Supporting Information

Synthesis of Allene Triazole through Iron Catalyzed Regioselective Addition to Propargyl Alcohols

Wuming Yan, Xiaohan Ye, Keith Weise, Jeffrey L. Petersen and Xiaodong Shi*

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506, USA
Email: Xiaodong.Shi@mail.wvu.edu

I. General Methods and Materials S2

II. Compounds Characterization S3-S25

III. ORTEP Drawing of the Crystal Structure S26-S30

VII. NMR Spectra Data S31-S127
I. General Methods and Materials

All of the reactions dealing with air and/or moisture-sensitive reactions were carried out under an atmosphere of nitrogen using oven/flame-dried glassware and standard syringe/septa techniques. Unless otherwise noted, all commercial reagents and solvents were obtained from the commercial provider and used without further purification. $^1$H NMR and $^{13}$C NMR spectra were recorded on Varian 600 MHz spectrometers. Chemical shifts were reported relative to internal tetramethylsilane ($\delta$ 0.00 ppm) or CDCl$_3$ ($\delta$ 7.26 ppm) for $^1$H and CDCl$_3$ ($\delta$ 77.0 ppm) for $^{13}$C. Melting points were measured on a Mel-Temp 1001D apparatus and uncorrected. Infrared (IR) spectra were obtained on a FT-IR spectrometer. Flash column chromatography was performed on 230-430 mesh silica gel. Analytical thin layer chromatography was performed with precoated glass baked plates (250µ) and visualized by fluorescence and by charring after treatment with p-anisaldehyde or potassium permanganate stain. HRMS were recorded on LTQ-FTUHRA spectrometer. UV-visible spectra were obtained on a Shimadzu UV-2550.

Propargylic alcohols 3 were synthesized according to the literatures as below:


Representative procedure for propargylation of 4 with triazoles

A solution of triazole (1.3 mmol) with catalyst iron(III) chloride (0.1 mmol) in 1,2-dichlorehthane(DCE) (5 ml) was stirred at 60 °C for one hour, then propargyl alcohol 3 (1.0 mmol) was added. The reaction mixture was quenched with 10 ml distilled water and then extracted with EtOAc (3 x 10 mL) after 5 hours. The combined organic phases were washed with water and brine, dried with anhydrous MgSO$_4$, and filtered. The filtrate was concentrated under reduced pressure and the residue was purified by flash chromatography on silica gel (hexanes/ethyl acetate, V/V, 20/1) to produce the desired product.
II. Compounds Characterization

![Chemical Structure](Image)

1-(1-(trimethylsilyl)-3,3-diphenylprop-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4a) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 84%; m. p. 127-129 °C; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.49; UV absorption: 232(0.182), 263(0.134), 295(0.126); IR (neat), 2957, 1598, 1489, 1447, 1285, 1245, 1062, 936, 833, 767, 694; 1H-NMR (600 MHz, CDCl₃) δ 8.09 (d, J = 7.8 Hz, 1H), 7.82 (d, J = 7.8 Hz, 1H), 7.50-7.47 (m, 4H), 7.43-7.38 (m, 5H), 7.37-7.32 (m, 3H), 0.50 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 200.4 (C), 146.2 (C), 135.8 (C), 132.5 (C), 128.7 (CH), 128.4 (CH), 128.1 (CH), 127.9 (CH), 124.3 (CH), 118.0 (CH), 115.3 (C), 111.9 (CH), 108.8 (C), -0.5 (CH₃); HRMS Calculated for C₂₄H₂₄N₃Si [M+H]⁺: 382.1734, Found: 382.1735.

![Chemical Structure](Image)

1-(1,1-diphenylhepta-1,2-dien-3-yl)-1H-benzo[d][1,2,3]triazole (4b) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 74%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.45; UV absorption: 233(0.160), 259(0.129), 295(0.100); IR (neat), 2935, 1603, 1485, 1447, 1281, 1244, 1056, 957, 785, 744, 691; 1H-NMR (600 MHz, CDCl₃) δ 8.08 (d, J = 7.8 Hz, 1H), 7.54 (d, J = 7.8 Hz, 1H), 7.46-7.43 (m, 4H), 7.42-7.30 (m, 8H), 3.22 (t, J = 7.8 Hz, 2H), 1.75 (quin, J = 7.8 Hz, 2H), 1.47 (sex, J = 7.8 Hz, 2H), 0.93 (t, J = 7.8 Hz, 3H); 13C-NMR (150 MHz, CDCl₃) δ 197.0 (C), 146.3 (C), 135.9 (C), 132.1 (C), 128.7 (CH), 128.6 (CH), 128.4 (CH), 127.9 (CH), 124.3 (CH), 120.0 (CH), 119.8 (C), 113.5 (C), 111.6 (CH), 31.2 (CH₂), 29.2 (CH₂), 22.3 (CH₂), 13.8 (CH₃); HRMS Calculated for C₂₅H₂₄N₃ [M+H]⁺: 366.1965, Found: 366.1964.
1-(1-(trimethylsilyl)-3-phenyl-3-p-tolypropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4c) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 80%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.51; UV absorption: 234(0.301), 263(0.209), 299(0.195); IR (neat), 2930, 1600, 1485, 1449, 1281, 1246, 1068, 935, 838, 764, 693; 1H-NMR (600 MHz, CDCl3) δ 8.07 (d, J = 7.8 Hz, 1H), 7.79 (d, J = 7.8 Hz, 1H), 7.44 (d, J = 7.8 Hz, 2H), 7.40-7.36 (m, 4H), 7.35-7.32 (m, 3H), 7.20 (d, J = 7.8 Hz, 2H), 2.38 (s, 3H), 0.46 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 200.4 (C), 146.2 (C), 138.0 (C), 136.0 (C), 132.8 (C), 132.5 (C), 129.5 (CH), 128.7 (CH), 128.5 (CH), 128.4 (CH), 128.0 (CH), 127.8 (CH), 124.3 (CH), 120.0 (CH), 115.2 (C), 112.0 (CH), 108.7 (C), 21.2 (CH3), -0.5 (CH3); HRMS Calculated for C25H26N3Si [M+H]+: 396.1887, Found: 396.1883.

1-(1-cyclopropyl-3,3-diphenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4d) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 82%; m. p. 107-109 °C; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.48; UV absorption: 229(0.205), 260(0.146), 295(0.102); IR (neat), 3008, 1598, 1490, 1449, 1278, 1161, 1078, 977, 853, 747, 692; 1H-NMR (600 MHz, CDCl3) δ 8.09-8.07 (m, 1H), 7.54-7.51 (m, 1H), 7.14-7.32 (m, 12H), 2.51-2.45 (m, 1H), 1.13-1.09 (m, 2H), 0.85-0.81 (m, 2H); 13C-NMR (150 MHz, CDCl3) δ 196.4 (C), 146.4 (C), 135.7 (C), 132.0 (C), 128.7 (CH), 128.6 (CH), 128.5 (CH), 127.9 (CH), 124.3 (CH), 120.9 (C), 120.0 (CH), 116.6 (C), 111.4 (CH), 11.8 (CH), 7.7 (CH2); HRMS Calculated for C24H20N3 [M+H]+: 350.1652, Found: 350.1653.
1-(4,4-dimethyl-1,1-diphenylpenta-1,2-dien-3-yl)-1H-benzo[d][1,2,3]triazole (4e) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 91%; m. p. 81-83 °C; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.47; UV absorption: 236(0.193), 265(0.215); IR (neat), 2972, 1589, 1490, 1451, 1274, 1231, 1062, 947, 810, 766, 694; 1H-NMR (600 MHz, CDCl3) δ 8.06-8.02 (m, 1H), 7.39-7.33 (m, 10H), 7.31-7.28 (m, 2H), 7.18-7.16 (m, 1H), 1.38 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 200.6 (C), 145.0 (C), 135.2 (C), 134.3 (C), 128.6 (CH), 128.5 (CH), 128.3 (CH), 127.5 (CH), 123.8 (CH), 119.7 (CH), 119.1 (C), 117.2 (C), 110.6 (CH), 37.2 (C), 29.1 (CH3); HRMS Calculated for C25H24N3 [M+H]+: 366.1965, Found: 366.1966.

![4f](image)

1-(4-methyl-1,1-diphenylpenta-1,2,4-trien-3-yl)-1H-benzo[d][1,2,3]triazole (4f) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 86%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.52; UV absorption: 235(0.165), 265(0.096), 297(0.062); IR (neat), 3057, 1597, 1490, 1448, 1278, 1160, 1065, 1002, 908, 743, 695; 1H-NMR (600 MHz, CDCl3) δ 8.08 (d, J = 7.8 Hz, 1H), 7.45-7.34 (m, 12H), 7.29 (d, J = 7.8 Hz, 1H), 5.17 (s, 1H), 4.66 (s, 1H), 2.15 (s, 3H); 13C-NMR (150 MHz, CDCl3) δ 204.6 (C), 145.4 (C), 136.0 (C), 134.6 (C), 133.7 (C), 128.9 (CH), 128.8 (CH), 128.7 (CH), 127.7 (CH), 124.0 (CH), 120.0 (CH), 118.7 (C), 115.4 (CH), 113.4 (C), 110.4 (CH2), 20.5 (CH3); HRMS Calculated for C24H20N3 [M+H]+: 350.1651, Found: 350.1650.

![4g](image)

1-(3-(2-(4-methoxybenzyloxy)phenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4h) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 90%; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.58; UV absorption: 231(0.186), 263(0.145), 299(0.128); IR (neat), 2976, 1583, 1493, 1450, 1286, 1240, 1063, 938, 831, 757, 692; 1H-NMR (600 MHz, CDCl3) δ 8.05 (d, J = 8.4 Hz, 2H), 7.98 (d, J = 8.4 Hz, 1H), 7.42-7.31 (m, 7H), 7.24 (t, J = 8.4 Hz, 1H), 7.07-7.03 (m, 2H), 6.85 (d, J = 8.4 Hz, 2H), 6.81 (s, 1H), 6.69 (d, J = 8.4 Hz, 2H), 4.93 (q, J = 11.4 Hz, 2H), 3.78 (s, 3H), 0.5 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 200.0 (C), 159.0...
1-(3-(2-methoxyphenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4h) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 90%; m. p. 131-133 °C; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.60; UV absorption: 230(0.200), 264(0.210), 295(0.173); IR (neat), 2957, 1599, 1490, 1453, 1286, 1245, 1066, 939, 829, 740, 691; 1H-NMR (600 MHz, CDCl₃) δ 8.15 (d, J = 7.8 Hz, 1H), 8.06 (d, J = 7.8 Hz, 1H), 7.42-7.32 (m, 8H), 7.28 (t, J = 7.8 Hz, 1H), 7.03 (t, J = 7.8 Hz, 1H), 6.98 (d, J = 7.8 Hz, 1H), 3.71 (s, 3H), 0.51 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 200.0 (C), 157.1 (C), 146.1 (C), 136.0 (C), 132.5 (C), 130.8 (CH), 129.5 (CH), 128.5 (CH), 127.4 (CH), 127.0 (CH), 125.0 (CH), 124.1 (CH), 121.0 (CH), 119.4 (CH), 113.5 (CH), 112.8 (CH), 112.3 (CH), 111.8 (C), 108.4 (C), 69.5 (CH₂), 55.2 (CH₃), -0.4 (CH₃); HRMS Calculated for C₃₂H₃₂N₃O₂Si [M+H]⁺: 517.2179, Found: 517.5180.

1-(3-(4-methoxyphenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4i) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 91%; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.64; UV absorption: 231(0.197), 262(0.184), 296(0.155); IR (neat), 2963, 1603, 1498, 1466, 1270, 1235, 1055, 930, 821, 747, 695; 1H-NMR (600 MHz, CDCl₃) δ 8.08 (d, J = 7.2 Hz, 1H), 7.80 (d, J = 7.2 Hz, 1H), 7.47 (d, J = 9.0 Hz, 2H), 7.41-7.32 (m, 7H), 6.94 (d, J = 9.0 Hz, 2H), 3.84 (s, 3H), 0.47 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 200.6 (C), 159.8 (C), 146.4 (C), 136.3 (C), 132.7 (C), 129.9 (CH), 129.0 (CH), 128.7 (CH), 128.3 (CH), 128.1 (CH), 124.6 (CH), 120.2 (CH), 115.3 (C), 114.5 (CH), 112.2 (CH), 108.9 (C), 55.6 (CH₃), -0.22 (CH₃); HRMS Calculated for C₂₅H₂₆N₃OSi [M+H]⁺: 412.1838, Found: 412.1840.
4-(3-(1H-benzo[d][1,2,3]triazol-1-yl)-3-(trimethylsilyl)-1-phenylpropa-1,2-diencyl)phenol (4j) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 80%; Rf (hexanes/ethyl acetate, V/V, 4/1) = 0.44; UV absorption: 233(0.217), 257(0.166), 300(0.134); IR (neat), 3363, 2988, 1620, 1476, 1433, 1271, 1212, 1055, 938, 811, 745, 698; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 8.06 (d, \(J = 7.2\) Hz, 1H), 7.80 (d, \(J = 7.2\) Hz, 1H), 7.45 (d, \(J = 7.2\) Hz, 2H), 7.41-7.37 (m, 4H), 7.36-7.30 (m, 3H), 6.95 (d, \(J = 7.2\) Hz, 2H), 0.45 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 200.5 (C), 156.4 (C), 145.7 (C), 136.0 (C), 132.5 (C), 129.8 (CH), 128.7 (CH), 128.5 (CH), 128.0 (CH), 127.3 (CH), 124.7 (CH), 119.6 (CH), 115.9 (CH), 115.3 (C), 112.2 (CH), 108.6 (C), -0.51 (CH\(_3\)); HRMS Calculated for C\(_{24}\)H\(_{24}\)N\(_3\)O\(_2\)Si [M+H]\(^+\): 398.1681, Found: 398.1682.

4-(3-(1H-benzo[d][1,2,3]triazol-1-yl)-4,4-dimethyl-1-phenylpenta-1,2-dienyl)phenol (4k) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 83%; Rf (hexanes/ethyl acetate, V/V, 4/1) = 0.43; UV absorption: 231(0.233), 270(0.209), 298(0.174); IR (neat), 3345, 2995, 1605, 1455, 1445, 1287, 1225, 1043, 936, 814, 748, 695; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 8.06-8.03 (m, 1H), 7.40-7.35 (m, 5H), 7.33-7.30 (m, 2H), 7.24 (d, \(J = 8.4\) Hz, 2H), 7.20-7.17 (m, 1H), 6.93 (d, \(J = 8.4\) Hz, 2H), 1.36 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 200.4 (C), 156.5 (C), 144.5 (C), 135.5 (C), 134.4 (C), 132.9 (CH), 130.0 (CH), 128.7 (CH), 128.6 (CH), 128.3 (CH), 128.2 (CH), 127.7 (CH), 124.1 (CH), 119.4 (CH), 115.7 (CH), 115.3 (C), 110.8 (C), 37.2 (C), 29.2 (CH\(_3\)); HRMS Calculated for C\(_{25}\)H\(_{24}\)N\(_3\)O [M+H]\(^+\): 382.1912, Found: 382.1910.
1-(4,4-dimethyl-1-phenyl-1-(thiophen-2-yl)penta-1,2-dien-3-yl)-1H-benzo\[d\][1,2,3]triazole (4l) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 95%; R\(f\) (hexanes/ethyl acetate, V/V, 6/1) = 0.46; UV absorption: 236(0.189), 260(0.237), 289(0.125); IR (neat), 2988, 1621, 1490, 1454, 1268, 1221, 1034, 951, 830, 745, 688; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 8.09 (d, \(J\) = 8.4 Hz, 1H), 7.86 (d, \(J\) = 8.4 Hz, 1H), 7.57 (d, \(J\) = 7.2 Hz, 2H), 7.45-7.36 (m, 5H), 7.34 (dd, \(J\) = 5.4 Hz, 1.2 Hz, 1H), 7.12 (dd, \(J\) = 3.6 Hz, 1.2 Hz, 1H), 7.08 (dd, \(J\) = 5.4 Hz, 3.6 Hz, 1H), 0.50 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 199.9 (C), 146.2 (C), 139.4 (C), 135.5 (C), 132.4 (C), 128.8 (CH), 128.4 (CH), 128.2 (CH), 128.0 (CH), 127.8 (CH), 127.0 (CH), 126.4 (CH), 124.4 (CH), 120.0 (CH), 111.9 (CH), 110.5 (C), 109.0 (C), -0.57 (CH\(_3\)); HRMS Calculated for C\(_{23}\)H\(_{22}\)N\(_3\)S [M+H\(^+\)]: 372.1528, Found: 372.1527.

N-2-4m

2-(1-(trimethylsilyl)-3,3-diphenylprop-1,2-dienyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4m) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 60%; R\(f\) (hexanes/ethyl acetate, V/V, 10/1) = 0.62; UV absorption: 237(0.202), 264(0.153), 299(0.135); IR (neat), 2923, 1633, 1487, 1446, 1281, 1243, 1039, 931, 827, 779, 692; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 8.01 (s, 1H), 7.77 (d, \(J\) = 7.8 Hz, 2H), 7.45-7.40 (m, 8H), 7.39-7.36 (m, 2H), 7.24 (d, \(J\) = 7.8 Hz, 2H), 2.39 (s, 3H), 0.47 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 199.9 (C), 146.2 (C), 139.4 (C), 135.2 (C), 129.4 (CH), 128.7 (CH), 128.4 (CH), 128.3 (CH), 127.5 (C), 125.6 (CH), 117.0 (CH), 116.1 (C), 109.3 (C), 21.2 (CH\(_3\)), -0.62 (CH\(_3\)); HRMS Calculated for C\(_{27}\)H\(_{28}\)N\(_3\)Si [M+H\(^+\)]: 422.2046, Found: 422.2044.

N-1-4m

1-(1-(trimethylsilyl)-3,3-diphenylprop-1,2-dienyl)-4-p-tolyl-1H-1,2,3-triazole (N-1-4m) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid.
Isolated yield 12%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.29; UV absorption: 236(0.179), 265(0.144), 297(0.114); IR (neat), 2928, 1635, 1469, 1433, 1287, 1222, 1032, 930, 816, 770, 694; 1H-NMR (600 MHz, CDCl3) δ 7.63 (s, 1H), 7.30-7.27 (m, 6H), 7.07 (d, J = 7.8 Hz, 2H), 7.05-7.03 (m, 4H), 6.73 (d, J = 7.8 Hz, 2H), 2.14 (s, 3H), 0.32 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 203.8 (C), 138.8 (C), 137.8 (C), 135.0 (C), 133.3 (C), 128.9 (CH), 128.7 (CH), 128.5 (CH), 128.3 (CH), 127.8 (CH), 124.3 (CH), 114.2 (C), 107.3 (C), 21.2 (CH3), -0.66 (CH3); HRMS Calculated for C27H28N3Si [M+H]+: 422.2046, Found: 422.2045.

2-(3-(trimethylsilyl)-1,1-diphenylprop-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4m') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 13%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.48; UV absorption: 244(0.408), 255(0.418); IR (neat), 3108, 2960, 1490, 1456, 1354, 1296, 1071, 974, 833, 764, 734, 687; 1H-NMR (600 MHz, CDCl3) δ 7.91 (s, 1H), 7.68 (d, J = 7.8 Hz, 2H), 7.36-7.33 (m, 6H), 7.32-7.29 (m, 4H), 7.21 (d, J = 7.8 Hz, 2H), 2.37 (s, 3H), 0.32 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 148.0 (C), 141.2 (C), 138.3 (C), 131.2 (CH), 129.4 (CH), 128.3 (CH), 128.2 (CH), 128.1 (CH), 127.5 (C), 126.0 (CH), 104.4 (C), 94.2 (C), 73.8 (C), 21.3 (CH3), -0.28 (CH3); HRMS Calculated for C27H28N3Si [M+H]+: 422.2046, Found: 422.2047.

1-(3-(trimethylsilyl)-1,1-diphenylprop-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4m') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 5%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.24; UV absorption:
243(0.314), 253(0.298); IR (neat), 3083, 2936, 1490, 1456, 1425, 1156, 1073, 976, 833, 751, 730, 686; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 7.97 (s, 1H), 7.73 (d, \(J = 7.8\) Hz, 2H), 7.37-7.35 (m, 6H), 7.32-7.29 (m, 4H), 7.22 (d, \(J = 7.8\) Hz, 2H), 2.38 (s, 3H), 0.29 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 146.8 (C), 140.6 (C), 137.9 (C), 129.4 (CH), 128.7 (CH), 128.4 (CH), 128.0 (CH), 127.7 (C), 125.6 (CH), 120.2 (CH), 104.1 (C), 94.9 (C), 70.0 (C), 21.2 (CH\(_3\)), -0.37 (CH\(_3\)); HRMS Calculated for C\(_{27}\)H\(_{28}\)N\(_3\)Si [M+H]\(^+\): 422.2046, Found: 422.2049.

\[ \text{N-2-4n} \]

4-(4-methoxyphenyl)-2-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-2H-1,2,3-triazole (N-2-4n) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.66; Isolated yield 70%; UV absorption: 244(0.223), 271(0.189), 298(0.154); IR (neat), 2987, 1621, 1503, 1454, 1268, 1237, 1067, 941, 832, 754, 687; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 7.92 (s, 1H), 7.77 (d, \(J = 9.0\) Hz, 2H), 7.39 (d, \(J = 9.0\) Hz, 4H), 7.28 (d, \(J = 7.8\) Hz, 2H), 7.21 (d, \(J = 7.8\) Hz, 2H), 6.94 (d, \(J = 9.0\) Hz, 2H), 3.84 (s, 3H), 2.39 (s, 3H), 0.42 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 201.3 (C), 159.7 (C), 147.4 (C), 138.3 (C), 135.4 (C), 132.2 (C), 129.5 (CH), 128.7 (CH), 128.4 (CH), 128.3 (CH), 128.2 (CH), 127.1 (CH), 123.1 (C), 116.6 (CH), 116.0 (C), 114.2 (CH), 109.2 (C), 55.3 (CH\(_3\)), 21.2 (CH\(_3\)), -0.59 (CH\(_3\)) ; HRMS Calculated for C\(_{28}\)H\(_{30}\)N\(_3\)OSi [M+H]\(^+\): 452.2153, Found: 452.2156.

\[ \text{N-1-4n} \]

4-(4-methoxyphenyl)-1-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-1H-1,2,3-triazole (N-1-4n) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 14%; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.30; UV absorption: 244(0.165), 273(0.132), 299(0.103); IR (neat), 2960, 1611, 1494, 1469, 1284, 1232, 1049, 938, 819, 732, 691; \(^1\)H-NMR (600 MHz, CDCl\(_3\)) \(\delta\) 7.62 (s, 1H), 7.36-7.33 (m, 2H), 7.20-7.14 (m, 3H), 7.10 (d, \(J = 9.0\) Hz, 4H), 7.07-7.05 (m, 2H), 6.46 (d, \(J = 7.8\) Hz, 2H), 3.64 (s, 3H), 2.36 (s, 3H), 0.31 (s, 9H); \(^{13}\)C-NMR (150 MHz, CDCl\(_3\)) \(\delta\) 204.0 (C), 160.2 (C), 142.9 (C), 137.9 (C), 135.4 (C), 132.3 (C), 130.5 (CH), 129.3 (CH), 128.8 (CH), 128.5 (CH), 128.3 (CH), 128.2 (CH), 128.0 (C), 127.9 (CH), 120.0 (C), 113.9
4-(4-methoxyphenyl)-2-(3-(trimethylsilyl)-1-phenyl-1-p-tolylprop-2-ynyl)-2H-1,2,3-
triazole (N-2-4n') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 10%; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.51; UV absorption: 256(0.413), 269(0.424); IR (neat), 3096, 2943, 1482, 1423, 1368, 1299, 1065, 975, 830, 751, 724, 689; 1H-NMR (600 MHz, CDCl3) δ 7.83 (s, 1H), 7.70 (d, J = 8.4 Hz, 2H), 7.32-7.29 (m, 2H), 7.25-7.23 (m, 2H), 7.18 (d, J = 8.4 Hz, 2H), 7.12 (t, J = 8.4 Hz, 3H), 6.91 (t, J = 8.4 Hz, 2H), 3.81 (s, 3H), 2.34 (s, 3H), 0.26 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 159.8 (C), 147.7 (C), 141.5 (C), 138.3 (C), 137.4 (C), 130.8 (CH), 128.8 (CH), 128.2 (CH), 128.1 (CH), 128.0 (CH), 127.9 (CH), 127.4 (CH), 123.1 (C), 114.1 (CH), 104.6 (C), 93.9 (C), 73.5 (C), 55.2 (CH3), 21.1 (CH3), -0.26 (CH3); HRMS Calculated for C28H30N3OSi [M+H]+: 452.2153, Found: 452.2150.

4-(4-methoxyphenyl)-1-(3-(trimethylsilyl)-1-phenyl-1-p-tolylprop-2-ynyl)-1H-1,2,3-
triazole (N-1-4n') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 4%; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.33; UV absorption: 256(0.335), 266(0.356); IR (neat), 3090, 2955, 1498, 1434, 1149, 1068, 956, 837, 750, 721, 680; 1H-NMR (600 MHz, CDCl3) δ 7.90 (s, 1H), 7.75 (d, J = 9.0 Hz, 2H), 7.36-7.34 (m, 3H), 7.29-7.25 (m, 2H), 7.19 (d, J = 8.4 Hz, 2H), 7.15 (d, J = 8.4 Hz, 2H), 6.94 (d, J = 9.0 Hz, 2H), 3.84 (s, 3H), 2.36 (s, 3H), 0.27 (s, 9H); 13C-NMR (150
MHz, CDCl$_3$) $\delta$ 159.6 (C), 146.6 (C), 140.8 (C), 138.6 (C), 137.6 (C), 129.0 (CH), 128.6 (CH), 128.4 (CH), 128.0 (CH), 127.9 (CH), 127.0 (CH), 123.4 (C), 119.7 (CH), 114.2 (CH), 104.3 (C), 94.6 (C), 69.8 (C), 55.3 (CH$_3$), 21.1 (CH$_3$), -0.35 (CH$_3$); HRMS Calculated for C$_{28}$H$_{30}$N$_3$OSi [M+H]$^+$: 452.2153, Found: 452.2151.

4-(4-chlorophenyl)-2-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-2H-1,2,3-triazole (N-2-4o) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 57%; R$_f$ (hexanes/ethyl acetate, V/V, 10/1) = 0.57; UV absorption: 238(0.329), 269(0.254), 301(0.216); IR (neat), 2937, 1623, 1477, 1450, 1276, 1235, 1063, 947, 818, 745, 696; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.99 (s, 1H), 7.78 (d, $J$ = 8.4 Hz, 2H), 7.40-7.38 (m, 5H), 7.35-7.30 (m, 2H), 7.28 (d, $J$ = 8.4 Hz, 2H), 7.21 (d, $J$ = 7.8 Hz, 2H), 7.29 (s, 3H), 0.43 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 201.3 (C), 146.5 (C), 138.4 (C), 135.3 (C), 134.0 (C), 132.1 (C), 129.5 (CH), 129.0 (CH), 128.9 (CH), 128.8 (CH), 128.4 (CH), 128.3 (CH), 128.2 (C), 127.0 (CH), 117.5 (CH), 116.2 (C), 109.2 (C), 21.2 (CH$_3$), -0.62 (CH$_3$); HRMS Calculated for C$_{28}$H$_{30}$N$_3$OSi [M+H]$^+$: 452.2153, Found: 452.2151.

4-(4-chlorophenyl)-1-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-1H-1,2,3-triazole (N-1-4o) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 15%; R$_f$ (hexanes/ethyl acetate, V/V, 10/1) = 0.29; UV absorption: 242(0.308), 261(0.249), 300(0.233); IR (neat), 2946, 1589, 1480, 1441, 1292, 1231, 1063, 939, 825, 756, 694; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.65 (s, 1H), 7.32-7.28 (m, 3H), 7.11 (d, $J$ = 8.4 Hz, 2H), 7.07 (d, $J$ = 8.4 Hz, 2H), 6.92 (d, $J$ = 8.4 Hz, 2H), 6.85 (d, $J$ = 8.4 Hz, 2H), 2.38 (s, 3H), 0.34 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 204.0 (C), 138.0 (C), 136.6 (C), 135.0 (C), 134.8 (C), 133.5 (C), 131.6 (C), 129.9 (CH), 129.2 (CH), 128.5 (CH), 128.4 (CH), 128.3 (CH), 128.2 (CH), 128.0 (CH), 125.8 (CH), 114.5 (C), 107.2 (C), 21.2 (CH$_3$), -0.67 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$ClN$_3$Si [M+H]$^+$: 456.1655, Found: 456.1654.
4-(4-chlorophenyl)-2-(3-(trimethylsilyl)-1-phenyl-1-p-tolylprop-2-ynyl)-2H-1,2,3-triazole (N-2-4o') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 19%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.47; UV absorption: 250(0.378), 265(0.345); IR (neat), 3100, 2947, 1498, 1434, 1367, 1292, 1049, 967, 854, 788, 730, 691; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.90 (s, 1H), 7.71 (d, $J$ = 8.4 Hz, 2H), 7.36 (d, $J$ = 8.4 Hz, 2H), 7.35-7.33 (m, 3H), 7.27-7.24 (m, 2H), 7.18 (d, $J$ = 8.4 Hz, 2H), 2.36 (s, 3H), 0.27 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 146.9 (C), 141.3 (C), 138.3 (C), 138.1 (C), 134.2 (C), 131.2 (CH), 128.9 (CH), 128.8 (CH), 128.3 (CH), 128.2 (CH), 128.1 (CH), 128.0 (CH), 127.4 (CH), 104.4 (C), 94.2 (C), 73.8 (C), 21.1 (CH$_3$), -0.28 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$ClN$_3$Si [M+H]$^+$: 456.1655, Found: 456.1654.

4-(4-chlorophenyl)-1-(3-(trimethylsilyl)-1-phenyl-1-p-tolylprop-2-ynyl)-2H-1,2,3-triazole (N-1-4o') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 5%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.26; UV absorption: 248(0.268), 263(0.247); IR (neat), 3054, 2921, 1495, 1458, 1421, 1150, 1054, 971, 827, 749, 720, 688; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.95 (s, 1H), 7.75 (d, $J$ = 8.4 Hz, 2H), 7.38-7.33 (m, 5H), 7.28-7.25 (m, 2H), 7.18 (d, $J$ = 9.0 Hz, 2H), 7.15 (d, $J$ = 9.0 Hz, 2H), 2.35 (s, 3H), 0.27 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 145.9 (C), 140.8 (C), 139.0 (C), 137.7 (C), 134.0 (C), 129.4 (CH), 129.2 (CH), 128.9 (CH), 128.6 (CH), 128.2 (CH), 128.1 (CH), 127.2 (CH), 120.8 (CH), 104.3 (C), 95.1 (C), 70.3 (C), 21.3 (CH$_3$), -0.13 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$ClN$_3$Si [M+H]$^+$: 456.1655, Found: 456.1655.
4-(4-fluorophenyl)-2-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-2H-1,2,3-triazole (N-2-4p) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 62%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.55; UV absorption: 257(0.405), 263(0.353), 311(0.252); IR (neat), 2966, 1586, 1493, 1444, 1282, 1234, 1039, 933, 854, 756, 682; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.97 (s, 1H), 7.84-7.81 (m, 2H), 7.42-7.40 (m, 4H), 7.38-7.35 (m, 1H), 7.30 (d, $J$ = 7.8 Hz, 2H), 7.22 (d, $J$ = 7.8 Hz, 2H), 7.11 (t, $J$ = 7.8 Hz, 2H), 2.40 (s, 3H), 0.44 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 201.3 (C), 163.5 (C), 161.9 (C), 146.6 (C), 138.4 (C), 133.1 (C), 129.5 (CH), 128.7 (CH), 128.4 (CH), 128.3 (CH), 128.2 (CH), 127.5 (CH), 127.4 (CH), 126.7 (C), 126.6 (C), 117.2 (CH), 116.1 (C), 115.7 (CH), 115.3 (C), 109.2 (C), 21.2 (CH$_3$), -0.63 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$FN$_3$Si [M+H]$^+$: 440.1951, Found: 440.1950.

4-(4-fluorophenyl)-1-(1-(trimethylsilyl)-3-phenyl-3-p-tolylpropa-1,2-dienyl)-1H-1,2,3-triazole (N-1-4p) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 14%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.25; UV absorption: 253(0.333), 261(0.279), 313(0.223); IR (neat), 2987, 1618, 1464, 1426, 1289, 1235, 1052, 946, 823, 745, 688; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.64 (s, 1H), 7.31-7.28 (m, 3H), 7.14-7.11 (m, 2H), 7.10 (d, $J$ = 7.8 Hz, 2H), 7.06-7.03 (m, 2H), 6.94 (d, $J$ = 7.8 Hz, 2H), 6.59 (t, $J$ = 7.8 Hz, 2H), 2.37 (s, 3H), 0.32 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 203.8 (C), 163.7 (C), 161.9 (C), 162.0 (C), 138.0 (C), 136.8 (C), 134.9 (C), 133.5 (CH), 131.7 (CH), 130.8 (C), 130.7 (C), 129.2 (CH), 128.4 (CH), 128.3 (CH), 128.0 (CH), 123.3 (CH), 115.4 (CH), 115.3 (CH), 114.4 (C), 107.2 (C), 21.2 (CH$_3$), -0.67 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$FN$_3$Si [M+H]$^+$: 440.1951, Found: 440.1954.
4-(4-fluorophenyl)-2-(3-(trimethylsilyl)-1-phenyl-1-p-tolyprop-2-ynyl)-2H-1,2,3-triazole (N-2-4p') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 15%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.45; UV absorption: 271(0.513), 285(0.446); IR (neat), 3118, 2937, 1476, 1424, 1375, 1299, 1055, 963, 850, 781, 727, 690; 1H-NMR (600 MHz, CDCl₃) δ 7.87 (s, 1H), 7.77-7.74 (m, 2H), 7.35-7.32 (m, 3H), 7.28-7.24 (m, 2H), 7.19 (d, J = 8.4 Hz, 2H), 7.15 (d, J = 8.4 Hz, 2H), 7.08 (t, J = 8.4 Hz, 2H), 2.36 (s, 3H), 0.27 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 163.7 (C), 162.0 (C), 147.0 (C), 141.4 (C), 138.3 (C), 138.2 (C), 131.0 (CH), 128.9 (CH), 128.3 (CH), 128.2 (CH), 128.1 (CH), 128.0 (CH), 127.9 (CH), 127.8 (CH), 126.7 (C), 126.6 (C), 115.8 (CH), 115.6 (CH), 104.4 (C), 94.1 (C), 73.7 (C), 21.1 (CH₃), -0.27 (CH₃); HRMS Calculated for C₂₇H₂₇FN₃Si [M+H]⁺: 440.1951, Found: 440.1948.

4-(4-fluorophenyl)-1-(3-(trimethylsilyl)-1-phenyl-1-p-tolyprop-2-ynyl)-2H-1,2,3-triazole (N-1-4p') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 4%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.28; UV absorption: 270(0.436), 285(0.389); IR (neat), 3089, 2931, 1488, 1433, 1363, 1281, 1042, 965, 864, 774, 735, 695; 1H-NMR (600 MHz, CDCl₃) δ 7.94 (s, 1H), 7.81-7.78 (m, 2H), 7.36-7.34 (m, 3H), 7.29-7.27 (m, 2H), 7.18 (d, J = 8.4 Hz, 2H), 7.16 (d, J = 8.4 Hz, 2H), 7.10 (t, J = 8.4 Hz, 2H), 2.36 (s, 3H), 0.28 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 163.5 (C), 161.8 (C), 145.9 (C), 140.6 (C), 138.7 (C), 137.5 (C), 129.1 (CH), 128.7 (CH), 128.4 (CH), 128.0 (CH), 127.9 (CH), 127.5 (CH), 127.4 (CH), 125.9 (C), 125.8 (C), 120.3 (CH), 115.8 (CH), 115.7 (CH), 104.1 (C), 94.8 (C), 70.0 (C), 21.0 (CH₃), -0.36 (CH₃); HRMS Calculated for C₂₇H₂₇FN₃Si [M+H]⁺: 440.1951, Found: 440.1953.
2-(4,4-dimethyl-1,1-diphenylpenta-1,2-dien-3-yl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4q) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 65%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.60; UV absorption: 240(0.214), 258(0.182), 294(0.195); IR (neat), 2956, 1588, 1497, 1441, 1264, 1245, 1072, 958, 815, 760, 675; ¹H-NMR (600 MHz, CDCl₃) δ 7.77 (s, 1H), 7.74 (d, J = 7.8 Hz, 2H), 7.44-7.39 (m, 8H), 7.38-7.34 (m, 2H), 7.22 (d, J = 7.8 Hz, 2H), 2.37 (s, 3H), 1.39 (s, 9H); ¹³C-NMR (150 MHz, CDCl₃) δ 199.4 (C), 146.8 (C), 138.0 (C), 135.2 (C), 129.4 (CH), 128.7 (CH), 128.5 (CH), 128.4 (CH), 127.6 (C), 125.6 (CH), 121.0 (C), 120.6 (CH), 117.6 (C), 36.3 (C), 29.1 (CH₃), 21.3 (CH₃); HRMS Calculated for C₂₈H₂₈N₃ [M+H]⁺: 406.2280, Found: 406.2280.

1-(4,4-dimethyl-1,1-diphenylpenta-1,2-dien-3-yl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4q) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 11%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.28; UV absorption: 243(0.253), 259(0.298), 297(0.203); IR (neat), 2934, 1576, 1501, 1433, 1237, 1216, 1066, 939, 811, 773, 683; ¹H-NMR (600 MHz, CDCl₃) δ 7.69 (s, 1H), 7.40-7.33 (m, 10H), 7.02 (d, J = 7.8 Hz, 2H), 6.84 (d, J = 7.8 Hz, 2H), 2.29 (s, 3H), 1.11 (s, 9H); ¹³C-NMR (150 MHz, CDCl₃) δ 202.6 (C), 163.0 (C), 138.9 (C), 134.7 (C), 132.1 (CH), 129.1 (CH), 128.9 (CH), 128.7 (CH), 128.6 (CH), 128.3 (CH), 124.2 (C), 119.1 (C), 117.1 (C), 37.1 (C), 29.1 (CH₃), 21.3 (CH₃); HRMS Calculated for C₂₈H₂₈N₃ [M+H]⁺: 406.2280, Found: 406.2285.
**2-(4,4-dimethyl-1,1-diphenylpent-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4q')** was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 15%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.45; UV absorption: 240(0.267), 253(0.305); IR (neat), 3123, 2956, 1500, 1431, 1362, 1280, 1040, 968, 842, 781, 733, 701; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.88 (s, 1H), 7.67 (d, $J$ = 7.8 Hz, 2H), 7.35-7.31 (m, 6H), 7.30-7.27 (m, 4H), 7.20 (d, $J$ = 7.8 Hz, 2H), 2.37 (s, 3H), 1.35 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 147.7 (C), 142.1 (C), 138.1 (C), 131.0 (CH), 129.4 (CH), 128.1 (CH), 128.0 (CH), 127.7 (C), 126.0 (CH), 97.7 (C), 79.0 (C), 73.4 (C), 30.6 (CH$_3$), 27.8 (C), 21.3 (CH$_3$); HRMS Calculated for C$_{28}$H$_{28}$N$_3$ [M+H]$^+$: 406.2280, Found: 406.2284.

**1-(4,4-dimethyl-1,1-diphenylpent-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4q')** was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 4%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.25; UV absorption: 242(0.253), 254(0.236); IR (neat), 3076, 2927, 1463, 1448, 1354, 1290, 1033, 985, 855, 793, 721, 698, 7.31-7.27 (m, 4H), 7.21 (d, $J$ = 7.8 Hz, 2H), 2.37 (s, 3H), 1.35 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 163.0 (C), 146.7 (C), 141.3 (C), 137.9 (C), 129.4 (CH), 128.5 (CH), 128.3 (CH), 128.0 (CH), 125.6 (CH), 120.2 (CH), 98.3 (C), 78.9 (C), 69.7 (C), 30.6 (CH$_3$), 27.9 (C), 21.3 (CH$_3$); HRMS Calculated for C$_{28}$H$_{28}$N$_3$ [M+H]$^+$: 406.2280, Found: 406.2279.
2-(4-methyl-1,1-diphenylpenta-1,4-trien-3-yl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4r) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 70%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.64; UV absorption: 231(0.405), 263(0.353), 311(0.252); IR (neat), 3033, 1586, 1495, 1438, 1266, 1153, 1071, 992, 903, 734, 694; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.86 (s, 1H), 7.74 (d, $J$ = 8.4 Hz, 2H), 7.47-7.45 (m, 4H), 7.43-7.35 (m, 6H), 7.23 (d, $J$ = 8.4 Hz, 2H), 5.21 (s, 1H), 4.88 (s, 1H), 2.38 (s, 3H), 2.09 (s, 3H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 203.5 (C), 147.3 (C), 138.1 (C), 136.2 (C), 134.6 (C), 129.5 (CH), 128.9 (CH), 128.7 (CH), 128.7 (CH), 127.5 (C), 125.7 (CH), 120.8 (CH), 119.0 (C), 115.4 (CH$_2$), 114.8 (C), 21.3 (CH$_3$), 20.7 (CH$_3$); HRMS Calculated for C$_{27}$H$_{24}$N$_3$ [M+H]$^+$: 390.1960, Found: 390.1962.

2-(4-methyl-1,1-diphenylpent-4-en-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4r') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 10%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.50; UV absorption: 248(0.231), 259(0.210); IR (neat), 3110, 2930, 1471, 1423, 1373, 1297, 1053, 838, 779, 718, 679; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.91 (s, 1H), 7.67 (d, $J$ = 7.8 Hz, 2H), 7.36-7.33 (m, 6H), 7.20 (d, $J$ = 7.8 Hz, 2H), 5.48 (s, 1H), 5.35 (quin, $J$ = 1.8 Hz, 1H), 2.37 (s, 3H), 2.01 (s, 3H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 148.0 (C), 141.5 (C), 138.4 (C), 131.2 (CH), 129.4 (CH), 128.3 (CH), 128.2 (CH), 128.1 (CH), 127.5 (C), 126.1 (C), 126.0 (CH), 123.1 (CH$_2$), 90.2 (C), 88.0 (C), 73.8 (C), 23.2 (CH$_3$), 21.3 (CH$_3$); HRMS Calculated for C$_{27}$H$_{24}$N$_3$ [M+H]$^+$: 390.1960, Found: 390.1962.
Mixture of 1-(4-methyl-1,1-diphenylpenta-1,2,4-trien-3-yl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4r) and 1-(4-methyl-1,1-diphenylpent-4-en-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4r') couldn’t separated by flash chromatography with different developing solvent systems which were Hexane-EtOAc (v/v: 20/1) and Hexane-ethylene chloride (v/v: 5/1) as yellow liquid. Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.29; Isolated yield 11%; UV absorption: 233(0.333), 245(0.200), 261(0.257), 313(0.163); IR (neat), 3066, 2935, 1589, 1477, 1448, 1350, 1284, 1165, 1049, 997, 913, 857 732, 688; 1H-NMR (600 MHz, CDCl3) δ 7.88 (s, 1.00H), 7.57-7.54 (m, 3.47H), 7.38-7.34 (m, 3.88H), 7.33-7.28 (m, 7.77H), 7.25-7.23 (m, 4.18H), 7.19 (d, J = 7.8 Hz, 2.20H), 7.01 (d, J = 7.8 Hz, 2.10H), 2.41 (s, 2.62H), 2.34 (s, 3.00H), 2.01 (s, 3.03H); 13C-NMR (150 MHz, CDCl3) δ 205.3 (C), 163.0 (C), 143.2 (C), 139.2 (C), 138.8 (C), 137.0 (C), 134.0 (C), 129.4 (CH), 128.9 (CH), 128.6 (CH), 128.5 (CH), 128.3 (CH), 127.9 (CH), 126.0 (CH), 123.7 (CH2), 118.8 (C), 115.0 (CH2), 113.9 (C), 92.4 (C), 85.8 (C), 74.5 (C), 32.7 (CH3), 21.3 (CH3), 20.2 (CH3); HRMS Calculated for C27H24N3 [M+H]^+: 390.1960, Found: 390.1962.

2-(1-cyclopropyl-3,3-diphenylpropa-1,2-dienyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4s) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 87%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.61; UV absorption: 226(0.242), 257(0.166), 299(0.129); IR (neat), 2962, 1583, 1480, 1423, 1262, 1151, 1067, 956, 862, 742, 690; 1H-NMR (600 MHz, CDCl3) δ 7.97 (s, 1H), 7.23 (d, J = 7.8 Hz, 2H), 7.42-7.36 (m, 10H), 2.38 (s, 3H), 2.29-2.24 (m, 1H), 1.11-1.07 (m, 2H), 0.83-0.79 (m, 2H); 13C-NMR (150 MHz, CDCl3) δ 196.7 (C), 147.8 (C), 135.4 (C), 129.5 (CH), 128.7 (CH), 128.6 (CH), 127.6 (C), 125.7 (CH), 121.2 (C), 117.4 (CH), 116.6 (C), 21.3 (CH3), 10.8 (CH), 7.5 (CH2); HRMS Calculated for C27H24N3 [M+H]^+: 390.1960, Found: 390.1963.
**N-1-4s**

1-(1-cyclopropyl-3,3-diphenylpropa-1,2-dienyl)-4-p-tolyl-1H-1,2,3-triazole (N-1-4s) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 9%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.30; UV absorption: 229(0.199), 258(0.113), 298(0.098); IR (neat), 3001, 1597, 1474, 1444, 1273, 1175, 1073, 976, 849, 737, 694; $^1$H-NMR (600 MHz, CDCl$_3$) δ 7.69 (s, 1H), 7.32-7.27 (m, 6H), 7.17-7.13 (m, 6H), 6.88 (d, $J = 7.8$ Hz, 2H), 2.25 (s, 3H), 1.94-1.88 (m, 1H), 0.91-0.86 (m, 2H), 0.69-0.65 (m, 2H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 200.6 (C), 138.9 (C), 137.8 (C), 134.8 (C), 132.8 (CH), 129.2 (CH), 128.8 (CH), 128.4 (CH), 128.3 (CH), 128.2 (CH), 123.9 (C), 119.1 (C), 114.1 (C), 21.3 (CH$_3$), 13.3 (CH), 7.3 (CH$_2$); HRMS Calculated for C$_{27}$H$_{24}$N$_3$ [M+H]$^+$: 390.1960, Found: 390.1959.

**4t**

1-(1,5-bis(trimethylsilyl)-3-phenylpenta-1,2-dien-4-ynyl)-1H-benzo[d][1,2,3]triazole (4t) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 76%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.46; UV absorption: 234(0.093), 250(0.077), 296(0.054); IR (neat), 3057, 2950, 1587, 1476, 1418, 1256, 1160, 1079, 987, 813, 710, 685; $^1$H-NMR (600 MHz, CDCl$_3$) δ 8.07 (d, $J = 8.4$ Hz, 1H), 7.79 (d, $J = 8.4$ Hz, 1H), 7.64 (d, $J = 8.4$ Hz, 2H), 7.44 (t, $J = 8.4$ Hz, 1H), 7.39 (t, $J = 8.4$ Hz, 3H), 7.32 (t, $J = 8.4$ Hz, 1H), 0.48 (s, 9H), 0.29 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) δ 205.8 (C), 146.0 (C), 132.8 (C), 132.4 (C), 128.8 (CH), 128.4 (CH), 128.2 (CH), 126.3 (CH), 124.6 (CH), 119.9 (CH), 111.8 (CH), 110.2 (C), 102.1 (C), 99.1 (C), 96.9 (C), -0.10 (CH$_3$), -0.63 (CH$_3$); HRMS Calculated for C$_{23}$H$_{28}$N$_3$Si$_2$ [M+H]$^+$: 402.1820, Found: 402.1819.
1-(3-(1-benzyl-1H-1,2,3-triazol-4-yl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4u) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Rf (hexanes/ethyl acetate, V/V, 2/1) = 0.45; UV absorption: 233(0.081), 253(0.06), 295(0.071); IR (neat), 3150, 3030, 2951, 1448, 1286, 1241, 1108, 1048, 938, 835, 766, 697; Isolated yield 58%; m. p. 155-157 °C; 1H-NMR (600 MHz, CDCl3) δ 8.05 (d, J = 7.2 Hz, 1H), 7.87 (d, J = 7.2 Hz, 1H), 7.59-7.56 (m, 2H), 7.48 (s, 1H), 7.41-7.29 (m, 10H), 5.57 (s, 2H), 0.44 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 200.9 (C), 146.1 (C), 143.6 (C), 134.4 (C), 134.3 (C), 132.6 (C), 129.2 (CH), 128.9 (CH), 128.4 (CH), 128.1 (CH), 128.0 (CH), 127.8 (CH), 124.4 (CH), 122.4 (CH), 119.9 (CH), 112.1 (CH), 109.4 (C), 106.0 (C), 54.4 (CH2), -0.55 (CH3); HRMS Calculated for C27H27N6Si [M+H]+: 463.2056, Found: 463.2059.

1-(1-(trimethylsilyl)-3-(4-nitrophenyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4v) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 71%; Rf(hexanes/ethyl acetate, V/V, 6/1) = 0.48; UV absorption: 231(0.078), 256(0.059), 299(0.041); IR (neat), 2967, 1634, 1523, 1438, 1299, 1235, 1157, 1045, 933, 847, 722; 1H-NMR (600 MHz, CDCl3) δ 8.24 (d, J = 8.4 Hz, 2H), 8.10 (d, J = 7.2 Hz, 1H), 7.70 (d, J = 7.2 Hz, 1H), 7.61 (d, J = 8.4 Hz, 2H), 7.46-7.38 (m, 7H), 0.48 (s, 9H); 13C-NMR (150 MHz, CDCl3) δ 200.9 (C), 147.4 (C), 146.3 (C), 143.0 (C), 134.6 (C), 132.4 (C), 129.2 (CH), 129.0 (CH), 128.7 (CH), 128.3 (CH), 128.2 (CH), 124.6 (CH), 124.1 (CH), 120.3 (CH), 114.0 (C), 111.4 (CH), 109.7 (C), -0.45 (CH3); HRMS Calculated for C24H23N4O2Si [M+H]+: 427.1593, Found: 427.1590.
1-(3-(4-fluorophenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4w) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 88%; m. p. 114-116 ºC; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.46; UV absorption: 234(0.203), 262(0.160), 300(0.141); IR (neat), 2955, 1603, 1504, 1447, 1285, 1248, 1155, 1066, 934, 833, 744, 692; 1H-NMR (600 MHz, CDCl$_3$) δ 8.08 (d, $J$ = 7.2 Hz, 1H), 7.77 (d, $J$ = 7.2 Hz, 1H), 7.46-7.34 (m, 9H), 7.12-7.06 (m, 2H), 0.47 (s, 9H); 13C-NMR (150 MHz, CDCl$_3$) δ 200.2 (C), 163.4 (C), 161.7 (C), 146.2 (C), 135.7 (C), 132.4 (C), 131.82 (C), 131.80 (C), 130.1 (CH), 130.0 (CH), 128.8 (CH), 128.3 (CH), 128.2 (CH), 128.0 (CH), 124.4 (CH), 120.0 (CH), 115.9 (CH), 115.7 (CH), 114.5 (C), 111.8 (C), 109.0 (CH), -0.49 (CH$_3$); HRMS Calculated for C$_{24}$H$_{23}$FN$_3$Si [M+H]$^+$: 400.1655, Found: 400.1658.

1-(3-(4-chlorophenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4x) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 72%; m. p. 139-141 ºC; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.47; UV absorption: 238(0.229), 264(0.167), 299(0.156); IR (neat), 2957, 1485, 1448, 1285, 1248, 1156, 1069, 937, 876, 831, 743, 692; 1H-NMR (600 MHz, CDCl$_3$) δ 8.09 (d, $J$ = 7.8 Hz, 1H), 7.76 (d, $J$ = 7.8 Hz, 1H), 7.46-7.35 (m, 11H), 0.49 (s, 9H); 13C-NMR (150 MHz, CDCl$_3$) δ 200.2 (C), 146.2 (C), 135.4 (C), 134.4 (C), 134.0 (C), 132.4 (C), 129.6 (CH), 129.0 (CH), 128.9 (CH), 128.3 (CH), 128.2 (CH), 128.0 (CH), 124.4 (CH), 120.0 (CH), 114.4 (C), 111.7 (CH), 109.1 (C), -0.49 (CH$_3$); HRMS Calculated for C$_{24}$H$_{23}$ClN$_3$Si [M+H]$^+$: 416.1344, Found: 416.1346.
1-(3,3-bis(4-fluorophenyl)-1-(trimethylsilyl)propa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (4y) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 84%; m. p. 118-120 °C; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.43; UV absorption: 235(0.175), 261(0.151), 299(0.127); IR (neat), 2964, 1602, 1504, 1450, 1283, 1223, 1157, 1069, 937, 836, 752; 1H-NMR (600 MHz, CDCl₃) δ 8.08 (d, J = 7.8 Hz, 1H), 7.75 (d, J = 7.8 Hz, 1H), 7.45-7.40 (m, 5H), 7.38 (t, J = 7.8 Hz, 1H), 7.13-7.08 (m, 4H), 0.48 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 200.0 (C), 163.4 (C), 161.7 (C), 146.2 (C), 132.4 (C), 131.7 (C), 131.6 (C), 130.0 (CH), 129.9 (CH), 128.0 (CH), 124.4 (CH), 120.1 (CH), 116.0 (CH), 115.8 (CH), 113.6 (C), 111.6 (CH), 109.1 (C), -0.53 (CH₃); HRMS Calculated for C₂₄H₂₂F₂N₃Si [M+H]⁺: 418.1546, Found: 418.1550.

N-2-4z

2-(3-(4-chlorophenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4z) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 59%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.60; UV absorption: 243(0.318), 270(0.267), 295(0.116); IR (neat), 2917, 1613, 1457, 1443, 1278, 1233, 1073, 929, 816, 738, 699; 1H-NMR (600 MHz, CDCl₃) δ 7.94 (s, 1H), 7.74 (d, J = 8.4 Hz, 2H), 7.41 (d, J = 7.8 Hz, 2H), 7.39-7.36 (m, 5H), 7.34 (d, J = 7.8 Hz, 2H), 7.22 (d, J = 8.4 Hz, 2H), 2.16 (s, 3H), 0.43 (s, 9H); 13C-NMR (150 MHz, CDCl₃) δ 201.2 (C), 147.7 (C), 138.2 (C), 134.8 (C), 134.3 (C), 133.8 (C), 129.6 (CH), 129.5 (CH), 129.0 (CH), 128.9 (CH), 128.5 (CH), 128.3 (CH), 127.4 (CH), 125.7 (CH), 117.0 (C), 115.2 (CH), 109.7 (C), 21.3 (CH₃), -0.60 (CH₃); HRMS Calculated for C₂₇H₂₇ClN₃Si [M+H]⁺: 456.1655, Found: 456.1652.
1-(3-(4-chlorophenyl)-1-(trimethylsilyl)-3-phenylpropa-1,2-dienyl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4z) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 15%; Rf(hexanes/ethyl acetate, V/V, 10/1) = 0.33; UV absorption: 244(0.295), 264(0.244), 299(0.138); IR (neat), 2936, 1588, 1477, 1422, 1278, 1213, 1034, 932, 843, 771, 687; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.63 (s, 1H), 7.30-7.28 (m, 3H), 7.24 (d, $J$ = 8.4 Hz, 2H), 7.05 (d, $J$ = 7.8 Hz, 2H), 2.16 (s, 3H), 0.32 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 203.6 (C), 138.9 (C), 137.8 (C), 134.6 (C), 133.7 (C), 133.6 (C), 133.4 (C), 129.6 (CH), 129.0 (CH), 128.7 (CH), 128.5 (CH), 128.4 (CH), 128.3 (CH), 128.0 (CH), 124.3 (C), 113.2 (CH), 107.6 (C), 21.2 (CH$_3$), -0.68 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$ClN$_3$Si [M+H]$^+$: 456.1655, Found: 456.1659.

2-(1-(4-chlorophenyl)-3-(trimethylsilyl)-1-phenylprop-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-2-4z') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 15%; Rf(hexanes/ethyl acetate, V/V, 10/1) = 0.49; UV absorption: 256(0.408), 271(0.393); IR (neat), 3077, 2934, 1483, 1446, 1343, 1297, 1041, 961, 852, 777, 739, 695; $^1$H-NMR (600 MHz, CDCl$_3$) $\delta$ 7.91 (s, 1H), 7.67 (d, $J$ = 7.8 Hz, 2H), 7.37-7.34 (m, 3H), 7.33-7.31 (m, 2H), 7.29-7.26 (m, 4H), 7.21 (d, $J$ = 7.8 Hz, 2H), 2.38 (s, 3H), 0.29 (s, 9H); $^{13}$C-NMR (150 MHz, CDCl$_3$) $\delta$ 148.1 (C), 140.9 (C), 139.8 (C), 138.5 (C), 134.4 (C), 131.3 (CH), 129.8 (CH), 129.4 (CH), 128.5 (CH), 128.3 (CH), 128.2 (CH), 127.9 (CH), 127.4 (C), 126.0 (CH), 103.8 (C), 94.8 (C), 73.2 (C), 21.3 (CH$_3$), -0.32 (CH$_3$); HRMS Calculated for C$_{27}$H$_{27}$ClN$_3$Si [M+H]$^+$: 456.1655, Found: 456.1652.
1-(1-(4-chlorophenyl)-3-(trimethylsilyl)-1-phenylprop-2-ynyl)-4-p-tolyl-2H-1,2,3-triazole (N-1-4z') was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as yellow liquid. Isolated yield 4%; Rf (hexanes/ethyl acetate, V/V, 10/1) = 0.30; UV absorption: 255(0.358), 273(0.367); IR (neat), 3089, 2928, 1487, 1455, 1433, 1148, 1052, 989, 820, 734, 709, 679; ¹H-NMR (600 MHz, CDCl₃) δ 8.01 (s, 1H), 7.73 (d, J = 7.8 Hz, 2H), 7.39-7.35 (m, 3H), 7.33 (d, J = 8.4 Hz, 2H), 7.29-7.27 (m, 2H), 7.25 (d, J = 8.4 Hz, 2H), 7.23 (d, J = 7.8 Hz, 2H), 2.38 (s, 3H), 0.29 (s, 9H); ¹³C-NMR (150 MHz, CDCl₃) δ 147.0 (C), 140.2 (C), 139.1 (C), 138.0 (C), 134.8 (C), 129.6 (CH), 129.5 (CH), 128.9 (CH), 128.5 (CH), 128.3 (CH), 127.8 (CH), 127.6 (CH), 125.6 (CH), 120.1 (CH), 103.5 (C), 95.6 (C), 69.5 (C), 21.3 (CH₃), -0.41 (CH₃); HRMS Calculated for C₂₇H₂₇ClN₃Si [M+H]+: 456.1655, Found: 456.1650.

1-(3-(2-methoxyphenyl)-3-phenylpropa-1,2-dienyl)-1H-benzo[d][1,2,3]triazole (7a) was purified by flash chromatography (Hexane-EtOAc, v/v 20/1) as white solid. Isolated yield 98%; m. p. 173-175 °C; Rf (hexanes/ethyl acetate, V/V, 6/1) = 0.42; UV absorption: 235(0.327), 299(0.206); IR (neat), 3056, 1596, 1491, 1443, 1278, 1172, 1061, 741, 694; ¹H-NMR (600 MHz, CDCl₃) δ 8.26 (s, 1H), 8.07 (d, J = 8.4 Hz, 1H), 8.00 (d, J = 8.4 Hz, 1H), 7.44-7.27 (m, 9H), 7.01 (t, J = 7.8 Hz, 1H), 6.96 (d, J = 8.4 Hz, 1H), 3.68 (s, 3H); ¹³C-NMR (150 MHz, CDCl₃) δ 196.6 (C), 157.0 (C), 146.6 (C), 135.3 (C), 131.4 (C), 130.9 (CH), 130.0 (CH), 128.5 (CH), 128.4 (CH), 127.9 (CH), 127.6 (CH), 124.5 (CH), 124.1 (CH), 120.8 (CH), 119.9 (CH), 117.8 (C), 111.9 (CH), 111.3 (C), 99.4 (CH), 55.3 (CH₃); HRMS Calculated for C₂₂H₁₈N₃O [M+H]+: 340.1458, Found: 340.1455.
III. ORTEP Drawing of the Crystal Structure

Figure 1. Perspective view of the molecular structure of 4a ($C_{24}H_{23}N_3Si$) with the atom labeling scheme. The thermal ellipsoids are scaled to enclose 30% probability. CCDC number: 851290.
Figure 2. Perspective view of the molecular structure of 4g \((C_{25}H_{25}N_3SiO)\) with the atom labeling scheme. The thermal ellipsoids are scaled to enclose 30% probability. CCDC number: 851291.
Figure 3. Perspective view of the molecular structure of 4u (C_{27}H_{26}N_{6}Si) with the atom labeling scheme. The thermal ellipsoids are scaled to enclose 30% probability. CCDC number: 851293.
Figure 4. Perspective view of the molecular structure of 4y (C_{24}H_{21}F_{2}N_{3}Si) with the atom labeling scheme. The thermal ellipsoids are scaled to enclose 30% probability. CCDC number: 851294.
Figure 5. Perspective view of the molecular structure of 7a (C_{22}H_{17}N_{3}O) with the atom labeling scheme. The thermal ellipsoids are scaled to enclose 30% probability. CCDC number: 851292.
VII. NMR Spectra Data
Electronic Supplementary Material (ESI) for Chemical Communications

This journal is © The Royal Society of Chemistry 2012

Ph

Ph

N

N

N

1H 600 MHz NMR 4b

Electronic Supplementary Material (ESI) for Chemical Communications

This journal is © The Royal Society of Chemistry 2012
$^{13}\text{C} \ 150 \text{ MHz NMR} \ 4b$
$^1$H 600 MHz NMR 4c
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^1$H 600 MHz NMR 4d
$^{13}$C 150 MHz NMR 4d
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^{1}{\text{H}}$ 600 MHz NMR 4e

Diagram of a chemical structure with labels Ph, t-Bu.
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012
$^1H$ 600 MHz NMR 4g
$^1$H 600 MHz NMR 4h
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

^H 600 MHz NMR 4i
Electronic Supplementary Material (ESI) for Chemical Communications

This journal is © The Royal Society of Chemistry 2012

$^1$H 600 MHz NMR 4j
$^1$H 600 MHz NMR N-2-4m
Electronic Supplementary Material (ESI) for Chemical Communications

$^{13}$C 150 MHz NMR N-1-4m
$^{13}$C 150 MHz NMR N-2-4'm
$^1$H 600 MHz NMR N-1-4m$'$
$^{13}$C-150 MHz NMR N-1-4m'}
$^{1}H$ 600 MHz NMR N-2-4n
$^{13}$C 150 MHz NMR N-2-4n
$^1$H 600 MHz NMR N-1-4n'
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012
$^{13}$C 150 MHz NMR N-1-40
$^{13}$C 150 MHz NMR N-1-4o'}
\[ ^1H \text{ 600 MHz NMR N-2-4p} \]
$^{13}$C 150 MHz NMR N-2-4p
$^{1}$H 600 MHz NMR N-1-4p
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^{13}$C 150 MHz NMR N-1-4p'}
$^1$H 600 MHz NMR N-2-4q
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^1$H 600 MHz NMR N-1-4q
$^1$H 600 MHz NMR N-2-4q'}
$^{13}$C 150 MHz NMR N-2-4q'
$^1$H 600 MHz NMR N-1-4q'}
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^{13}\text{C} \ 150 \text{ MHz NMR N-1-4q'}$
$^1\text{H} 600 \text{ MHz NMR N-2-4r}$
$\text{HN} - 2 - 4r^*$

$^1\text{H} \ 600\ \text{MHz NMR}$
$^{13}\text{C} \ 150 \text{ MHz NMR N-2-4r}^*$
$^1$H 600 MHz NMR mixture of N-1-4r & N-1-4r'
$^{13}$C 150 MHz NMR mixture of N-1-4r & N-1-4r'

Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012
$^1H$ 600 MHz NMR N-2-4s
$^{13}$C 150 MHz NMR N-2-4s
$^1H$ 600 MHz NMR N-1-4s
$^{13}$C 150 MHz NMR N-1-4s
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

$^1$H 600 MHz NMR 4x
\[ ^1H\ 600\ MHz\ NMR\ N-2-4z \]
Electronic Supplementary Material (ESI) for Chemical Communications
This journal is © The Royal Society of Chemistry 2012

13C 150 MHz NMR N-2-4z
Electronic Supplementary Material (ESI) for Chemical Communications

This journal is © The Royal Society of Chemistry 2012

$^{13}\text{C} 150 \text{ MHz NMR N-2-4z'}$
Electronic Supplementary Material (ESI) for Chemical Communications

This journal is © The Royal Society of Chemistry 2012
$^{1}H$ 600 MHz NMR 7a