

Supporting Information

Fabrication of polypyrrole/Cu (II) nanocomposite through liquid/liquid interfacial polymerization: A novel catalyst for synthesis of NH-1,2,3-triazoles in PEG-400

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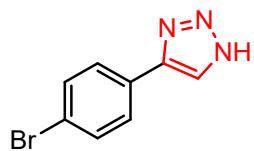
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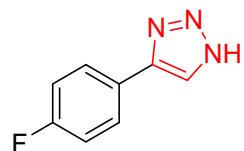
Analytical data of representative compounds:

4-(4-bromophenyl)-1H-1,2,3-triazole (Scheme 4, entry a)



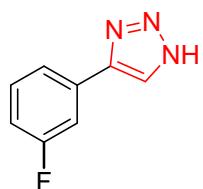
¹H NMR (500 MHz, DMSO) δ 9.15 (s, 1H), 7.84 (d, *J* = 8.4 Hz, 2H), 7.78 (s, 1H), 7.67 (d, *J* = 8.5 Hz, 2H). ¹³C NMR (126 MHz, DMSO) δ 141.08, 132.23, 131.01, 130.80, 129.13, 127.87.

(4-(4-fluorophenyl)-1H-1,2,3-triazole) (Scheme 4, entry b)



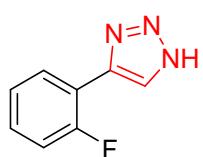
¹H NMR (400 MHz, DMSO-d₆) δ 9.08 (s, 1H), 8.25 (s, 1H), 7.87 (d, *J* = 8.5 Hz, 2H), 7.26 (d, *J* = 8.9 Hz, 2H).

(4-(3-fluorophenyl)-1H-1,2,3-triazole) (Scheme 4, entry c)



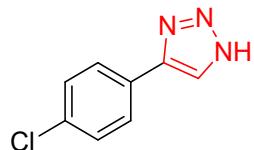
¹H NMR (500 MHz, DMSO) δ 11.46 (s, 1H), 8.32 (s, 1H), 7.75 – 7.24 (m, 5H). ¹³C NMR (126 MHz, DMSO) δ 161.97, 139.16, 131.19, 131.13, 124.73, 122.01, 115.07.

(4-(2-fluorophenyl)-1H-1,2,3-triazole) (Scheme 4, entry d)



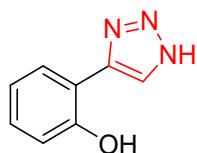
¹H NMR (600 MHz, DMSO-d₆) δ 14.88 (s, 1H), 7.79 (s, 1H), 7.22 – 6.87 (m, 4H). ¹³C NMR (126 MHz, DMSO) δ 158.46, 146.93, 131.66, 129.87, 128.37, 125.30, 116.54.

(4-(4-chlorophenyl)-1H-1,2,3-triazole) (Scheme 4, entry e)



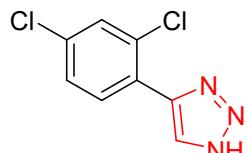
¹H NMR (400 MHz, DMSO-d₆): δ 9.11 (s, 1H), 8.24 (s, 1H), 7.84 (d, J = 8.4 Hz, 2H), 7.48 (d, J = 7.3 Hz, 2H). ¹³C NMR (126 MHz, DMSO) δ 157.68, 138.36, 130.48, 129.31, 128.71, 127.58.

(2-(1H-1,2,3-triazol-4-yl)phenol) (Scheme 4, entry f)



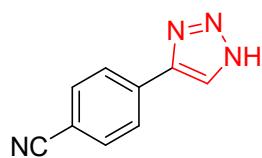
¹H NMR (500 MHz, DMSO-d₆) δ 14.92 (s, 1H), 8.19 (s, 1H), 7.88 (s, 1H), 7.39 – 6.89 (m, 4H). ¹³C NMR (126 MHz, DMSO) δ 154.43, 143.94, 133.19, 129.46, 129.00, 127.84, 119.68, 116.50.

(4-(2,4-dichlorophenyl)-1H-1,2,3-triazole) (Scheme 4, entry g)



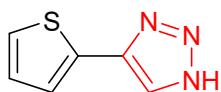
¹H NMR (400 MHz, DMSO-d₆) δ 9.03 (s, 1H), 8.27 (d, J = 1.3 Hz, 1H), 7.71 (s, 1H), 7.67 (s, 1H), 7.49 (d, J = 13.6 Hz, 1H). ¹³C NMR (126 MHz, DMSO) δ 143.30, 133.75, 131.95, 130.03, 128.14, 127.75.

(4-(1H-1,2,3-triazol-4-yl)benzonitrile) (Scheme 4, entry h)



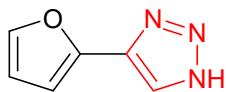
¹H NMR (400 MHz, DMSO-d₆) δ 8.72 (s, 1H), 8.34(s, 1H), 8.03 (d, *J* = 8.2 Hz, 2H), 7.89 (d, *J* = 7.6 Hz, 2H).

(4-(thiophen-2-yl)-1H-1,2,3-triazole) (Scheme 4, entry i)



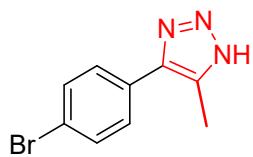
¹H NMR (400 MHz,) δ 9.18 (s), 8.13 (s), 7.10 – 7.07 (m), 6.91 (t, *J* = 5.1 Hz). ¹³C NMR (101 MHz,) δ 142.20, 129.11, 128.45, 127.39, 126.44, 125.88.

(4-(furan-2-yl)-1H-1,2,3-triazole) (Scheme 4, entry j)



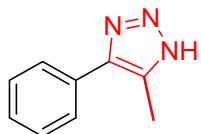
¹H NMR (600 MHz, DMSO-d₆) δ 15.30 (s, 1H), 9.08 (s, 1H), 8.04 (d, *J* = 52.2 Hz, 1H), 7.33 (dd, *J* = 36.0, 28.3 Hz, 2H). ¹³C NMR (151 MHz, DMSO) δ 158.51, 142.53, 116.63, 114.38, 63.93, 38.13.

(4-(4-bromophenyl)-5-methyl-1H-1,2,3-triazole) (Scheme 4, entry k)



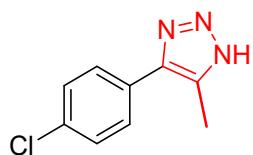
¹H NMR (500 MHz, DMSO-d₆) δ 14.73 (s, 1H), 7.70 – 7.66 (m, 4H), 2.44 (s, 3H). ¹³C NMR (126 MHz, DMSO) δ 142.64, 140.06, 132.05, 130.92, 129.09, 128.43, 11.80.

(5-methyl-4-phenyl-1H-1,2,3-triazole) (Scheme 4, entry l)



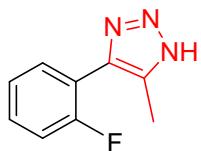
¹H NMR (500 MHz, DMSO) δ 14.36 (s, 1H), 7.95 (d, J = 1.9 Hz, 2H), 7.64 – 7.61 (m, 2H), 7.52 – 7.49 (m, 1H), 2.52(s, 3H).¹³C NMR (126 MHz, DMSO) δ 167.68, 133.22, 131.07, 129.60, 128.92, 126.02, 11.21.

(4-(4-chlorophenyl)-5-methyl-1H-1,2,3-triazole) (Scheme 4, entry m)



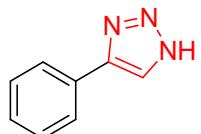
¹H NMR (500 MHz, DMSO) δ 14.72 (s, 1H), 7.75 (d, J = 8.3 Hz, 2H), 7.54 (d, J = 8.3 Hz, 2H), 2.51 (s, 3H).¹³C NMR (126 MHz, DMSO) δ 142.25, 139.67, 132.37, 128.77, 128.43, 127.76, 11.42.

(4-(2-fluorophenyl)-5-methyl-1H-1,2,3-triazole) (Scheme 4, entry n)



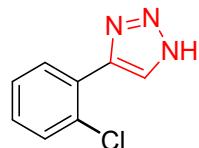
¹H NMR (500 MHz, DMSO) δ 14.83 (s, 1H), 7.56 (d, J = 23.4 Hz, 1H), 7.36 – 7.30 (m, 3H), 2.51 (s, 3H).¹³C NMR (126 MHz, DMSO) δ 158.69, 141.35, 139.71, 131.48, 130.86, 130.35, 125.06, 116.55, 10.75.

4-Phenyl-1H-1,2,3-triazole (Scheme 6, entry i)



¹H NMR (400 MHz, DMSO) δ 11.32 (s, 1H), 8.31 (s, 1H), 7.92 (d, 1H, *J* = 7.5 Hz), 7.50 (t, 2H, *J* = 7.6 Hz), 7.41(m, 1H). ¹³C NMR (101 MHz, DMSO) δ 143.03, 130.45, 129.47, 128.77, 127.25.

4-(2-chlorophenyl)-1H-1,2,3-triazole (Scheme 6, entry ii)



¹H NMR (400 MHz, DMSO) δ 8.07 (s, 1H), 7.69 (d, 1H, *J* = 7.8 Hz), 7.59 – 7.50 (m, 3H). ¹³C NMR (101 MHz, DMSO) δ 136.85, 132.82, 131.64, 130.94, 130.37, 130.11, 129.16, 128.24.

¹H and ¹³C NMR of the compounds:

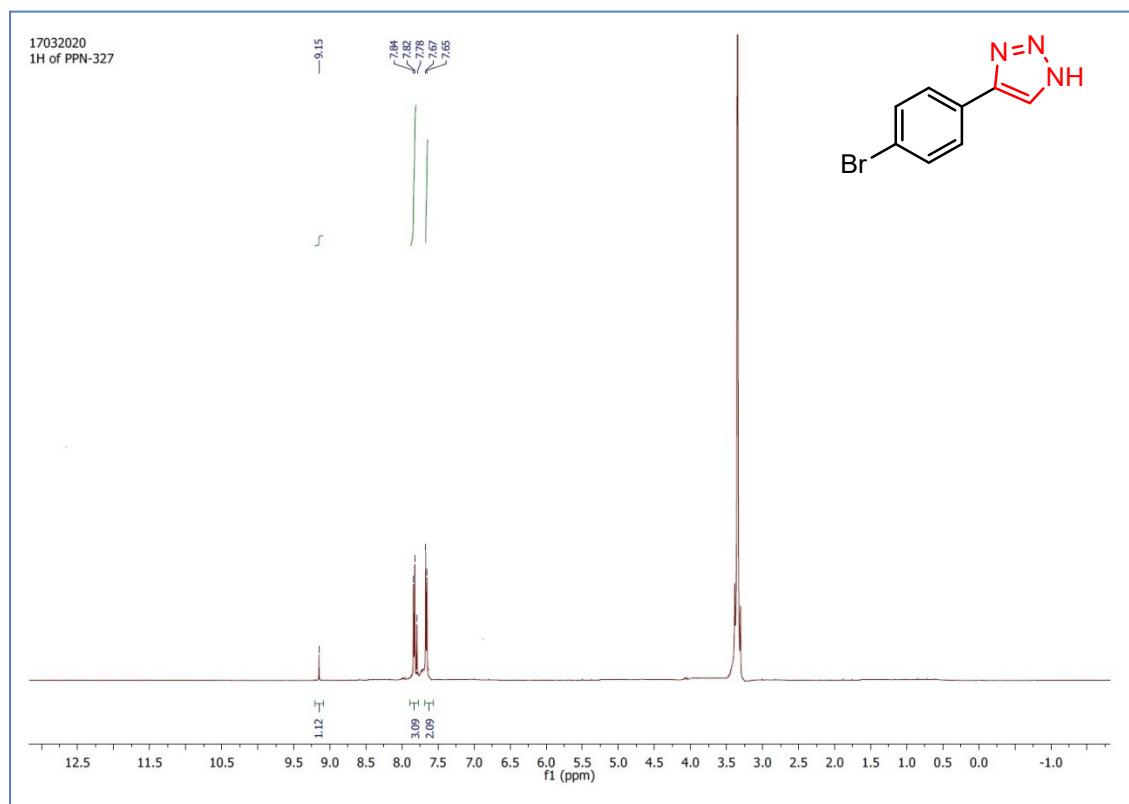


Figure S1: ¹H NMR spectrum of 4-(4-bromophenyl)-1H-1,2,3-triazole

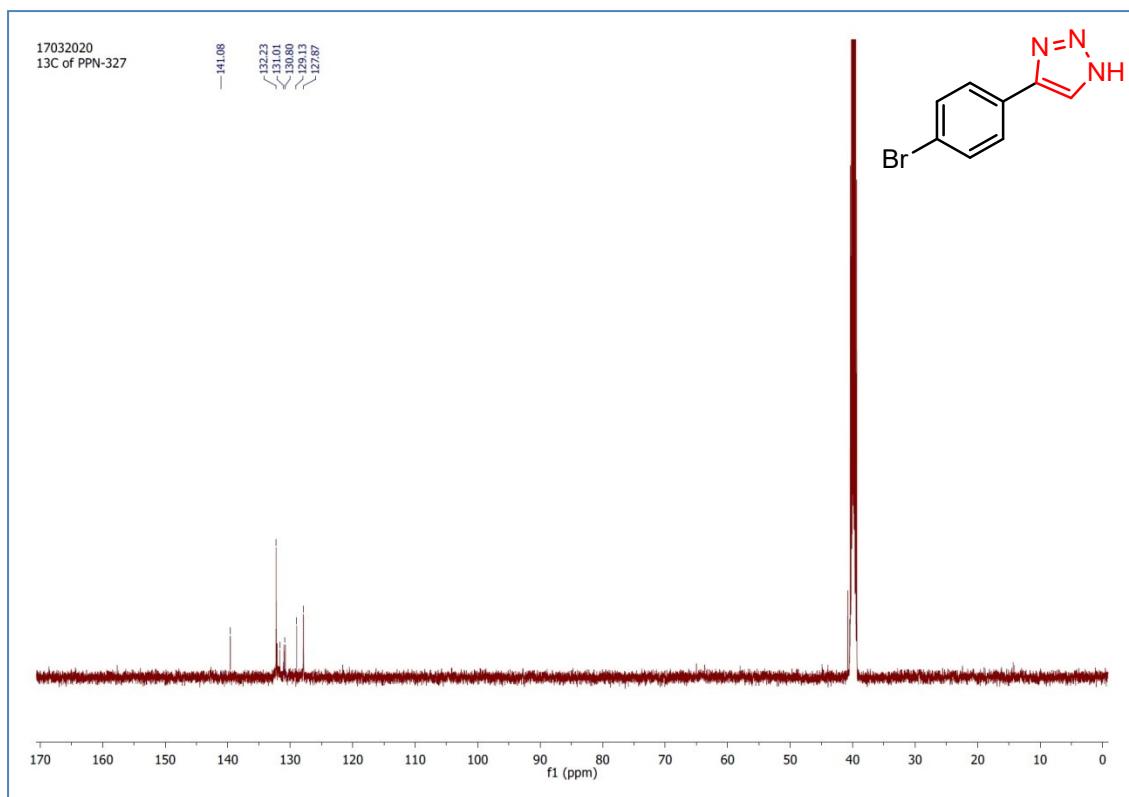


Figure S2: ^{13}C NMR spectrum of 4-(4-bromophenyl)-1*H*-1,2,3-triazole

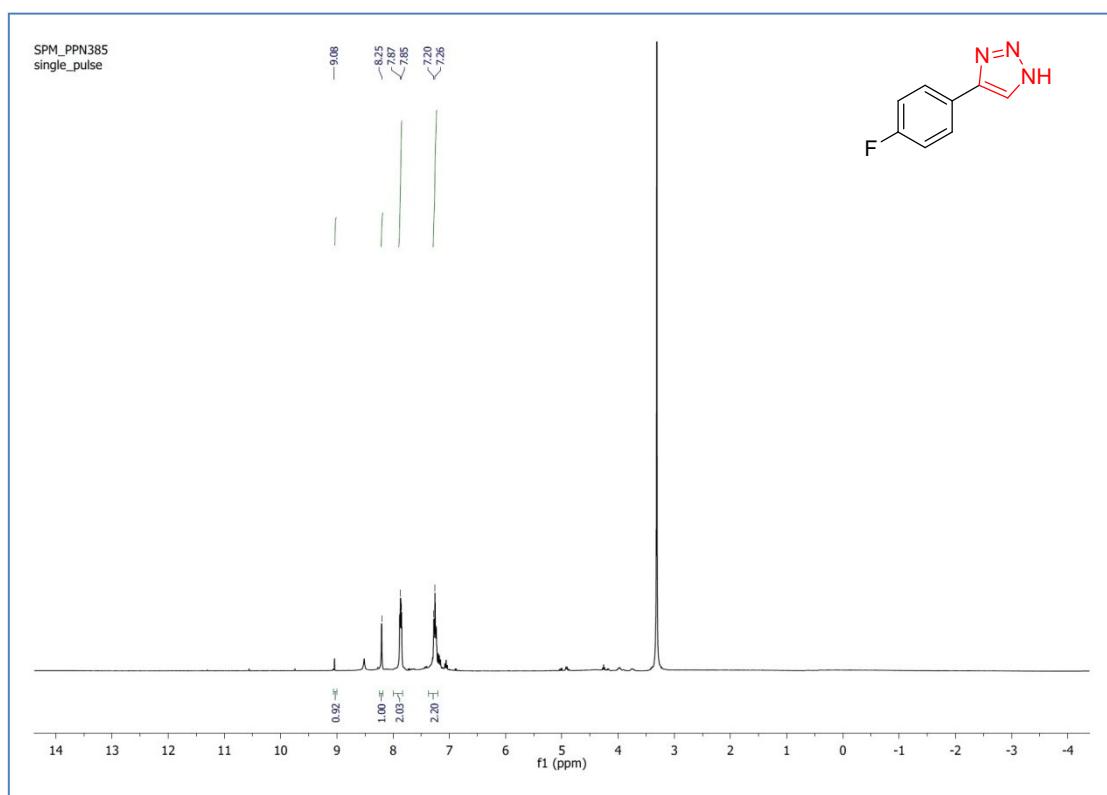


Figure S3: ^1H NMR spectrum of (4-(4-fluorophenyl)-1*H*-1,2,3-triazole)

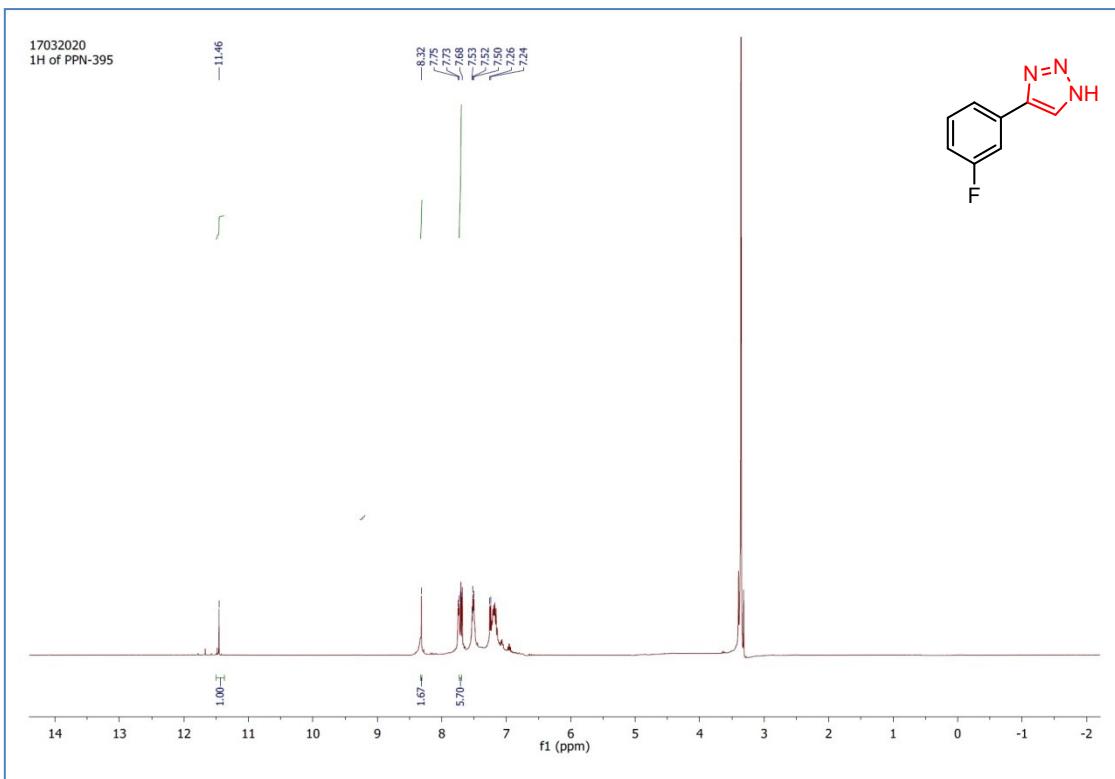


Figure S4: ^1H NMR spectrum of (4-(3-fluorophenyl)-1H-1,2,3-triazole)

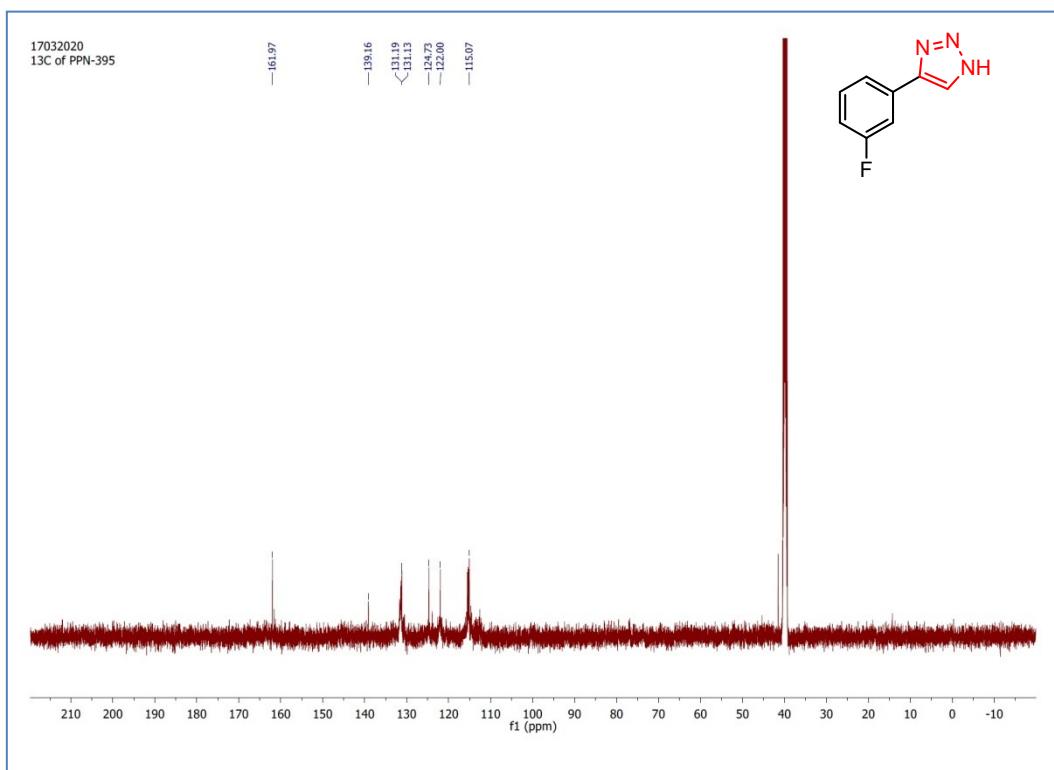


Figure S5: ^{13}C NMR spectrum of (4-(3-fluorophenyl)-1H-1,2,3-triazole)

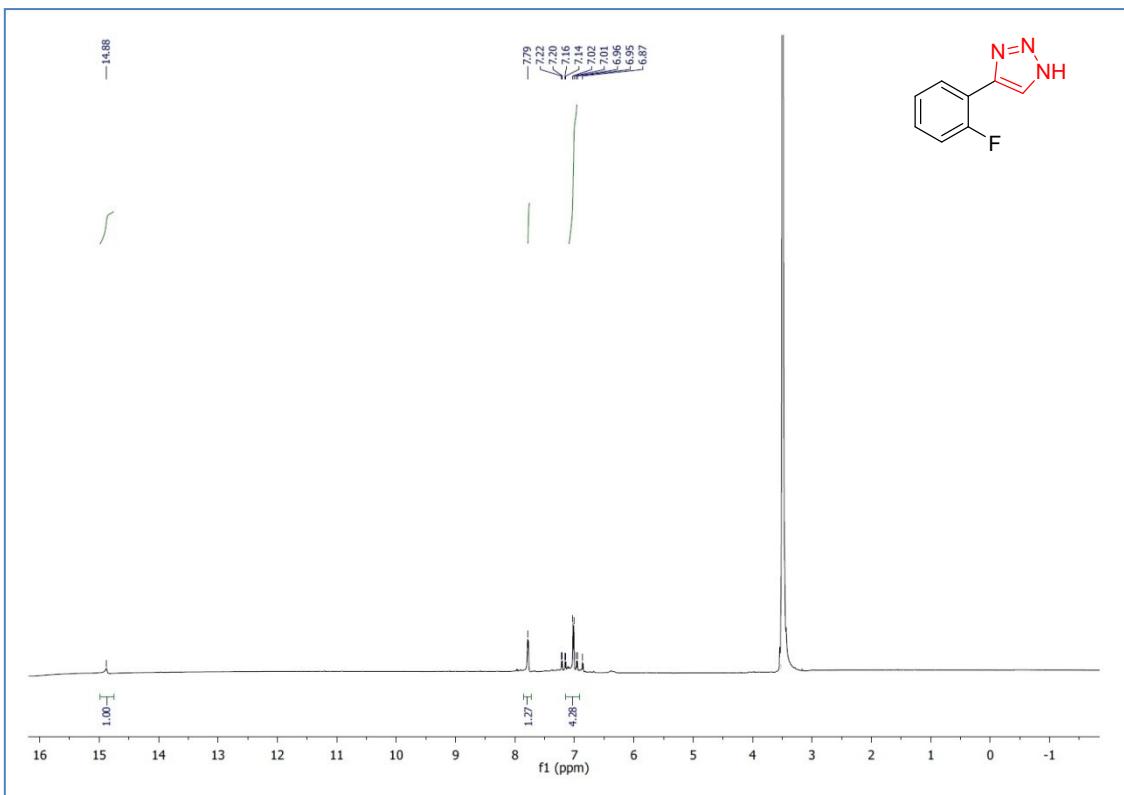


Figure S6: ^1H NMR spectrum of (4-(2-fluorophenyl)-1H-1,2,3-triazole)

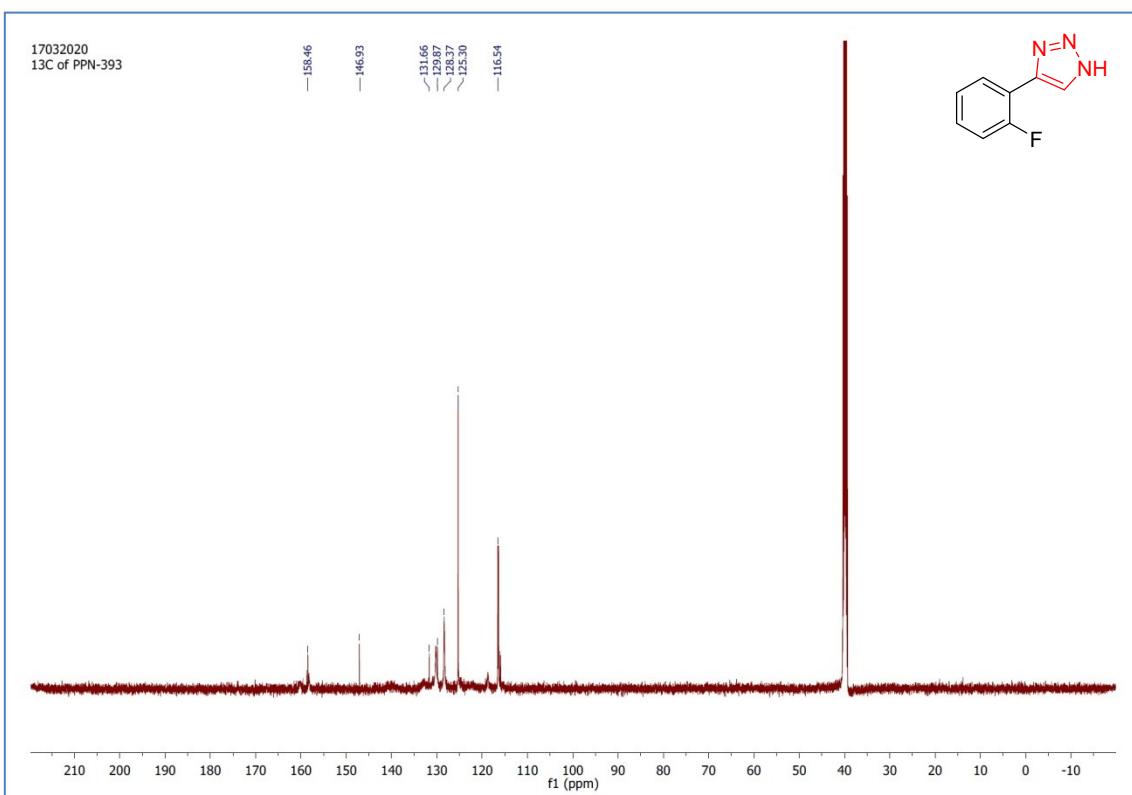


Figure S7: ^{13}C NMR spectrum of (4-(2-fluorophenyl)-1H-1,2,3-triazole)

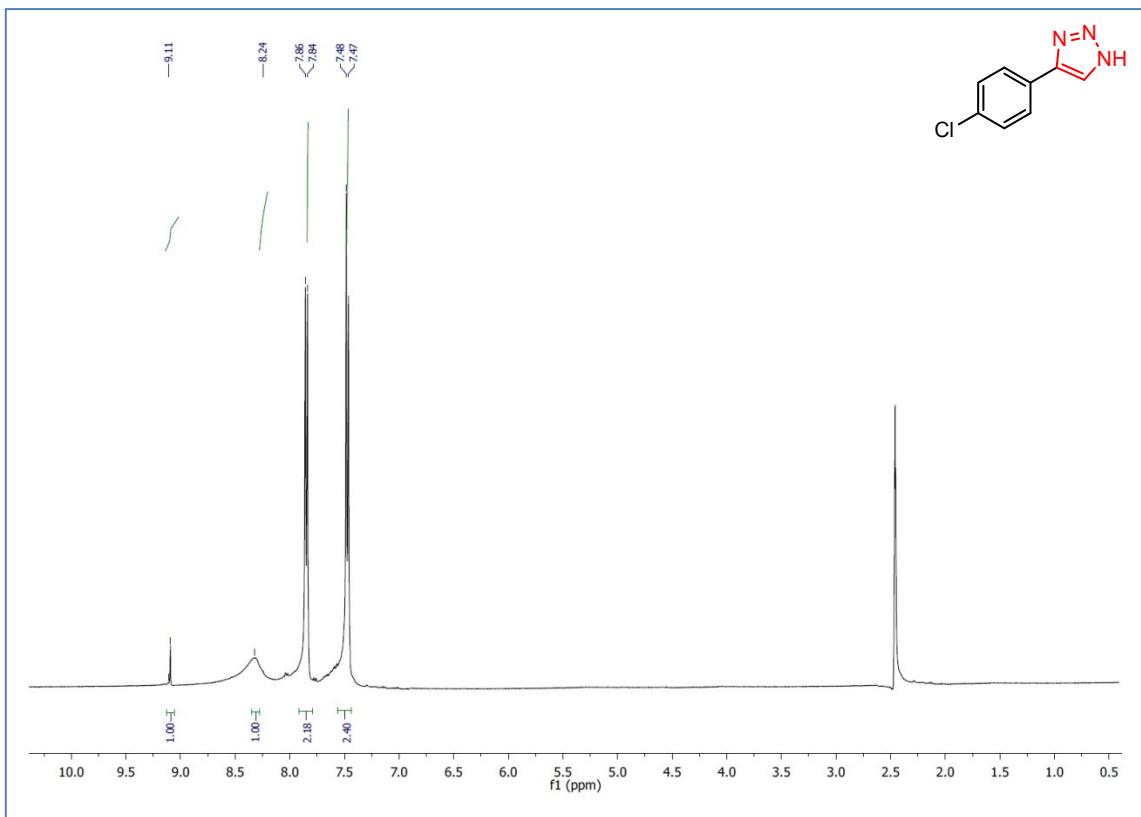


Figure S8: ^1H NMR spectrum of (4-(4-chlorophenyl)-1H-1,2,3-triazole)

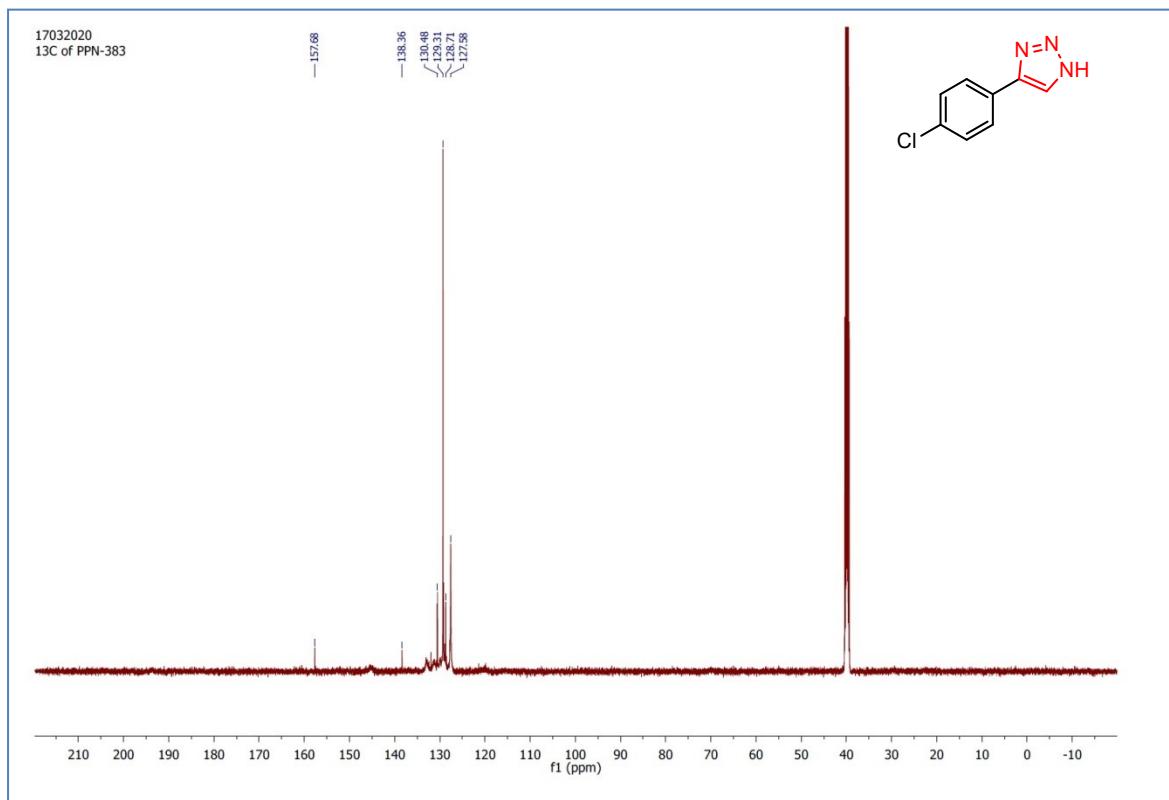


Figure S9: ^{13}C NMR spectrum of (4-(4-chlorophenyl)-1H-1,2,3-triazole)

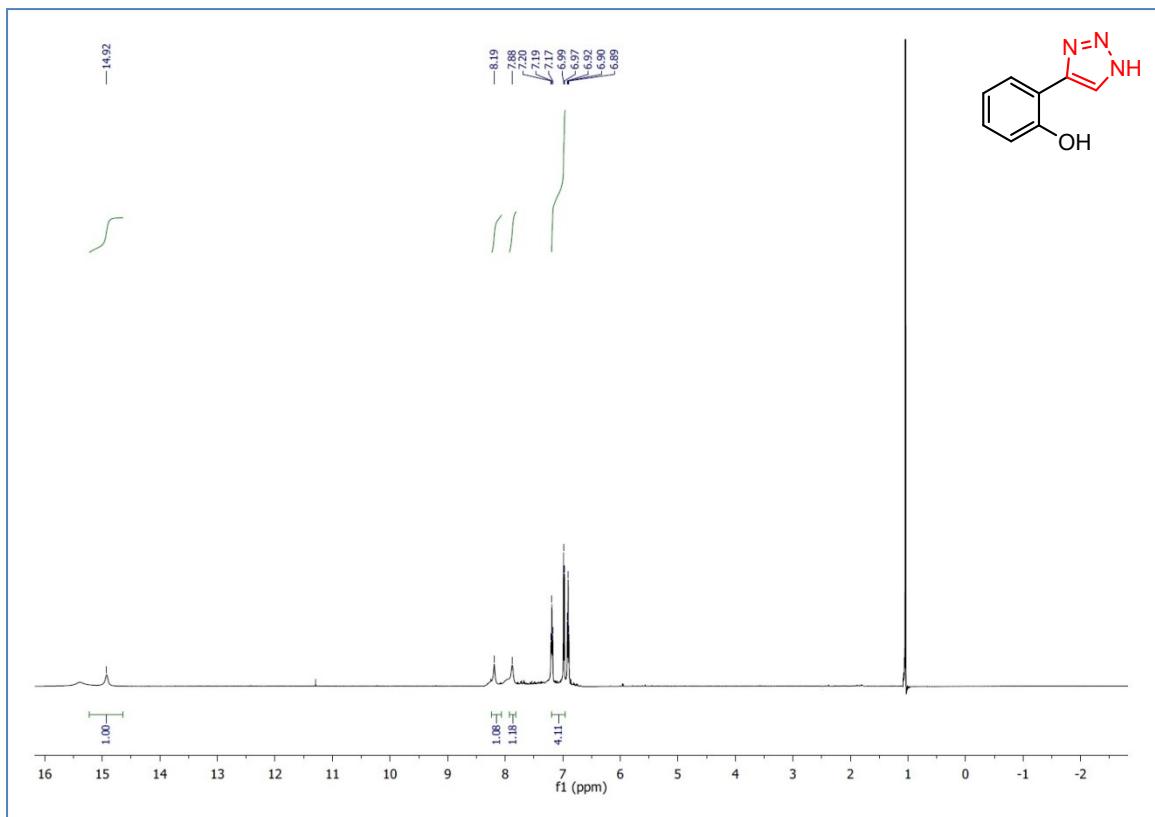


Figure S10: ^1H NMR spectrum of (2-(1H-1,2,3-triazol-4-yl)phenol)

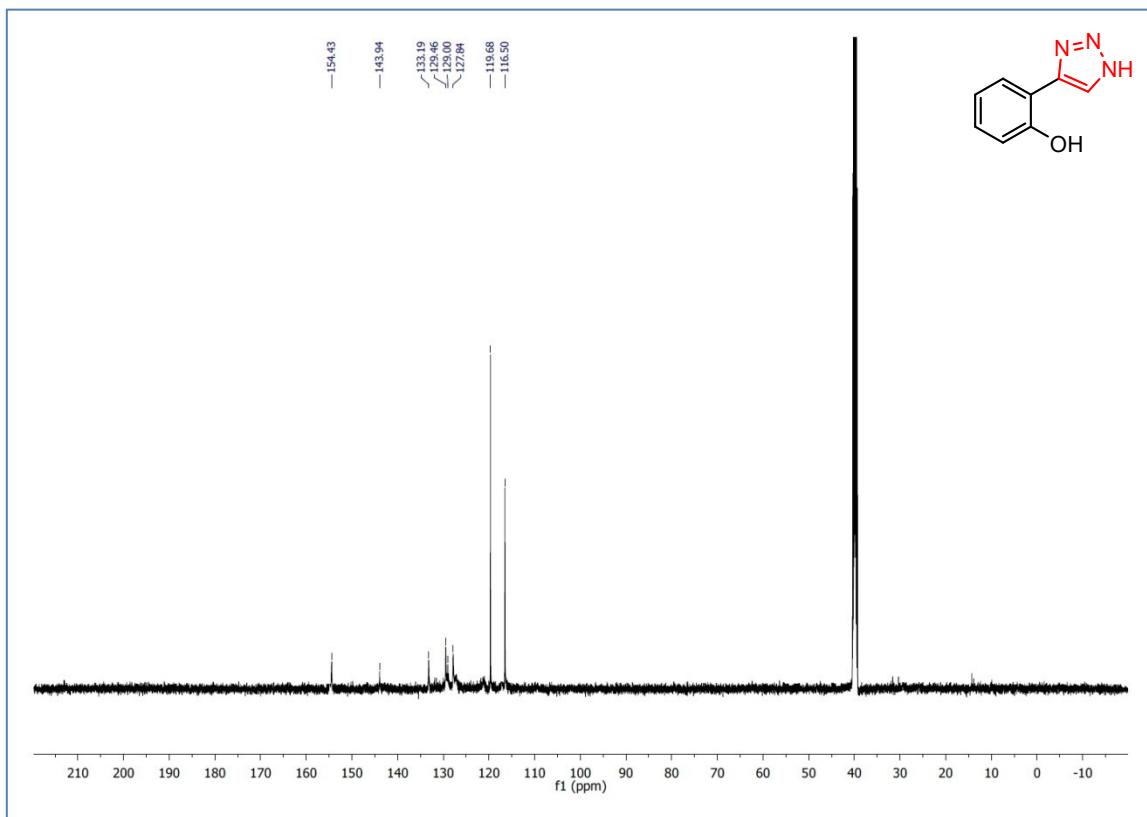


Figure S11: ^{13}C NMR spectrum of (2-(1H-1,2,3-triazol-4-yl)phenol)

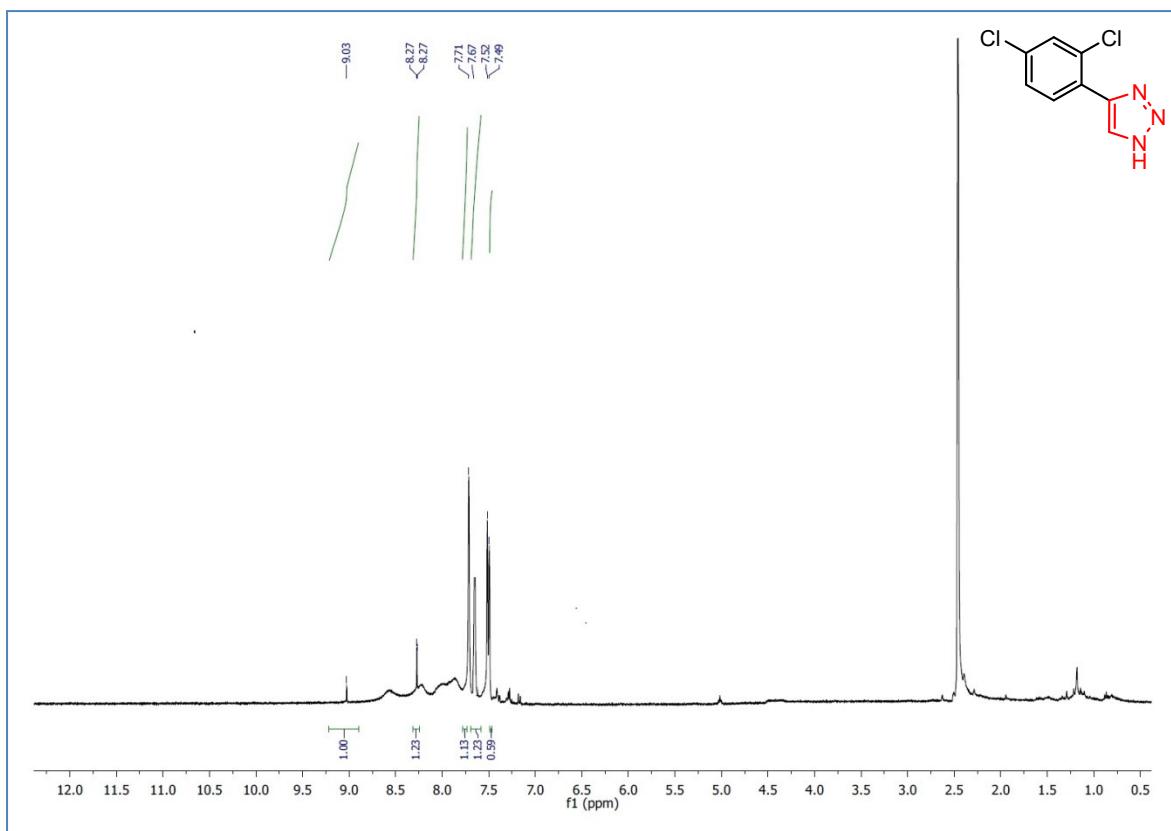


Figure S12: ^1H NMR spectrum of (4-(2,4-dichlorophenyl)-1H-1,2,3-triazole)

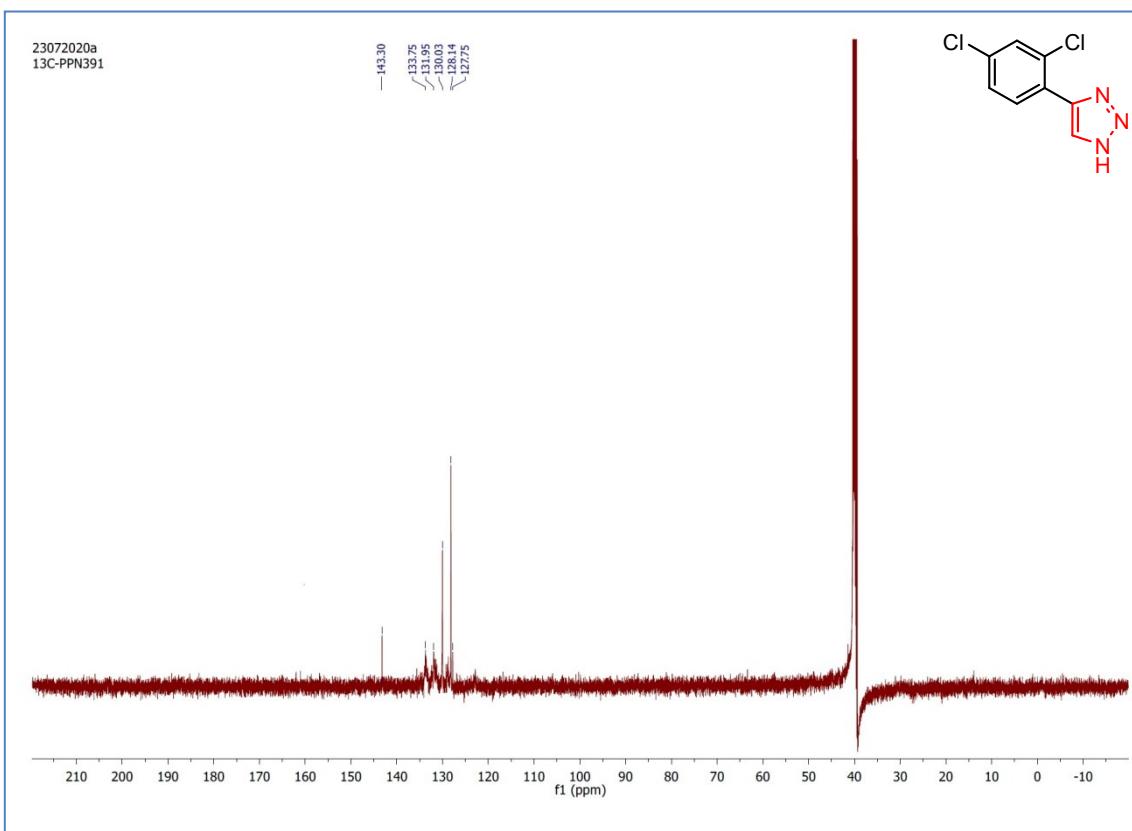


Figure S13: ^{13}C NMR spectrum of (4-(2,4-dichlorophenyl)-1H-1,2,3-triazole)

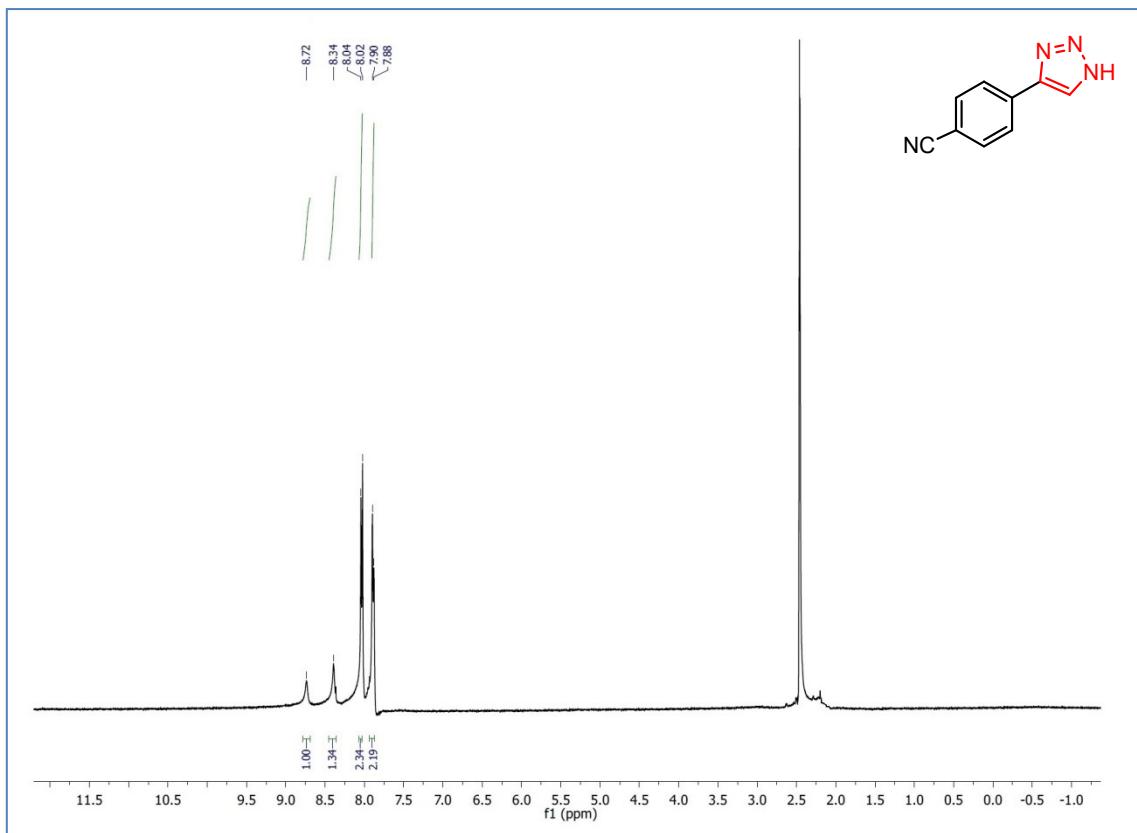


Figure S14: ^1H NMR spectrum of (4-(1H-1,2,3-triazol-4-yl)benzonitrile)

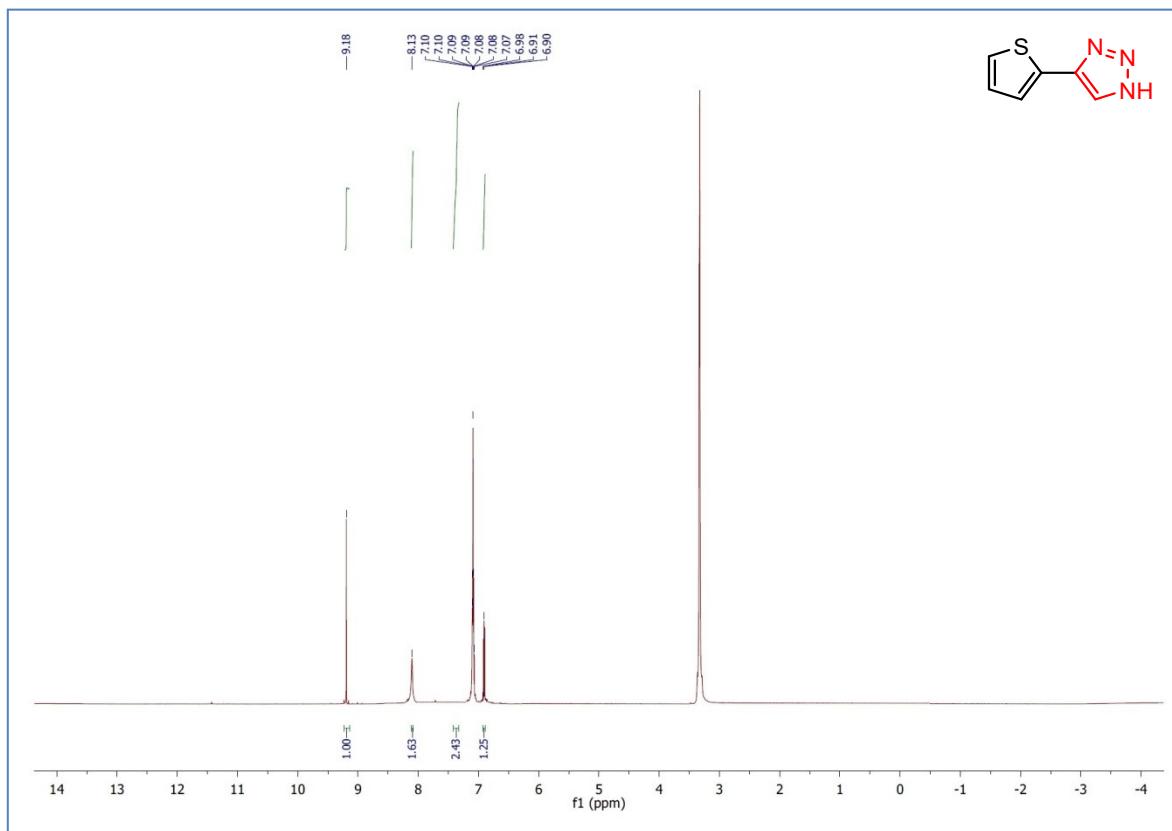


Figure S15: ^1H NMR spectrum of (4-(thiophen-2-yl)-1H-1,2,3-triazole)

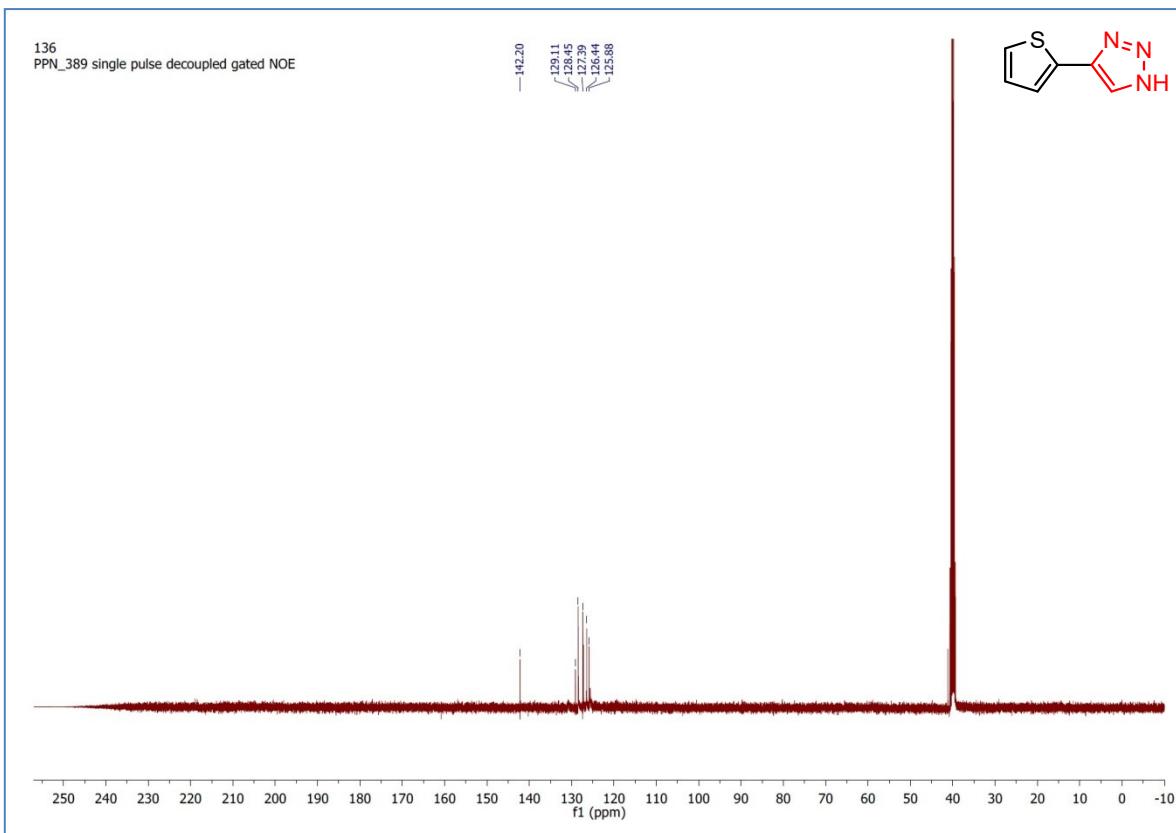


Figure S16: ¹³C NMR spectrum of (4-(thiophen-2-yl)-1H-1,2,3-triazole)

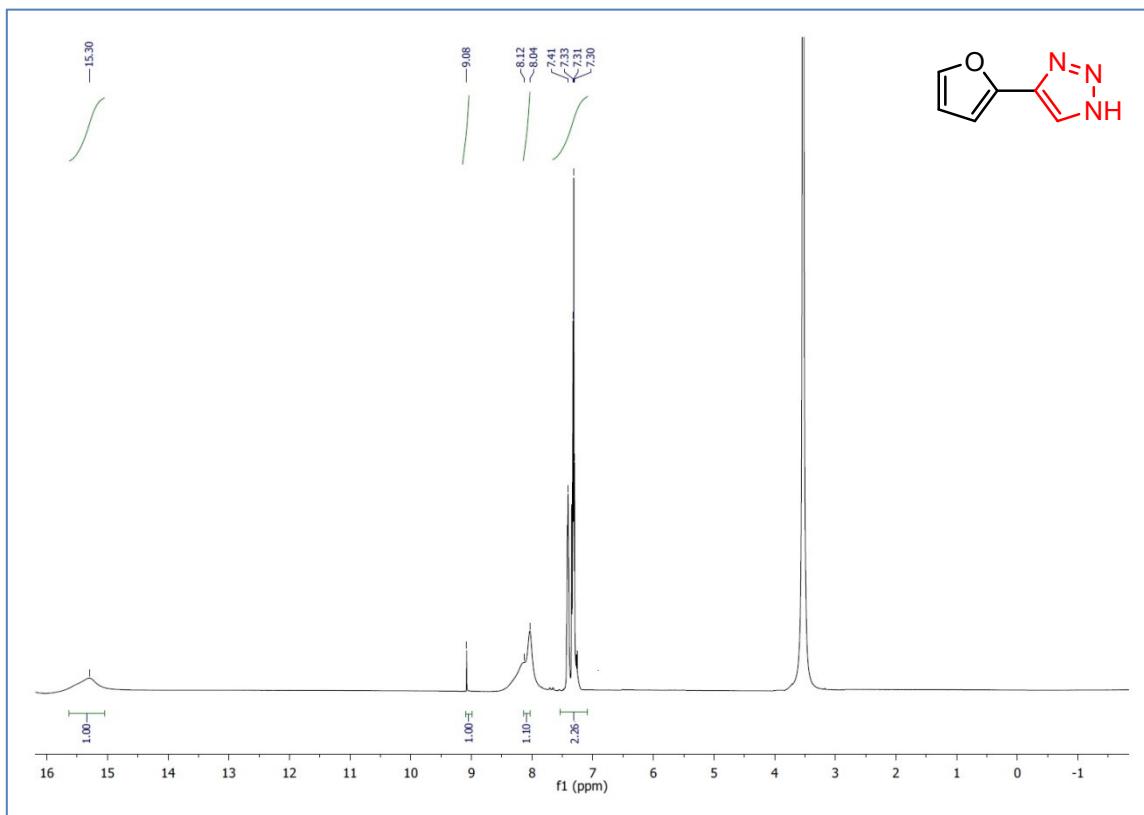


Figure S17: ¹H NMR spectrum of (4-(furan-2-yl)-1H-1,2,3-triazole)

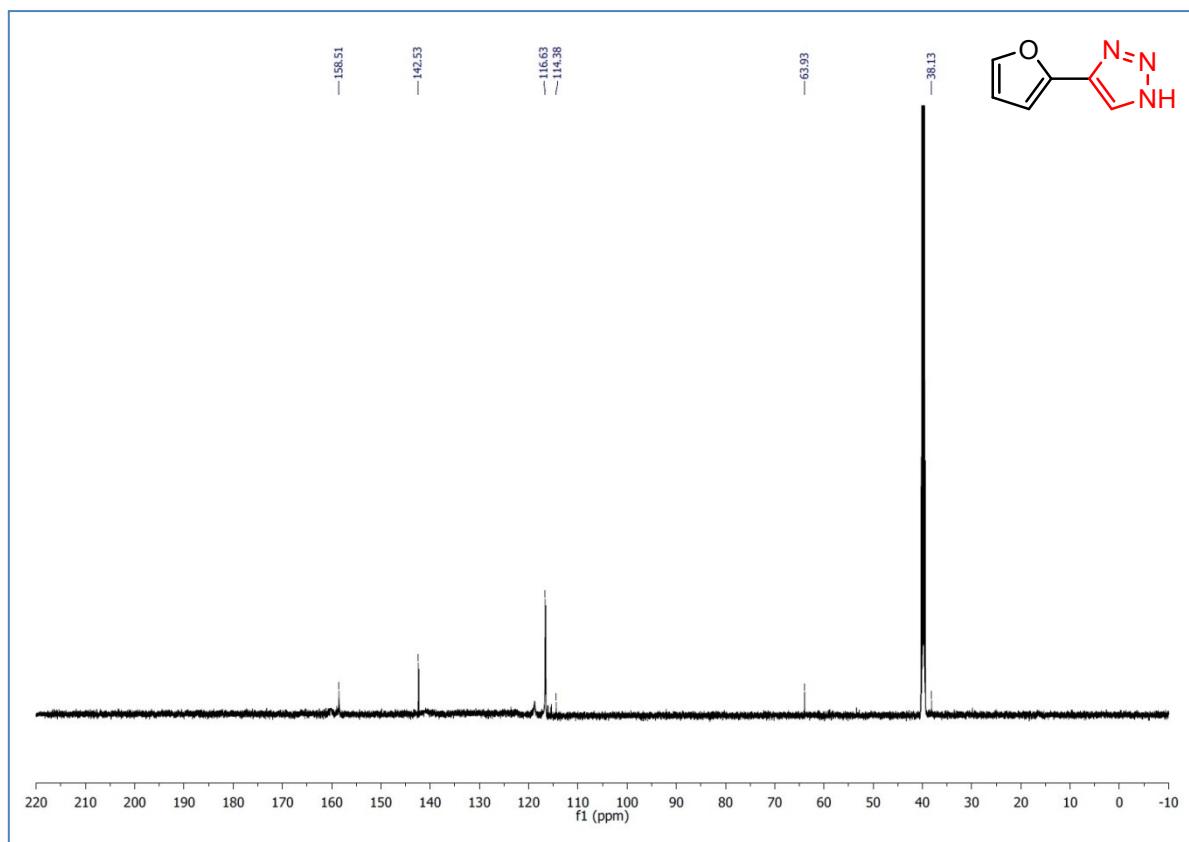


Figure S18: ^{13}C NMR spectrum of (4-(furan-2-yl)-1H-1,2,3-triazole)

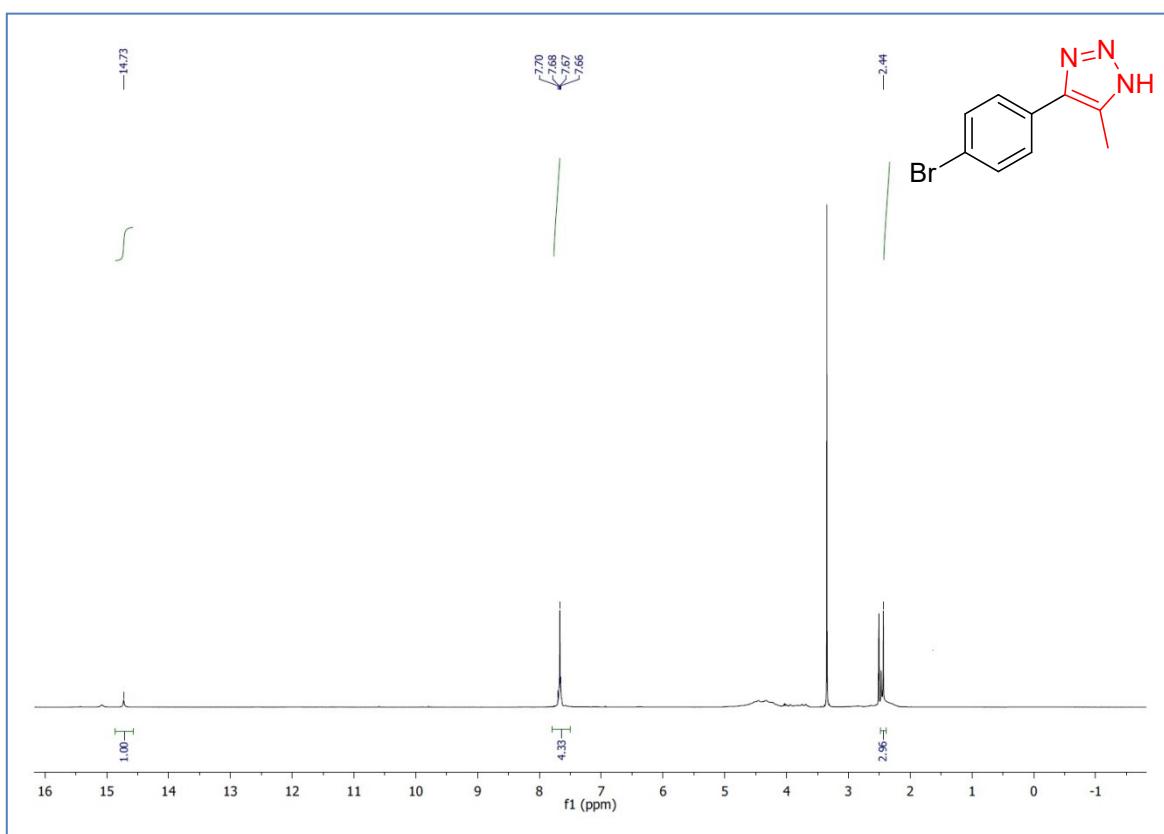


Figure S19: ^1H NMR spectrum of (4-(4-bromophenyl)-5-methyl-1H-1,2,3-triazole)

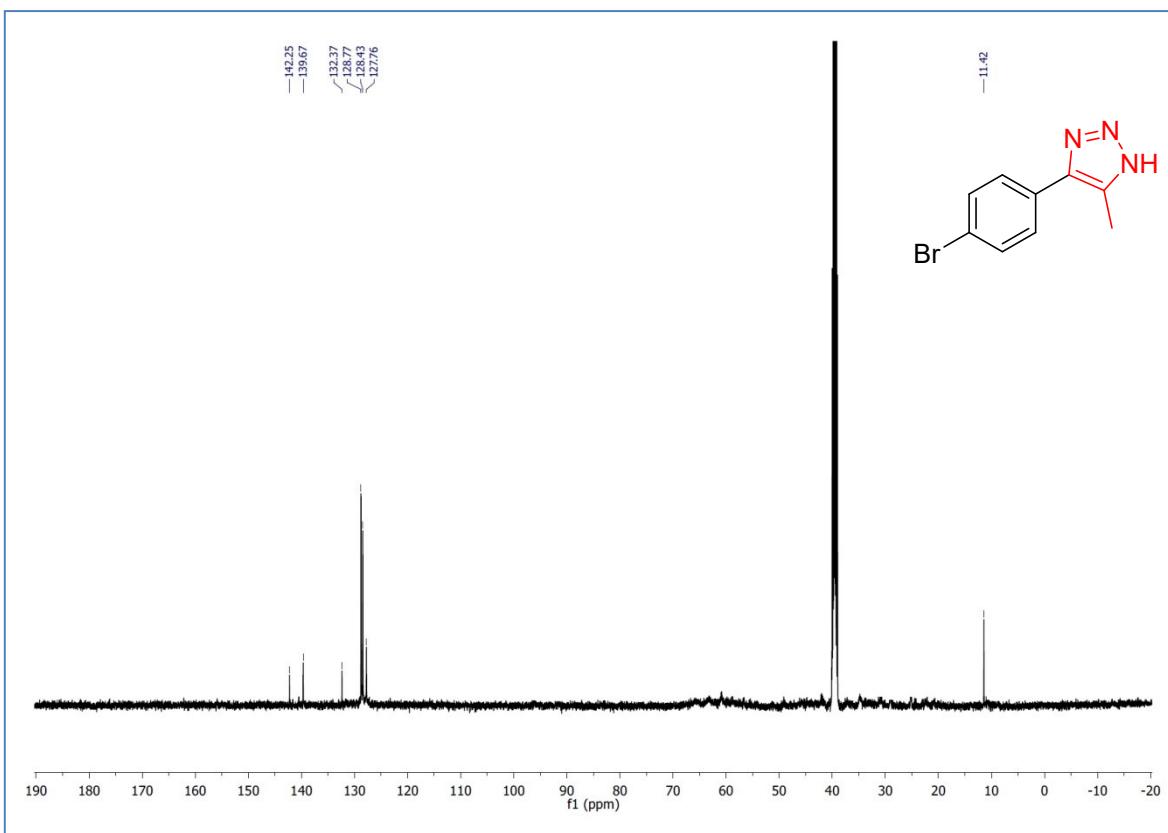


Figure S20: ¹³C NMR spectrum of (4-(4-bromophenyl)-5-methyl-1H-1,2,3-triazole)

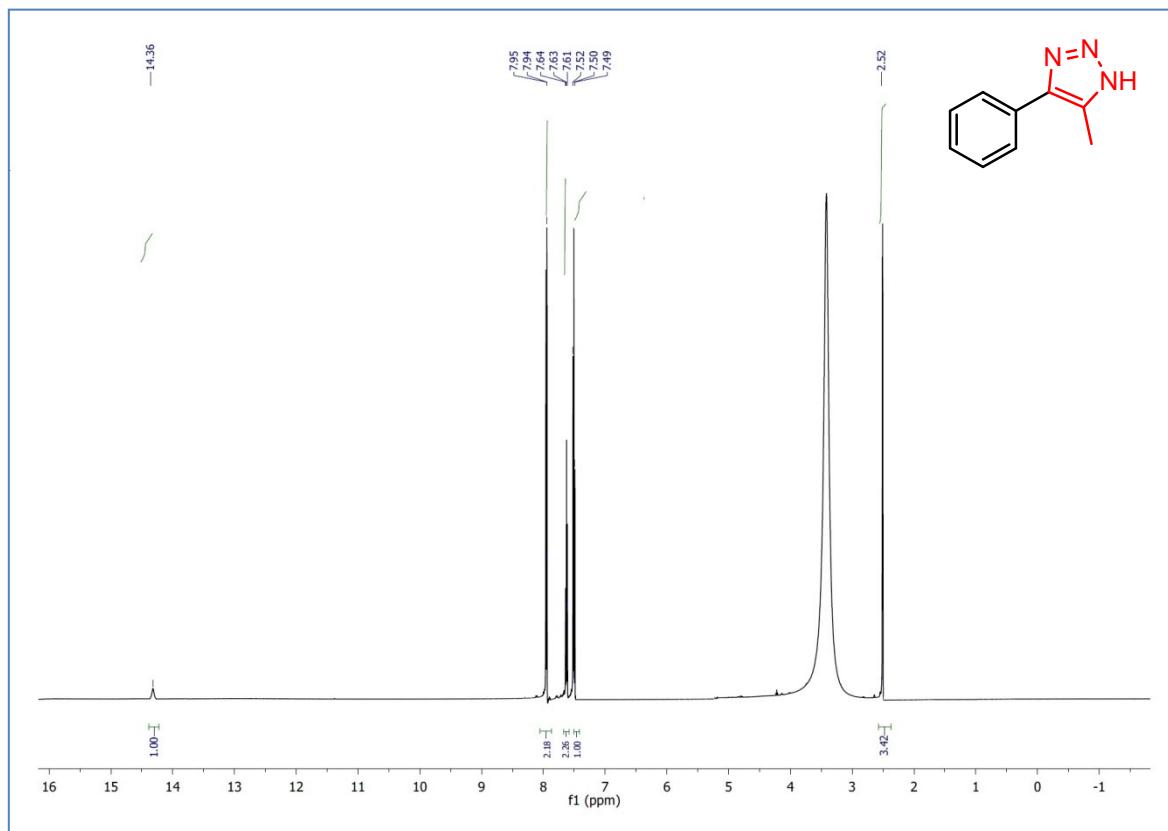


Figure S21: ¹H NMR spectrum of (5-methyl-4-phenyl-1H-1,2,3-triazole)

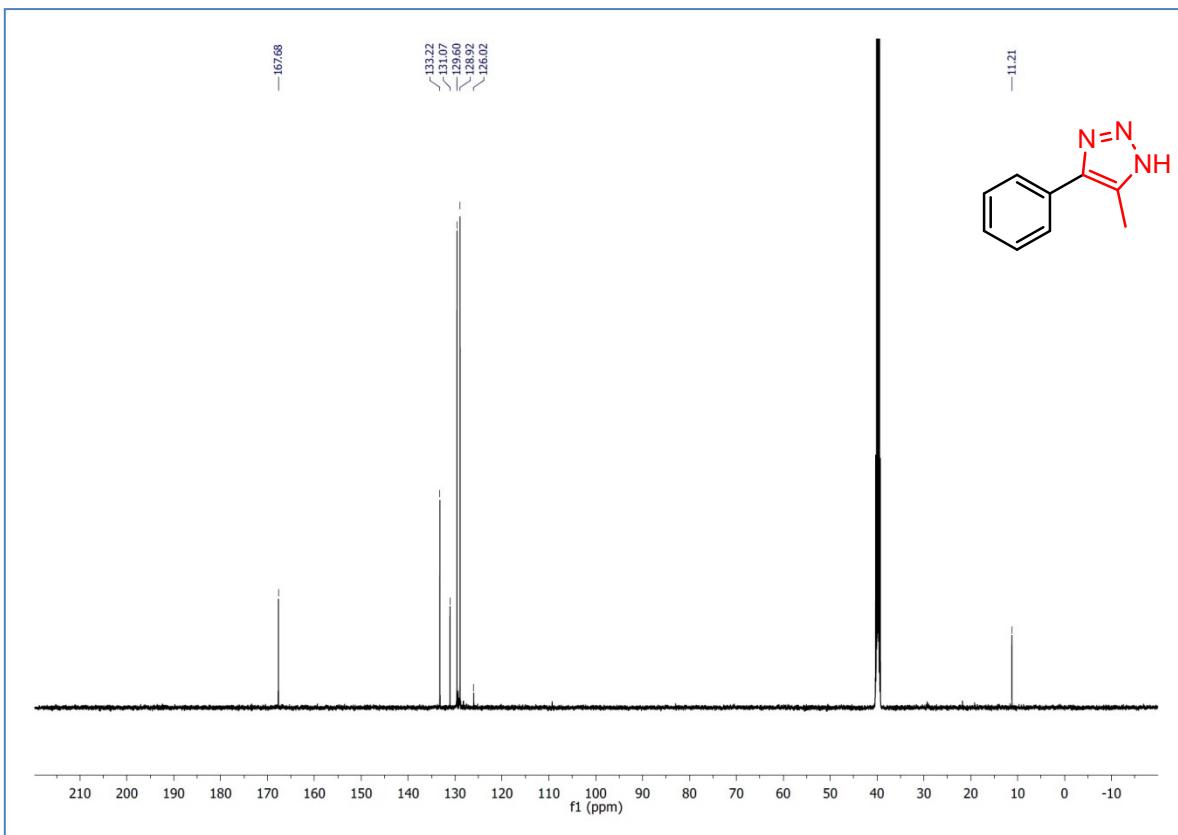


Figure S22: ^{13}C NMR spectrum of (5-methyl-4-phenyl-1H-1,2,3-triazole)

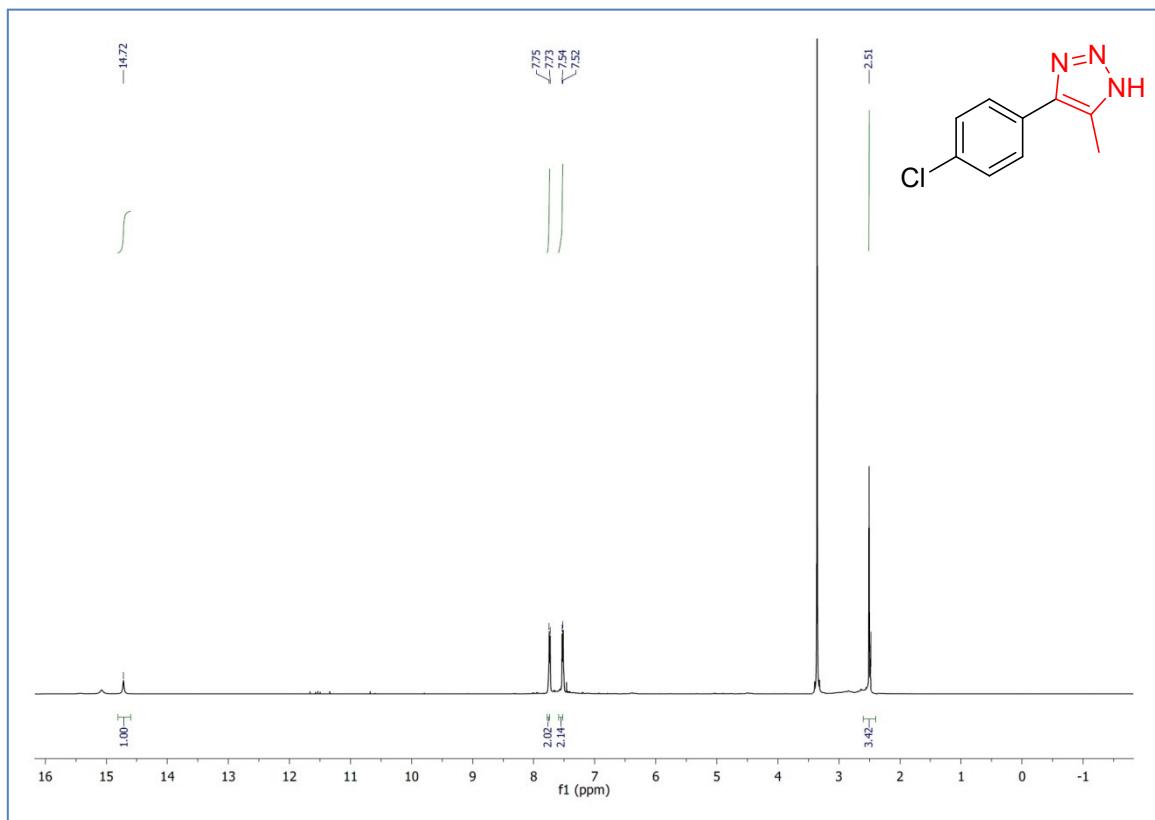


Figure S23: ^1H NMR spectrum of (4-(4-chlorophenyl)-5-methyl-1H-1,2,3-triazole)

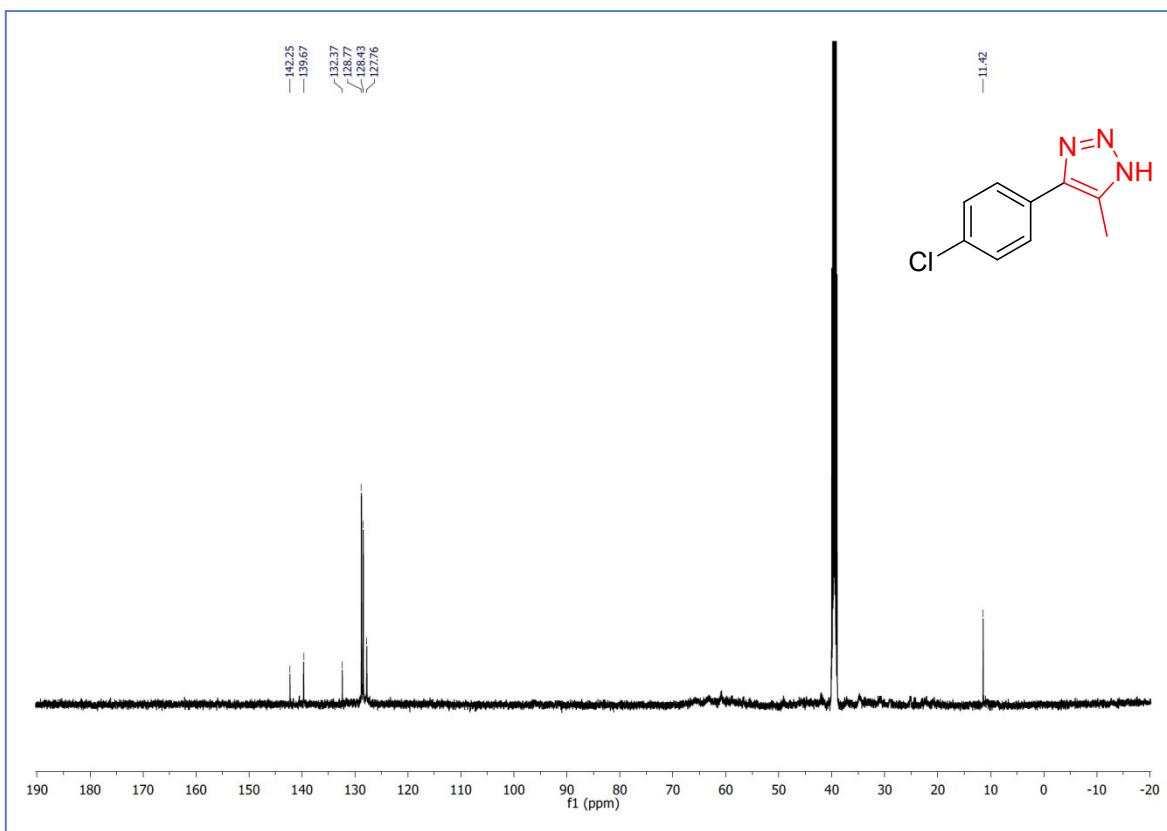


Figure S24: ^{13}C NMR spectrum of (4-(4-chlorophenyl)-5-methyl-1H-1,2,3-triazole)

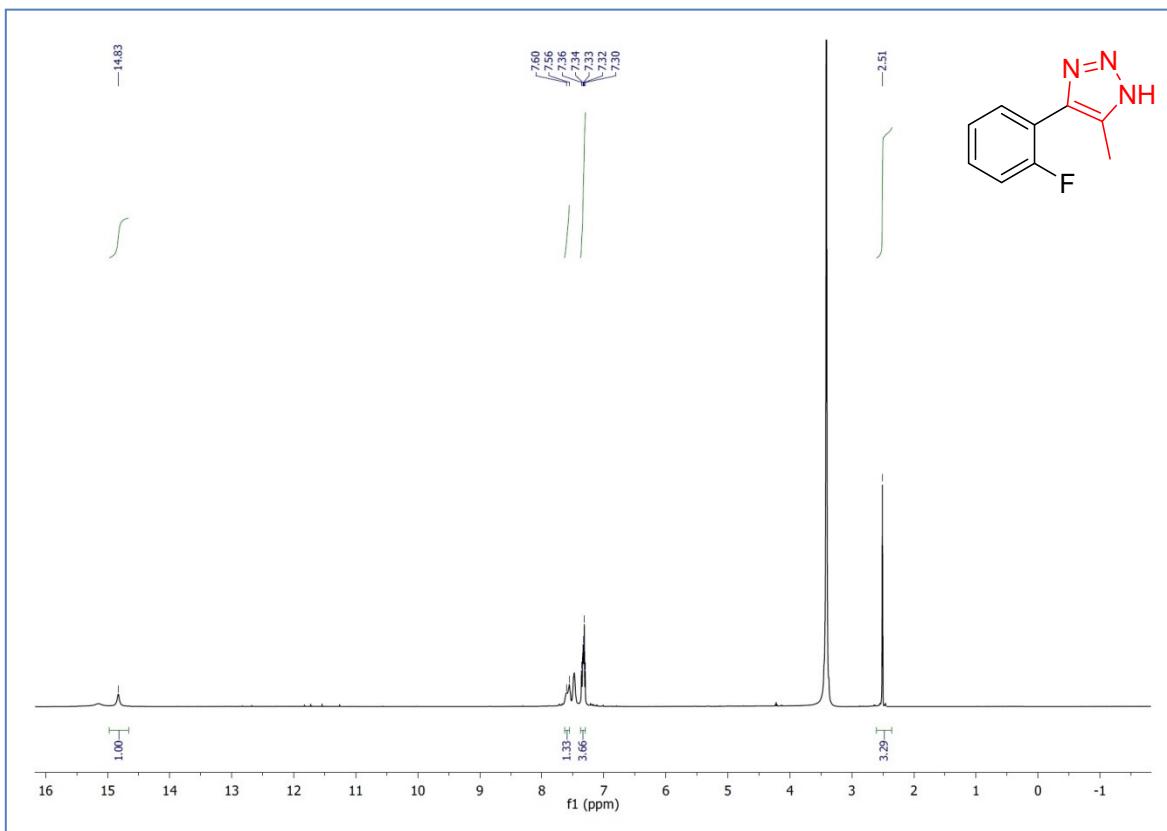


Figure S25: ^1H NMR spectrum of (4-(2-fluorophenyl)-5-methyl-1H-1,2,3-triazole)

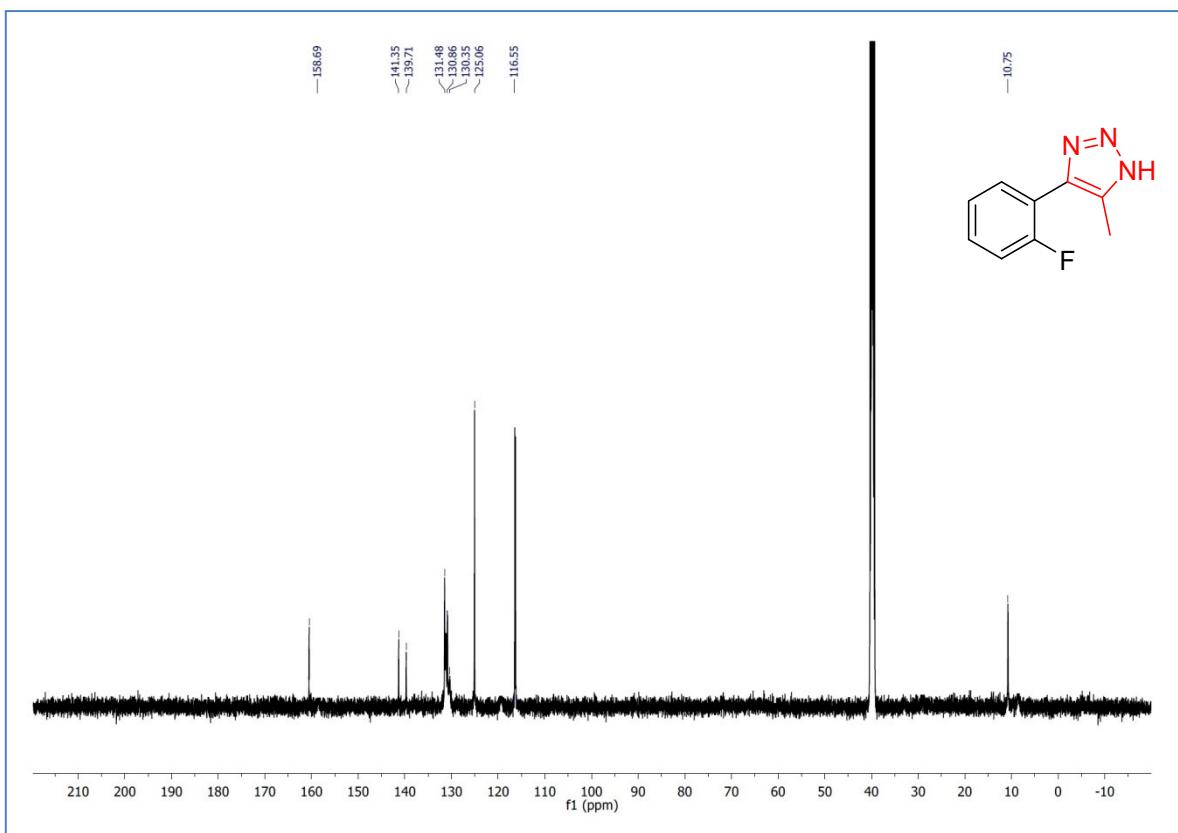


Figure S26: ^{13}C NMR spectrum of (4-(2-fluorophenyl)-5-methyl-1H-1,2,3-triazole)

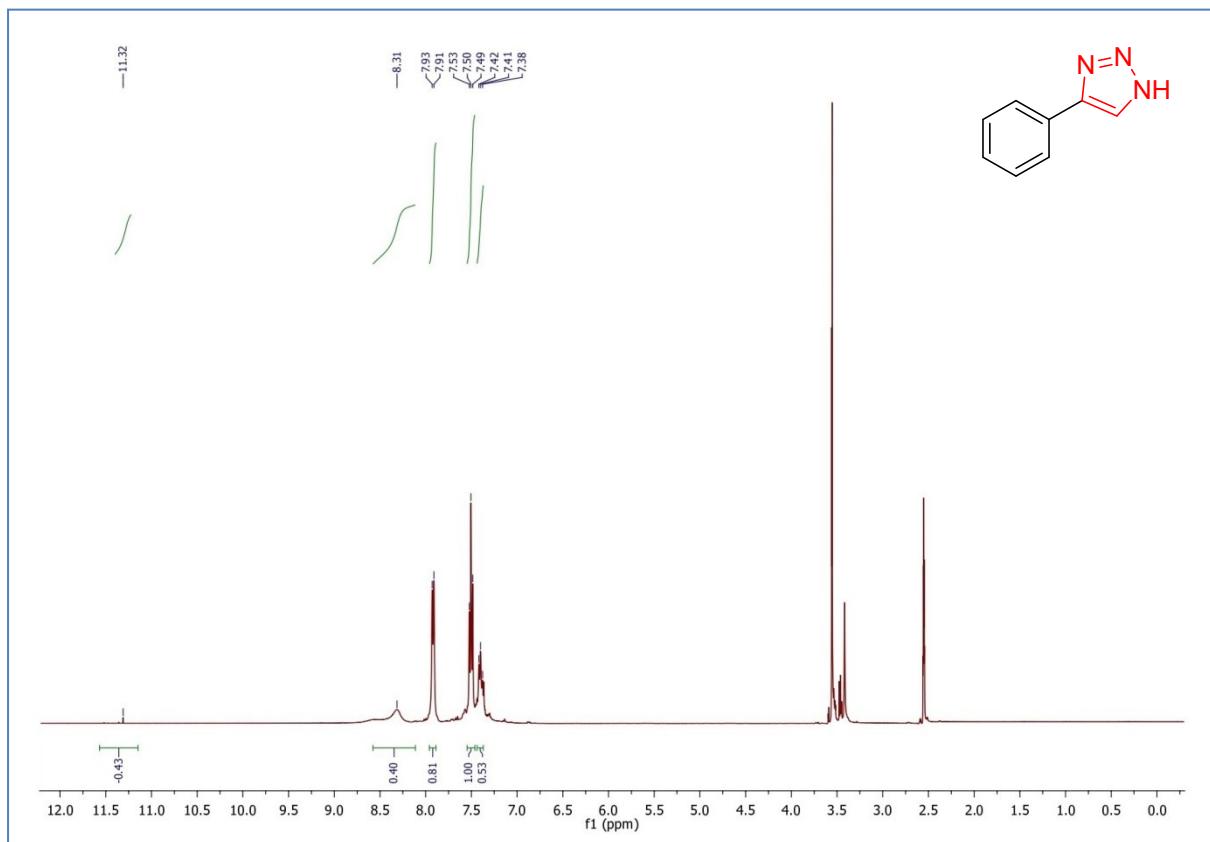


Figure S27: ^1H NMR spectrum of 4-phenyl-1H-1,2,3-triazole

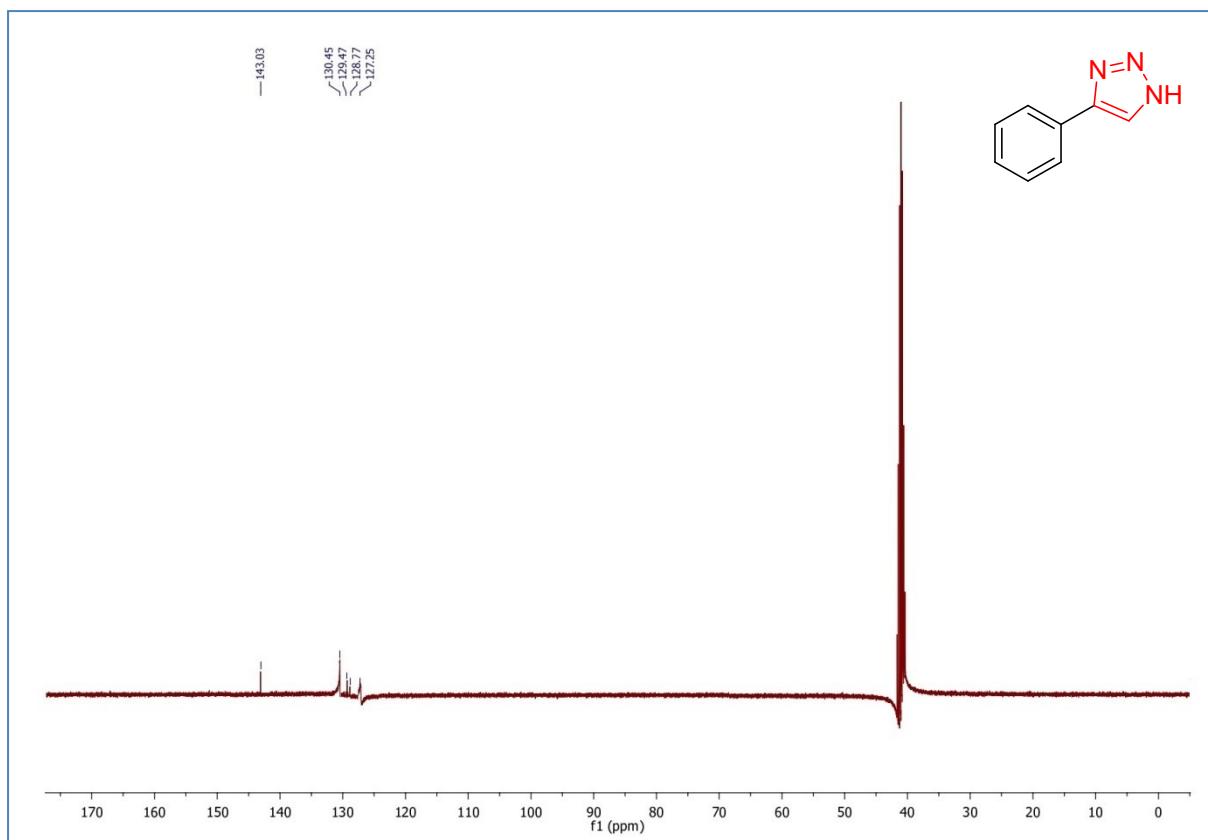


Figure S28: ^{13}C NMR spectrum of 4-phenyl-1H-1,2,3-triazole

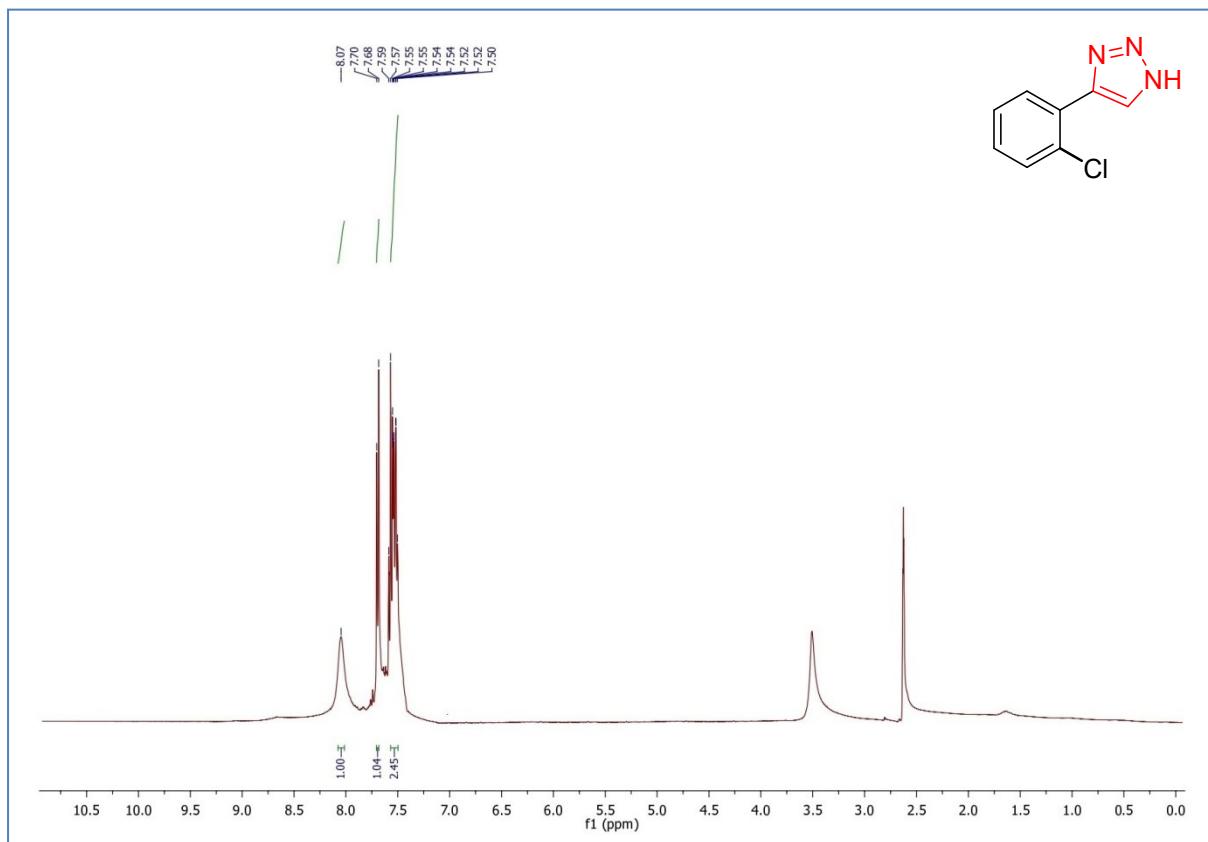


Figure S29: ^1H NMR spectrum of 4-(2-chlorophenyl)-1H-1,2,3-triazole

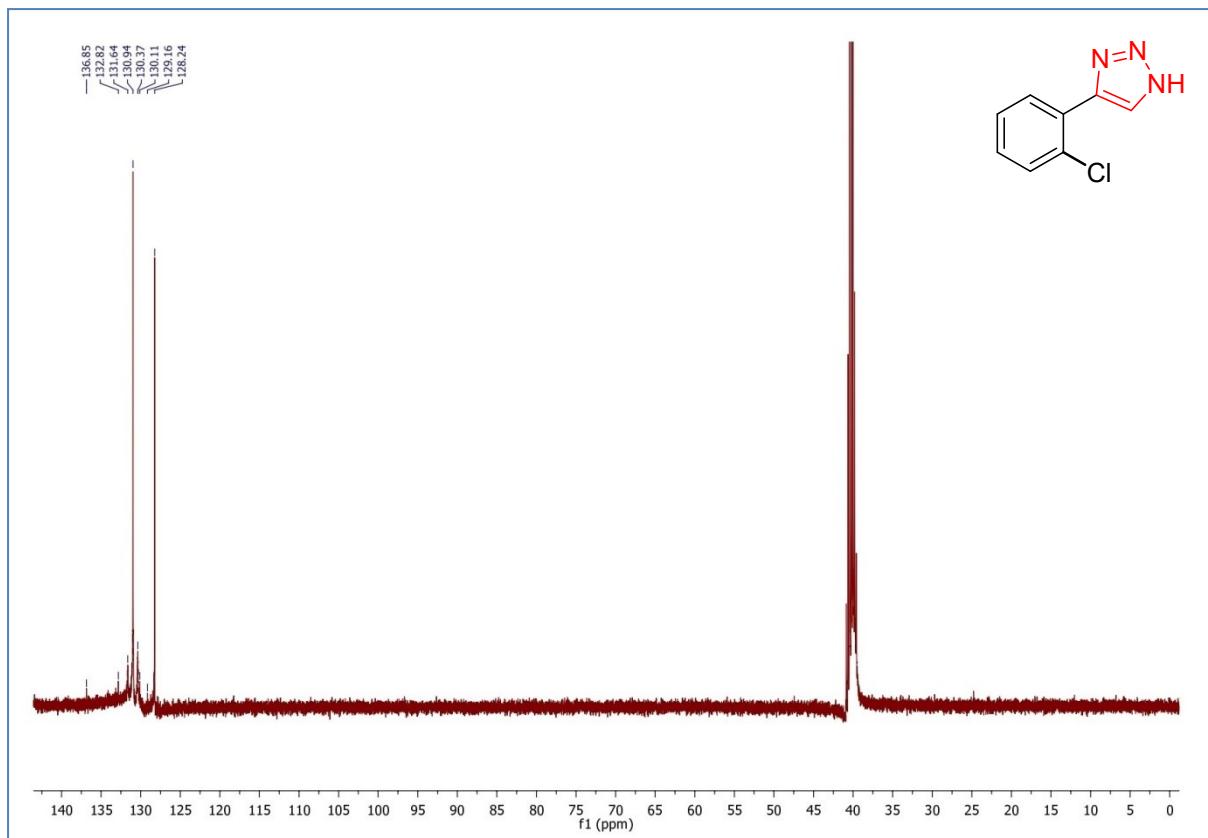


Figure S30: ^{13}C NMR spectrum of 4-(2-chlorophenyl)-1H-1,2,3-triazole