H), 1.13 (dd, $J = 4.4, 8.8$ Hz, 0.69H), 1.22-1.60 (m, 6.69H), 2.44 (dd, $J = 8.9, 14.9$ Hz, 0.69H), 2.72 (dd, $J = 6.2, 14.7$ Hz, 0.31H), 2.85-2.96 (m, 1H), 7.17-7.33 (m, 5H); ^{13}C NMR δ 0.0, 13.7, 13.8, 17.0, 18.9, 21.6, 21.7, 22.1, 22.4, 27.3, 27.6, 29.4, 29.8, 31.7,

34.2, 36.4, 37.9, 79.7, 83.4, 109.9, 112.8, 125.5, 125.7, 127.90, 127.94, 128.1, 128.3, 140.9, 141.5.

Anal. Calcd for C₁₉H₂₈Si: C, 80.21; H, 9.92. Found: C, 80.27; H, 10.17.

1-Butyl-1-(*tert*-butyldimethylsilylethynyl)-2-phenylcyclopropane (11i): IR (neat) 2954, 2158, 1603, 1497, 1462, 1249, 825, 775, 697 cm⁻¹; ¹H NMR δ 0.09 (s, 6H), 0.73 (t, *J* = 7.2 Hz, 3H), 0.87-0.98 (m, 10H), 1.06-1.25 (m, 4H), 1.33-1.45 (m, 3H), 2.53 (dd, *J* = 7.9, 7.9 Hz, 1H), 7.19-7.30 (m, 5H); ¹³C NMR δ -4.4, 13.9, 16.7, 19.5, 19.8, 22.3, 26.1, 29.5, 31.7, 31.8, 78.5, 113.3, 126.3, 128.0, 129.1, 137.2 ; Anal. Calcd for C₂₁H₃₂Si: C, 80.21; H, 9.92. Found: C, 80.27; H, 10.17.

1-Methyl-1-(trimethylsilylethynyl)-2-phenethylcyclopropane (11j): IR (neat) 3064, 2959, 2157, 1603, 1496, 1454, 1249, 840, 698, 631 cm⁻¹; ¹H NMR δ 0.13 (s, 7.29H), 0.14 (s, 1.71H), 0.25 (dd, *J* = 4.2, 6.2 Hz, 0.81H), 0.57 (dd, *J* = 3.8, 5.7 Hz, 0.19H), 0.67-0.78 (m, 0.38H), 1.05 (dd, *J* = 4.1, 8.9 Hz, 0.81H), 1.12-1.23 (m, 0.81H), 1.21(s, 2.43H), 1.25 (s, 0.57H), 1.46-1.69 (m, 1H), 1.67-1.84 (m, 1H), 2.70-2.81 (m, 2H), 7.16-7.30 (m, 5H); ¹³C NMR (major isomer) δ 0.0, 11.1, 18.0, 22.3, 26.5, 30.7, 35.6, 78.1, 114.3, 125.5, 128.0, 128.2, 141.8. Anal. Calcd for C₁₇H₂₄Si: C, 79.62; H, 9.43. Found: C, 79.98; H, 9.82.

2-Benzyl-1-methyl-1-(trimethylsilylethynyl)cyclopropane (11k): IR (neat) 3064, 2960, 2157, 1604, 1496, 1454, 1250, 840, 631 cm⁻¹; ¹H NMR δ 0.12 (s, 7.11H), 0.14 (s, 1.89H), 0.45 (dd, *J* = 4.4, 6.4 Hz, 0.79H), 0.73 (dd, *J* = 4.5, 6.1 Hz, 0.21H), 0.80 (dd, *J* = 4.4, 8.1 Hz, 0.21H), 1.00-1.11 (m, 0.21H), 1.16 (dd, *J* = 4.4, 8.8 Hz, 0.79H), 1.27 (s, 0.63H), 1.32 (s, 2.37H), 1.39-1.52 (m, 0.79H), 2.51 (dd, *J* = 8.1, 15.2 Hz, 0.79H), 2.71 (dd, *J* = 6.4, 14.9 Hz, 0.19H), 2.79-2.94 (m, 1H), 7.20-7.33 (m, 5H); ¹³C NMR (major isomer) δ 0.0, 11.5, 18.3, 22.6, 27.2, 34.3, 78.4, 113.9, 125.7, 127.9, 128.1, 140.8. Anal. Calcd for C₁₆H₂₂Si: C, 79.27; H, 9.15. Found: C, 79.11; H, 9.16.

2-Phenyl-1-(3-phenylpropyl)-1-(trimethylsilyl)ethenylcyclopropane (13): IR (neat) 2953, 2858, 1602, 1486, 1454, 1246, 839, 697 cm^{-1} ; ^1H NMR δ 0.16 (s, 9H), 1.10-1.35 (m, 4H), 1.40-1.66 (m, 2H), 2.06 (dd, $J = 7.4, 7.4$ Hz, 1H), 2.21-2.40 (m, 2H), 5.52 (d, $J = 14.5$ Hz, 1H), 6.63 (d, $J = 14.7$ Hz, 1H), 6.90-7.00 (m, 2H), 7.08-7.32 (m, 8H); ^{13}C NMR δ 0.6, 18.9, 28.4, 29.8, 31.4, 33.2, 36.1, 125.4, 125.7, 127.9, 128.1, 128.2, 128.8, 129.8, 138.7, 142.4. Anal. Calcd for $\text{C}_{23}\text{H}_{30}\text{Si}$: C, 82.57; H, 8.39. Found: C, 82.66; H, 8.60.

3-(Dimethylphenylsilyl)-6-phenyl-1-(trimethylsilyl)but-1-yne (18b): IR (neat) 3070, 2960, 2899, 2157, 1249, 1113, 841, 814, 777, 700 cm^{-1} ; ^1H NMR δ 0.13 (s, 9H), 0.37 (s, 3H), 0.38 (s, 3H), 1.12 (d, $J = 7.2$ Hz, 3H), 1.93(q, $J = 7.2$ Hz, 1H), 7.31-7.41 (m, 3H), 7.53-7.01 (m, 2H); ^{13}C NMR δ -5.6, -4.9, 14.3, 14.7, 84.0, 111.1, 127.6, 129.3, 134.1, 136.6. Anal. Calcd for $\text{C}_{15}\text{H}_{24}\text{Si}_2$: C, 69.15; H, 9.29. Found: C, 69.52; H, 9.10.

A mixture of 4-ethyl-3-(3-phenylpropyl)-1-(trimethylsilyl)hex-3-en-1-yne (22a) and 3-ethyl-9-phenyl-4-(trimethylsilyl)non-3-en-5-yne (24a): IR (neat) 2964, 2133, 1454, 1249, 841, 758, 698 cm^{-1} ; ^1H NMR δ 0.19 (s, 7.20H), 0.21 (s, 1.80H), 0.94 (t, $J = 7.6$ Hz, 2.40H), 0.99-1.09 (m, 3.6H), 1.85 (quint, $J = 7.7$ Hz, 2H), 2.07 (q, $J = 7.5$ Hz, 1.60H), 2.16 (q, $J = 7.6$ Hz, 1.60H), 2.22 (q, $J = 8.1$ Hz, 0.40H), 2.36 (q, $J = 7.8$ Hz, 2H), 2.45 (q, $J = 7.5$ Hz, 0.40H), 2.63 (t, $J = 7.8$ Hz, 1.60H), 2.75 (t, $J = 7.7$ Hz, 0.40H), 7.13-7.31 (m, 5H); ^{13}C NMR δ 0.0, 0.3, 12.5, 12.6, 12.8, 13.3, 19.2, 23.8, 27.75, 27.78, 28.1, 30.2, 30.5, 30.9, 34.9, 35.1, 94.9, 95.7, 106.0, 116.4, 125.4, 125.6, 128.0, 128.1, 128.2, 128.3, 141.8, 142.4, 153.0, 167.1. Anal. Calcd for $\text{C}_{20}\text{H}_{30}\text{Si}$: C, 80.46; H, 10.13. Found: C, 80.39; H, 10.12.

A mixture of 1-(tert-butyldimethylsilyl)-4-ethyl-3-(3-phenylpropyl)hex-3-en-1-yne (22b) and 4-(tert-butyldimethylsilyl)-3-ethyl-9-phenylnon-3-en-5-yne (24b): IR (neat) 2932, 2134, 1604, 1496, 1454, 1361, 1248, 1007, 832 cm^{-1} ; ^1H NMR δ 0.12 (s, 5.64H), 0.22 (s, 0.36H), 0.91-1.05

(m, 15H), 1.86 (tt, $J = 7.7, 7.7$ Hz, 2H), 2.03-2.24 (m, 4H), 2.36 (q, $J = 7.5$ Hz, 1.88H), 2.46 (q, $J = 7.5$ Hz, 0.12H), 2.62 (t, $J = 7.8$ Hz, 1.88H), 2.74 (t, $J = 7.8$ Hz, 0.12H), 7.14-7.31 (m, 5H); ^{13}C NMR (major isomer) δ -4.4, 12.8, 13.0, 16.7, 24.1, 26.1, 26.2, 28.0, 30.4, 30.7, 34.2, 35.3, 94.1, 106.6, 116.7, 125.6, 128.2, 128.4, 142.6, 153.0. Anal. Calcd for $\text{C}_{23}\text{H}_{36}\text{Si}$: C, 81.10; H, 10.65. Found: C, 81.39; H, 11.05.

A mixture of 1-(*tert*-butyldimethylsilyl)-4-phenethyl-6-phenyl-3-(3-phenylpropyl)hex-3-en-1-yne (22c) and 4-(*tert*-butyldimethylsilyl)-3-phenethyl-9-phenyl-4-(3-phenylpropyl)non-3-en-5-yne (24c): IR (neat) 3026, 2928, 2134, 1496, 1454, 835, 774, 698 cm^{-1} ; ^1H NMR δ 0.15 (s, 5.28H), 0.25 (s, 0.72H), 0.92 (s, 1.08H), 0.96 (s, 7.92H), 1.78-1.89 (m, 2H), 2.13 (t, $J = 7.5$ Hz, 1.76H), 2.29-2.35 (m, 1.76H), 2.40-2.50 (m, 0.48H), 2.56-2.85 (m, 8H), 7.07-7.29 (m, 15H); ^{13}C NMR (major isomer) δ -4.4, 16.7, 26.2, 30.2, 30.9, 34.0, 34.7, 34.8, 35.2, 37.5, 95.3, 106.3, 119.5, 125.6, 125.8, 126.0, 128.2, 128.38, 128.40, 128.43, 141.6, 142.0, 142.3. Anal. Calcd for $\text{C}_{35}\text{H}_{44}\text{Si}$: C, 85.30; H, 9.00. Found: C, 85.47; H, 9.06.

A mixture of 1-(*tert*-butyldimethylsilyl)-4-phenyl-3-(3-phenylpropyl)pent-3-en-1-yne (22d) and 3-(*tert*-butyldimethylsilyl)-2,8-diphenyloct-2-en-4-yne (24d): IR (neat) 3027, 2928, 2856, 2137, 1462, 1249, 836, 774, 698 cm^{-1} ; ^1H NMR δ -0.02 (s, 1.95H), -0.03 (s, 1.95H), 0.07 (s, 0.36H), 0.08 (s, 0.36H), 0.170 (s, 0.69H), 0.171 (s, 0.69H), 0.80 (s, 5.85H), 0.92 (s, 1.08H), 0.99 (s, 2.07H), 1.77 (tt, $J = 8.8, 8.8$ Hz, 0.24H), 1.84 (tt, $J = 7.4, 7.4$ Hz, 0.46H), 1.97 (tt, $J = 6.1, 6.1$ Hz, 1.3H), 2.03 (s, 1.95H), 2.09 (t, $J = 7.2, 7.2$ Hz, 0.46H), 2.27 (s, 1.05H), 2.33 (t, $J = 7.3$ Hz, 1.3H), 2.50 (t, $J = 7.7$ Hz, 0.46H), 2.63 (t, $J = 7.8$ Hz, 0.24H), 2.71 (t, $J = 7.7$ Hz, 1.54H), 7.06-7.43 (m, 10H); ^{13}C NMR (two major isomers) δ -4.7, -4.4, 16.6, 16.7, 20.2, 24.4, 26.0, 26.2, 29.8, 30.4, 32.2, 32.3, 35.16, 35.24, 94.3, 96.9, 106.1, 107.1, 119.5, 119.8, 125.5, 125.7, 126.8, 127.57, 127.61, 128.1, 128.2, 128.26, 128.32, 128.38, 128.44, 128.5, 142.3, 142.36, 142.41, 143.6, 144.1, 145.1. Anal. Calcd for $\text{C}_{26}\text{H}_{34}\text{Si}$: C, 83.36 ; H, 9.15. Found: C, 83.10 ; H, 9.23.

A mixture of 3-butyl-1-(tert-butyldimethylsilyl)-4-phenethyl-6-phenylhex-3-en-1-yne (22e) and 4-(tert-butyldimethylsilyl)-3-phenethyldec-3-en-5-yne (24e): IR (neat) 3027, 2953, 2135, 1454, 1249, 836, 774, 698 cm^{-1} ; ^1H NMR δ 0.14 (s, 2.61H), 0.15 (s, 2.61H), 0.229 (s, 0.39H), 0.234 (s, 0.39H), 0.87-0.96 (m, 12H), 1.29 (tt, $J = 7.3$, 7.3 Hz, 1.74H), 1.42-1.54 (m, 2.26H), 2.11 (t, $J = 7.5$ Hz, 1.74H), 2.36-2.47 (m, 2.26H), 2.62-2.82 (m, 6H), 7.15-7.31 (m, 10H); ^{13}C NMR δ -4.4, -3.0, 13.6, 14.1, 16.7, 18.4, 19.6, 22.1, 22.3, 26.2, 27.0, 30.9, 31.2, 31.3, 34.0, 34.77, 34.82, 35.5, 37.5, 37.9, 38.5, 95.0, 97.2, 106.5, 119.9, 125.7, 125.8, 125.9, 126.0, 128.18, 128.24, 128.3, 128.4, 128.5, 141.78, 141.84, 142.1, 142.2, 147.4, 162.8. Anal. Calcd for $\text{C}_{30}\text{H}_{42}\text{Si}$: C, 83.65; H, 9.83. Found: C, 83.86; H, 10.21.

1-(tert-Butyldimethylsilyl)-3-methyl-4-phenylpent-3-en-1-yne (22g: major isomer): IR (neat) 2927, 2136, 1470, 1249, 1008, 860, 774, 697 cm^{-1} ; ^1H NMR δ -0.04 (s, 6H), 0.77 (s, 9H), 1.97 (q, $J = 1.1$ Hz, 3H), 2.06 (q, $J = 1.1$ Hz, 3H), 7.16-7.30 (m, 3H), 7.37-7.45 (m, 2H); ^{13}C NMR δ -4.7, 16.6, 20.1, 20.4, 26.0, 93.1, 108.4, 114.4, 126.8, 127.6, 128.1, 143.4, 144.0.

1-(tert-Butyldimethylsilyl)-3-methyl-4-phenylpent-3-en-1-yne (22g: minor isomer): IR (neat) 2928, 2139, 1470, 1250, 1069, 774, 700 cm^{-1} ; ^1H NMR δ 0.17 (s, 6H), 1.00 (s, 9H), 1.78 (q, $J = 1.5$ Hz, 3H), 2.27 (q, $J = 1.5$ Hz, 3H), 7.12-7.17 (m, 2H), 7.20-7.27 (m, 1H), 7.29-7.36 (m, 2H); ^{13}C NMR δ -4.4, 16.7, 20.1, 24.0, 26.2, 95.8, 107.5, 114.7, 126.8, 127.7, 128.1, 142.2, 144.8. Anal. Calcd for $\text{C}_{18}\text{H}_{26}\text{Si}$: C, 79.93; H, 9.69. Found: C, 80.13; H, 10.01.

1-(tert-Butyldimethylsilyl)-4-methyl-3-(3-phenylpropyl)pent-3-en-1-yne (22h): IR (neat) 2928, 2136, 1604, 1496, 1454, 1249, 1008, 826, 774 cm^{-1} ; ^1H NMR δ 0.12 (s, 6H), 0.95 (s, 9H), 1.70 (s, 3H), 1.85 (tt, $J = 7.6$, 7.7 Hz, 2H), 1.97 (s, 3H), 2.17 (t, $J = 7.4$ Hz, 2H), 2.63 (t, $J = 7.7$ Hz, 2H), 7.13-7.20 (m, 3H), 7.23-7.29 (m, 2H); ^{13}C NMR δ -4.4, 16.7, 19.8, 23.9, 26.2, 30.0, 31.2, 35.2, 94.1, 106.8, 117.3, 125.6, 128.2, 128.4, 141.5, 142.5. Anal. Calcd for $\text{C}_{21}\text{H}_{32}\text{Si}$: C, 80.70; H, 10.32. Found: C, 80.96; H, 10.70.

1-(*tert*-Butyldimethylsilyl)-4-methyl-3-(3-phenylpropyl)hex-3-en-1-yne (22i): IR (neat) 3305, 3026, 2927, 2854, 2087, 1496, 1452, 1350, 669 cm^{-1} ; ^1H NMR δ 0.12 (s, 6H), 0.92-1.04 (m, 3H), 0.95 (s, 9H), 1.67 (s, 2.49H), 1.85 (tt, $J = 7.6, 7.6$ Hz, 2H), 1.96 (s, 0.51H), 2.07 (q, $J = 7.6$ Hz, 0.34H), 2.15 (t, $J = 7.2$ Hz, 2H), 2.37 (q, $J = 7.6$ Hz, 1.66H), 2.62 (t, $J = 7.6$ Hz, 2H), 7.14-7.29 (m, 5H); ^{13}C NMR (major isomer) δ -4.4, 12.4, 16.7, 17.3, 26.2, 30.0, 30.7, 31.2, 35.2, 93.89, 106.5, 116.7, 125.6, 128.2, 128.4, 136.3, 142.6, 147.3. Anal. Calcd for $\text{C}_{22}\text{H}_{34}\text{Si}$: C, 80.91; H, 10.49. Found: C, 81.24; H, 10.57.

[1-(*tert*-Butyldimethylsilyl)-6-phenylhex-1-yn-3-yliden]cyclohexane (22j): IR (neat) 2928, 2855, 2136, 1453, 1496, 1249, 836, 774, 698 cm^{-1} ; ^1H NMR δ 0.12 (s, 6H), 0.94 (s, 9H), 1.45-1.63 (m, 6H), 1.84 (tt, $J = 7.6, 7.6$ Hz, 2H), 2.16 (t, $J = 5.6$ Hz, 2H), 2.20 (t, $J = 7.4$ Hz, 2H), 2.49 (t, $J = 5.4$ Hz, 2H), 2.62 (t, $J = 7.8$ Hz, 2H), 7.14-7.20 (m, 3H), 7.23-7.30 (m, 2H); ^{13}C NMR δ -4.4, 16.7, 26.2, 26.6, 27.86, 27.95, 30.1, 30.5, 30.8, 34.1, 35.3, 94.0, 106.8, 114.1, 125.6, 128.2, 128.4, 142.6, 149.2. Anal. Calcd for $\text{C}_{24}\text{H}_{36}\text{Si}$: C, 81.75; H, 10.29. Found: C, 82.08; H, 10.61.

1-*tert*-Butyl-4-[1-(*tert*-butyldimethylsilyl)-6-phenylhex-2-yn-3-yliden]cyclohexane (22k): IR (neat) 2952, 2136, 1470, 1364, 1249, 836, 774, 698 cm^{-1} ; ^1H NMR δ 0.12 (s, 6H), 0.84 (s, 9H), 0.95 (s, 9H), 0.74-1.26 (m, 3H), 1.70-1.92 (m, 6H), 2.19 (t, $J = 7.3$ Hz, 2H), 2.59-2.65 (m, 3H), 3.10-3.21 (bd, $J = 14.2$ Hz, 1H), 7.14-7.20 (m, 3H), 7.22-7.29 (m, 2H); ^{13}C NMR δ -4.3, 16.7, 26.2, 27.6, 28.47, 28.52, 29.9, 30.4, 30.8, 32.4, 33.9, 35.3, 48.2, 93.9, 106.8, 113.8, 125.6, 128.2, 128.4, 142.5, 149.0. Anal. Calcd for $\text{C}_{28}\text{H}_{44}\text{Si}$: C, 82.28; H, 10.85. Found: C, 82.45; H, 11.18.

1-[1-(*tert*-Butyldimethylsilyl)-6-phenylhex-1-yn-3-yliden]-4-phenylcyclohexane (22l): IR (neat) 3027, 2927, 2855, 2136, 1495, 1454, 1249, 825, 774 cm^{-1} ; ^1H NMR δ 0.13 (s, 6H), 0.95 (s, 9H), 1.38-1.64 (m, 2H), 1.82-2.13 (m, 6H), 2.24 (t, $J = 7.4$ Hz, 2H), 2.62-2.74 (m, 2H), 2.65 (t, $J = 7.8$ Hz, 2H), 3.25 (bd, $J = 14.9$ Hz, 1H), 7.16-7.30 (m, 10H); ^{13}C NMR δ -4.4, 16.7, 26.2, 29.8,

30.5, 30.9, 33.8, 35.0, 35.1, 35.3, 44.4, 94.4, 106.5, 114.9, 125.6, 126.0, 126.8, 128.2, 128.3, 128.4, 142.4, 146.5, 147.6. Anal. Calcd for C₃₀H₄₀Si: C, 84.05; H, 9.40. Found: C, 83.77; H, 9.45.

3-[1-(*tert*-Butyldimethylsilyl)-6-phenylhex-1-yn-3-yliden]cyclohex-1-ene (22m): IR (neat) 2929, 2856, 2128, 1461, 1250, 825, 810, 774, 698 cm⁻¹; ¹H NMR δ 0.08 (s, 0.45H), 0.09 (s, 0.45H), 0.14 (s, 5.1H), 0.92 (s, 0.675H), 0.93 (s, 0.675H), 0.96 (s, 7.65H), 1.63- 1.94 (m, 4H), 2.09-2.34 (m, 4H), 2.56-2.75 (m, 4H), 5.90 (dt, *J* = 10.1, 4.3 Hz, 0.85H), 5.90-5.94 (m, 0.15H), 6.38 (dt, *J* = 10.3, 2.1 Hz, 0.85H), 6.81 (dt, *J* = 9.9, 2.0 Hz, 0.15H), 7.13-7.31 (m, 5H); ¹³C NMR δ -4.4, 16.7, 22.6, 26.0, 26.2, 29.6, 30.2, 30.5, 35.3, 98.2, 107.2, 124.7, 125.6, 125.8, 128.2, 128.3, 128.4, 128.5, 132.2. Anal. Calcd for C₂₄H₃₄Si: C, 82.22; H, 9.77. Found: C, 81.86; H, 10.07.

1-*tert*-Butyl-4-[1-(*tert*-butyldimethylsilyl)hept-1-yn-3-yliden]cyclohexane (22n): IR (neat) 2954, 2135, 1469, 1365, 1249, 838, 774 cm⁻¹; ¹H NMR δ 0.20 (s, 6H), 0.83-1.28 (m, 3H), 0.94 (s, 9H), 0.99 (t, *J* = 7.2 Hz, 3H), 1.04 (s, 9H), 1.41 (tq, *J* = 7.2, 7.2 Hz, 2H), 1.56 (tt, *J* = 7.4, 7.4 Hz, 2H), 1.77-2.06 (m, 4H), 2.24 (t, *J* = 7.3 Hz, 2H), 2.78 (d, *J* = 13.4 Hz, 1H), 3.23 (bd, *J* = 12.7 Hz, 1H); ¹³C NMR δ -4.3, 14.0, 16.7, 22.3, 26.2, 27.6, 28.47, 28.53, 29.9, 31.1, 31.2, 32.5, 33.9, 48.2, 93.6, 107.0, 114.3, 148.5. Anal. Calcd for C₂₃H₄₂Si: C, 79.69; H, 12.21. Found: C, 79.71; H, 12.52.

1-[1-(*tert*-butyldimethylsilyl)hept-1-yn-3-yliden]-4-phenylcyclohexane (22o): IR (neat) 2927, 2134, 1492, 1462, 1250, 1006, 826, 774, 698 cm⁻¹; ¹H NMR δ 0.20 (s, 6H), 1.00 (t, *J* = 7.3 Hz, 3H), 1.03 (s, 9H), 1.36-1.73 (m, 6H), 2.00-2.19 (m, 4H), 2.27 (t, *J* = 7.3 Hz, 2H), 2.71-2.93 (m, 2H), 3.32 (bd, *J* = 13.8 Hz, 1H), 7.23-7.38 (m, 5H); ¹³C NMR δ -4.4, 14.0, 16.7, 22.3, 26.2, 29.8, 31.19, 31.21, 33.8, 35.0, 35.2, 44.5, 94.1, 106.8, 115.4, 126.0, 126.8, 128.4, 146.6, 147.0. Anal. Calcd for C₂₅H₃₈Si: C, 81.89; H, 10.45. Found: C, 81.88; H, 10.52.

1-[1-(*tert*-Butyldimethylsilyl)but-1-yn-3-ylidene]-4-phenylcyclohexane (22p): IR (neat) 2927, 2855, 2141, 1470, 1249, 824, 774, 698 cm^{-1} ; ^1H NMR δ 0.13 (s, 6H), 0.96 (s, 9H), 1.41-1.64 (m, 2H), 1.86 (s, 3H), 1.88-2.11 (m, 4H), 2.61-2.85 (m, 2H), 3.25 (bd, $J = 13.2$ Hz, 1H), 7.16-7.31 (m, 5H); ^{13}C NMR δ -4.4, 16.7, 18.0, 26.2, 29.8, 33.5, 34.7, 34.8, 44.4, 93.4, 107.5, 109.5, 126.0, 126.8, 128.3, 146.6, 147.4. Anal. Calcd for $\text{C}_{22}\text{H}_{32}\text{Si}$: C, 81.41; H, 9.94. Found: C, 81.83; H, 10.34.

1-(*tert*-Butyldimethylsilyl)-4-ethoxy-5-phenyl-3-(3-phenylpropyl)pent-3-en-1-yne (22q): IR (neat) 2928, 2856, 2130, 1619, 1496, 1454, 1248, 1175, 825, 774, 730 cm^{-1} ; ^1H NMR δ 0.09 (s, 6H), 0.91 (s, 9H), 1.10 (t, $J = 7.0$ Hz, 3H), 1.87 (tt, $J = 7.6, 7.6$ Hz, 2H), 2.29 (t, $J = 7.3$ Hz, 2H), 2.65 (t, $J = 7.8$ Hz, 2H), 3.72 (q, $J = 7.0$ Hz, 2H), 3.93 (s, 2H), 7.12-7.33 (m, 10H); ^{13}C NMR δ -4.4, 15.3, 16.7, 26.1, 28.1, 30.1, 35.4, 36.1, 64.3, 94.5, 105.9, 106.7, 125.5, 126.3, 128.1, 128.4, 128.45, 128.49, 138.2, 142.8, 161.0. Anal. Calcd for $\text{C}_{28}\text{H}_{38}\text{OSi}$: C, 80.32; H, 9.15. Found: C, 80.28 ; H, 9.43.

2-[1-(*tert*-Butyldimethylsilyl)-6-phenylhex-1-yn-3-ylidene]oxane (22s): IR (neat) 2930, 2165, 1719, 1672, 1462, 1251, 837, 777, 699 cm^{-1} ; ^1H NMR δ 0.11 (s, 6H), 0.94 (s, 9H), 1.65-1.76 (m, 4H), 1.80 (tt, $J = 7.6$ Hz, 2H), 2.20 (t, $J = 7.3$ Hz, 2H), 2.58 (t, $J = 7.5$ Hz, 2H), 2.62 (t, $J = 7.9$ Hz, 2H), 3.90 (t, $J = 5.3$ Hz, 2H), 7.11-7.29 (m, 5H); ^{13}C NMR δ -4.3, 16.7, 21.7, 24.3, 26.2, 27.1, 27.6, 30.0, 35.3, 69.1, 94.8, 101.7, 106.0, 125.4, 128.1, 128.4, 142.9, 160.4. Anal. Calcd for $\text{C}_{23}\text{H}_{34}\text{OSi}$: C, 77.90; H, 9.66. Found: C, 77.52 ; H, 9.90.

1-(*tert*-Butyldimethylsilyl)-3-methyl-4-methoxy-5-phenylpent-3-en-1-yne (22t): IR (neat) 2929, 2857, 2131, 1628, 1248, 1154, 1091, 826, 812, 775, 698 cm^{-1} ; ^1H NMR δ 0.09 (s, 6H), 0.90 (s, 9H), 1.82 (s, 3H), 3.52 (s, 3H), 3.93 (s, 2H), 7.16-7.34 (m, 5H); ^{13}C NMR δ -4.4, 15.2, 16.7,

26.1, 35.5, 56.3, 93.24, 100.2, 107.6, 126.4, 128.4, 128.5, 137.9. Anal. Calcd for C₁₉H₂₈OSi: C, 75.94; H, 9.39. Found: C, 75.84; H, 9.69.

1-(tert-Butyldimethylsilyl)-4-ethoxy-3-methyl-6-phenylhex-3-en-1-yne (22u): IR (neat) 2928, 2856, 2131, 1627, 1249, 1218, 1068, 824, 811, 774, 698 cm⁻¹; ¹H NMR δ 0.12 (s, 6H), 0.94 (s, 9H), 1.29 (t, *J* = 7.9 Hz, 3H), 1.76 (s, 3H), 2.79 (s, 4H), 3.83 (q, *J* = 7.0 Hz, 2H), 7.15-7.31 (m, 5H); ¹³C NMR δ -4.3, 15.2, 15.5, 16.7, 26.2, 31.8, 33.9, 64.0, 93.8, 100.3, 107.1, 126.0, 128.31, 128.33, 141.5, 162.1. Anal. Calcd for C₂₁H₃₂OSi: C, 76.77; H, 9.82. Found: C, 76.35; H, 10.18.

1-Ethynyl-2-butyl-1-(3-phenylpropyl)cyclopropane (25a): IR (neat) 3312, 3064, 2929, 2109, 1604, 1496, 1454, 1378, 1031, 747, 699 cm⁻¹; ¹H NMR δ 0.23 (dd, *J* = 4.1, 6.0 Hz, 0.56H), 0.52 (dd, *J* = 2.4, 4.0 Hz, 0.44H), 0.65-0.73 (m, 0.88H), 0.86-0.93 (m, 3.56H), 1.03 (dd, *J* = 4.1, 8.9 Hz, 0.56H), 1.07-1.16 (m, 1H), 1.12-1.57 (m, 7H), 1.79-1.97 (m, 2H), 1.83 (s, 0.56H), 1.89 (s, 0.44H), 2.57-2.74 (m, 2H), 7.14-7.21 (m, 3H), 7.24-7.30 (m, 2H); ¹³C NMR δ 14.06, 14.09, 15.4, 17.3, 21.3, 21.5, 22.49, 22.54, 25.9, 27.0, 28.2, 29.3, 29.6, 30.4, 31.4, 31.6, 31.8, 35.6, 35.8, 38.3, 63.8, 66.6, 87.2, 90.8, 125.6, 128.2, 128.3, 142.47, 142.50. Anal. Calcd for C₁₈H₂₄: C, 89.94; H, 10.06. Found: C, 89.93; H, 10.36.

1-Ethynyl-2-phenethyl-1-(3-phenylpropyl)cyclopropane (25b): IR (neat) 3307, 3026, 2936, 2858, 2108, 1603, 1496, 1454, 1031, 748, 699 cm⁻¹; ¹H NMR δ 0.25 (dd, *J* = 4.3, 6.3 Hz, 0.62H), 0.55-0.59 (m, 0.38H), 0.67-0.80 (m, 0.76H), 1.05 (dd, *J* = 4.3 8.9 Hz, 0.62H), 1.15-1.53 (m, 3.62H), 1.75-1.96 (m, 3.38H), 1.84 (s, 0.62H), 2.56-2.86 (m, 4H), 7.15-7.28 (m, 10H); ¹³C NMR δ 15.7, 17.5, 21.2, 21.4, 25.3, 26.7, 29.3, 29.5, 30.7, 31.6, 32.8, 35.4, 35.6, 35.7, 35.9, 38.2, 64.0, 66.8, 86.9, 90.5, 125.7, 125.8, 128.2, 128.31, 128.35, 128.4, 128.5, 142.0, 142.4. Anal. Calcd for C₂₂H₂₄: C, 91.61; H, 8.39. Found: C, 91.71; H, 8.78.

1-Butyl-1-ethynyl-2-phenethylcyclopropane (25c): IR (neat) 3311, 3064, 2932, 2156, 2109, 1604, 1496, 1454, 1032, 747, 698 cm^{-1} ; ^1H NMR δ 0.26 (dd, $J = 4.2, 6.4$ Hz, 0.83H), 0.56 (dd, $J = 3.7, 5.5$ Hz, 0.17H), 0.69-0.78 (m, 0.34H), 0.91 (t, $J = 7.2$ Hz, 3H), 1.04 (dd, $J = 4.3, 8.9$ Hz, 0.83H), 1.14-1.61 (m, 7.83H), 1.73-1.89 (m, 1H), 1.84 (s, 0.83), 1.92 (s, 0.17H), 2.64-2.86 (m, 2H), 7.16-7.31 (m, 5H); ^{13}C NMR (major isomer) δ 14.1, 15.8, 21.1, 22.7, 26.7, 30.1, 30.8, 31.7, 35.9, 63.7, 90.8, 125.8, 128.3, 128.4, 142.0. Anal. Calcd for $\text{C}_{17}\text{H}_{22}$: C, 90.20; H, 9.80. Found: C, 89.91; H, 10.20.

4-Ethyl-3-(3-phenylpropyl)hex-3-en-1-yne (26a): IR (neat) 3307, 3062, 3027, 2966, 2087, 1603, 1496, 1454, 1374, 1076, 1031, 754, 699 cm^{-1} ; ^1H NMR δ 0.95 (t, $J = 7.6$ Hz, 3H), 1.02 (t, $J = 7.5$ Hz, 3H), 1.85 (tt, $J = 7.1, 8.8$ Hz, 2H), 2.08 (q, $J = 7.6$ Hz, 2H), 2.18 (t, $J = 7.6$ Hz, 2H), 2.36 (q, $J = 7.6$ Hz, 2H), 2.63 (t, $J = 7.8$ Hz, 2H), 3.02 (s, 1H), 7.15-7.20 (m, 3H), 7.25-7.30 (m, 2H); ^{13}C NMR δ 12.8, 12.9, 23.9, 27.8, 30.4, 31.0, 35.4, 79.1, 115.4, 125.6, 128.2, 128.4, 142.5, 153.4. Anal. Calcd for $\text{C}_{17}\text{H}_{22}$: C, 90.20; H, 9.80. Found: C, 90.05 ; H, 9.77.

4-Phenyl-3-(3-phenylpropyl)pent-3-en-1-yne (26b) (*E* / *Z* mixture): IR (neat) 3286, 3026, 2930, 2858, 2088, 1495, 1454, 764, 698 cm^{-1} ; ^1H NMR δ 1.75-2.06 (m, 2H), 2.04 (s, 2.1 H), 2.11 (t, $J = 7.7$ Hz, 0.6H), 2.27 (s, 0.9H), 2.36 (t, $J = 7.5$ Hz, 1.4H), 2.49 (t, $J = 7.8$ Hz, 0.6H), 2.71 (t, $J = 7.7$ Hz, 1.4H), 2.77 (s, 0.7H), 3.21 (s, 0.3H), 7.08-7.40 (m, 10H); ^{13}C NMR δ 20.3, 24.2, 29.8, 30.3, 32.3, 32.6, 35.2, 35.4, 78.8, 81.5, 83.9, 84.8, 118.4, 125.6, 125.7, 126.9, 127.1, 127.5, 127.8, 128.0, 128.2, 128.3, 128.4, 142.3, 143.5, 144.7. Anal. Calcd for $\text{C}_{20}\text{H}_{20}$: C, 92.26; H, 7.74. Found: C, 92.38 ; H, 7.93.

3-Methyl-4-phenethyl-6-phenylhex-3-en-1-yne (26c): IR (neat): 3285, 3026, 2928, 2088, 1496, 1454, 750, 699 cm^{-1} ; ^1H NMR δ 1.76 (s, 3H), 2.41 (dd, $J = 6.3, 9.8$ Hz, 2H), 2.62-2.79 (m, 6H), 3.09 (s, 1H), 7.16-7.32 (m, 10H); ^{13}C NMR δ 18.2, 34.0, 34.2, 34.7, 37.3, 79.2, 85.1, 113.0, 125.8,

126.0, 128.30, 128.32, 128.34, 128.4, 141.6, 142.1, 148.3. Anal. Calcd for C₂₁H₂₂: C, 91.92; H, 8.08. Found: C, 91.62; H, 8.29.

4-Methyl-3-(3-phenylpropyl)pent-3-en-1-yne (26d): IR (neat) 3304, 3062, 3027, 2929, 2088, 1604, 1496, 1453, 1374, 745, 669 cm⁻¹; ¹H NMR δ 1.71 (s, 3H), 1.81-1.90 (m, 2H), 1.97 (s, 3H), 2.19 (t, *J* = 7.6 Hz, 2H), 2.62 (t, *J* = 7.8 Hz, 2H), 3.04 (s, 1H), 7.14-7.20 (m, 3H), 7.25-7.30 (m, 2H); ¹³C NMR δ 19.8, 23.7, 30.0, 31.4, 35.3, 79.1, 84.5, 116.0, 125.6, 128.2, 128.4, 141.9, 142.4. Anal. Calcd for C₁₅H₁₈: C, 90.85; H, 9.15. Found: C, 90.68; H, 9.40.

4-Methyl-3-(3-phenylpropyl)hex-3-en-1-yne (26e): IR (neat) 3306, 3027, 2967, 2933, 2859, 2087, 1496, 1454, 699, 633 cm⁻¹; ¹H NMR δ 0.96 (t, *J* = 7.9 Hz, 0.54H), 1.01 (t, *J* = 7.5 Hz, 2.46H), 1.69 (s, 2.46H), 1.84 (tt, *J* = 7.6, 7.6 Hz, 2H), 1.95 (s, 0.54H), 2.09 (q, *J* = 7.6 Hz, 0.36H), 2.18 (t, *J* = 7.4 Hz, 2H), 2.36 (q, *J* = 7.5 Hz, 1.64H), 2.62 (t, *J* = 7.8 Hz, 2H), 3.01 (s, 0.82H), 3.04 (s, 0.18H), 7.14-7.30 (m, 5H); ¹³C NMR (major isomer) δ 12.4, 17.2, 30.0, 30.5, 31.4, 35.3, 78.9, 84.2, 115.4, 125.6, 128.2, 128.4, 142.4, 147.6. Anal. Calcd for C₁₆H₂₀: C, 90.51; H, 9.49. Found: C, 90.64; H, 9.54.

1-tert-Butyl-4-(6-phenylhex-1-yn-3-ylidene)cyclohexane (26g): IR (neat) 3308, 3026, 2944, 2862, 2086, 1496, 1454, 1365, 745, 699 cm⁻¹; ¹H NMR δ 0.76-1.26 (m, 3H), 0.85 (s, 9H), 1.71-1.94 (m, 6H), 2.21 (t, *J* = 7.4 Hz, 2H), 2.59-2.67 (m, 3H), 3.01 (s, 1H), 3.12 (bd, *J* = 13.9 Hz, 1H), 7.14-7.21 (m, 3H), 7.24-7.30 (m, 2H); ¹³C NMR δ 27.6, 28.5, 29.9, 30.4, 31.0, 32.4, 33.8, 35.3, 48.1, 78.9, 84.5, 112.5, 125.6, 128.2, 128.4, 142.4, 149.6. Anal. Calcd for C₂₂H₃₀: C, 90.04; H, 9.96. Found: C, 89.80; H, 10.31.

1-(Hept-1-yn-3-ylidene)-4-phenylcyclohexane (26h): IR (neat) 3306, 2925, 2088, 1602, 1493, 1452, 756, 699 cm⁻¹; ¹H NMR δ 0.93 (t, *J* = 7.2 Hz, 3H), 1.26-1.65 (m, 6H), 1.93-2.14 (m, 4H),

2.21 (t, $J = 7.5$ Hz, 2H), 2.67-2.83 (m, 2H), 3.03 (s, 1H), 3.16-3.27 (m, 1H), 7.16-7.32 (m, 5H);
 ^{13}C NMR δ 14.0, 22.3, 29.8, 31.2, 31.3, 33.6, 34.9, 35.2, 44.4, 79.0, 84.6, 114.1, 126.1, 126.8,
128.4, 146.5, 147.6. Anal. Calcd for $\text{C}_{19}\text{H}_{24}$: C, 90.42; H, 9.58. Found: C, 90.11; H, 9.73.