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Supporting Information

Copper foam as a catalyst for azide-alkyne cycloaddition of organosilicon molecules

*Kseniya A. Bezlepkina[a,b], Irina I. Belikova[a,c], Vasilissa A. Aristova[a,c], Sofia N. Ardabevskaia[a,b], Ksenia S. Klokova[a], Petr D. Shkinev[a], Inga V. Frank[c,e], Ulyana S. Andropova[a], Fedor V. Drozdov[a,b,d], Sergey A. Milenin[a,b]**

a- Enikolopov Institute of Synthetic Polymeric Materials of Russian Academy of Sciences, 117393, Moscow, Russian Federation

b- Research Laboratory of New Silicone Materials and Technologies, Tula State Lev Tolstoy Pedagogical University, 300026 Tula, Russia

c-Center for Advanced Studies, 20 Kulakova Str, Moscow, Russia

d- Scientific-Educational Centre "Soft matter and physics of fluids", Bauman Moscow State Technical University, 2nd Baumanskaya Street 5, Moscow 105005, Russia.

e- A. N. Nesmeyanov Institute of Organoelement Compounds, RAS, 119991, Moscow, Russia

KEYWORDS (Word Style "BG_Keywords"). Cu(I) catalyzed azide-alkyne cycloaddition (CuAAC), Organosilicon compounds, functional polysiloxanes, functional silanes, copper foam

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1. Synthesis of 3-azidopropylheptamethyltrisiloxane

A mixture of 6.6 g (22 mmol) 3-chlorpropylheptamethyltrisiloxane, 1.7 g (26 mmol) sodium azide, 14 ml DMF and 0.1 mass.% TBAI as a catalyst was stirred for 6-8 h at 80 °C. The conversion was monitored using ^{1}H NMR. The resulting solution was dissolved in hexane and washed by water for three times and dry over sodium sulfate anhydrous. The solvent was removed under reduced pressure 6.4 g (yield ~ 95 %) of a colorless transparent liquid were obtained. ^{1}H NMR (300 MHz, $CDCl_3$): δ 3.25-3.19 (m, 2H, CH_2N_3), 1.67-1.53 (m, 2H, CH_2-CH_2-N_3), 0.53-0.46 (m, 2H, CH_2-CH_2-CH_2-N_3), 0.09 (m, 3H, CH_3).

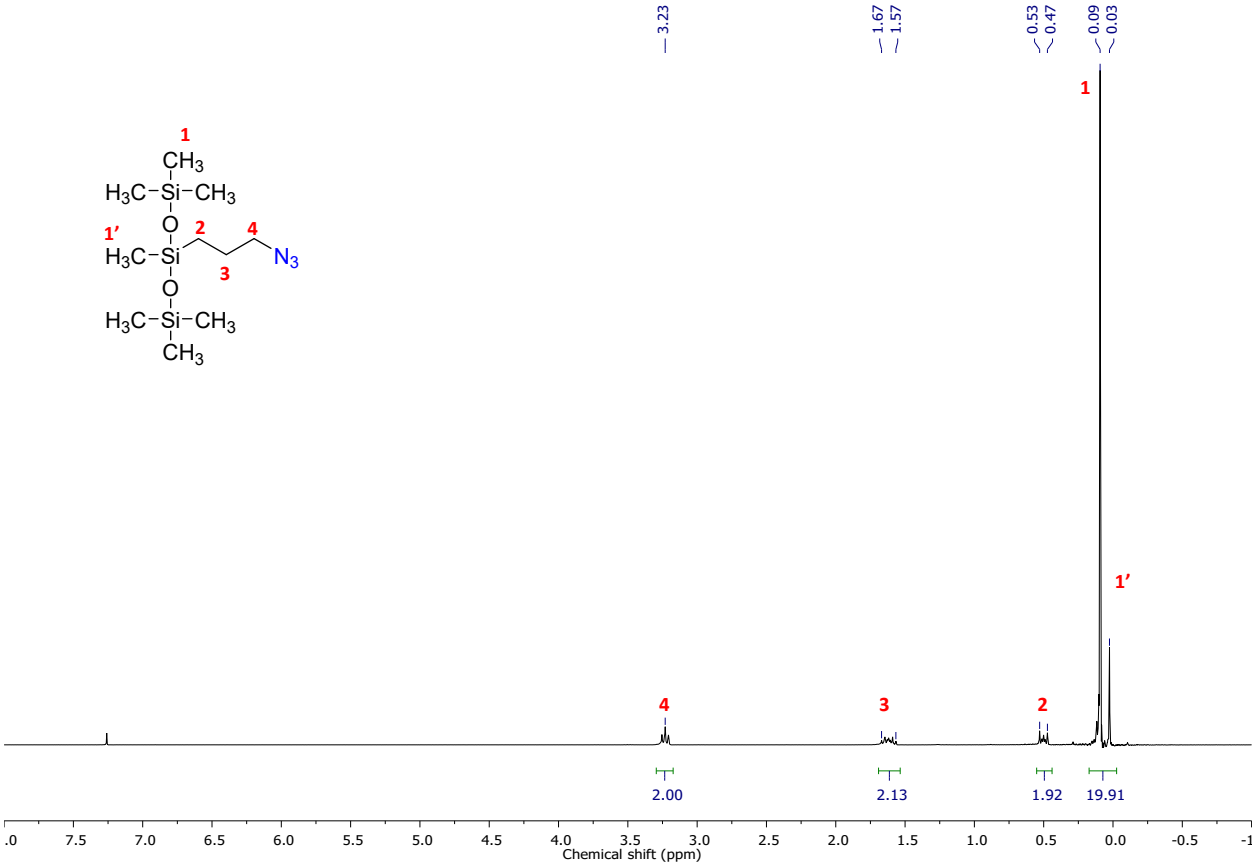

Figure S1. ^{1}H NMR spectra of 3-azidopropylheptamethyltrisiloxane

2. NMR spectra, GPC curves and MALDI-TOF of functional silanes

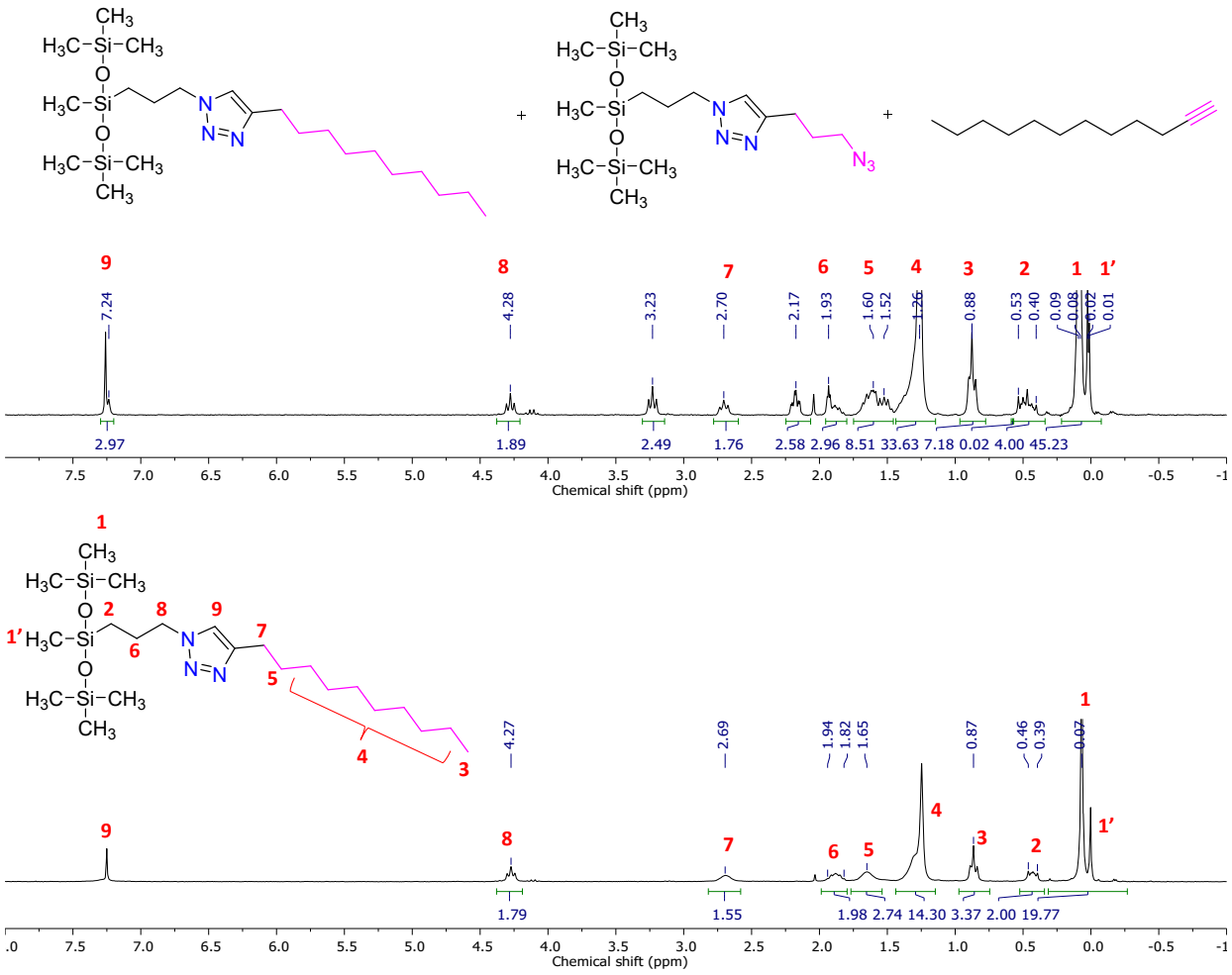

Figure S2. ^{1}H NMR spectra of 4-decyl-1-(3-(1,1,1,3,5,5,5-heptamethyltrisiloxan-3-yl)propyl)-1H-1,2,3-triazole and 4-decyl-1-(3-(1,1,1,3,5,5,5-heptamethyltrisiloxan-3-yl)propyl)-1H-1,2,3-triazole with (3-azidopropyl)heptamethyltrisiloxane and dodec-1-yne

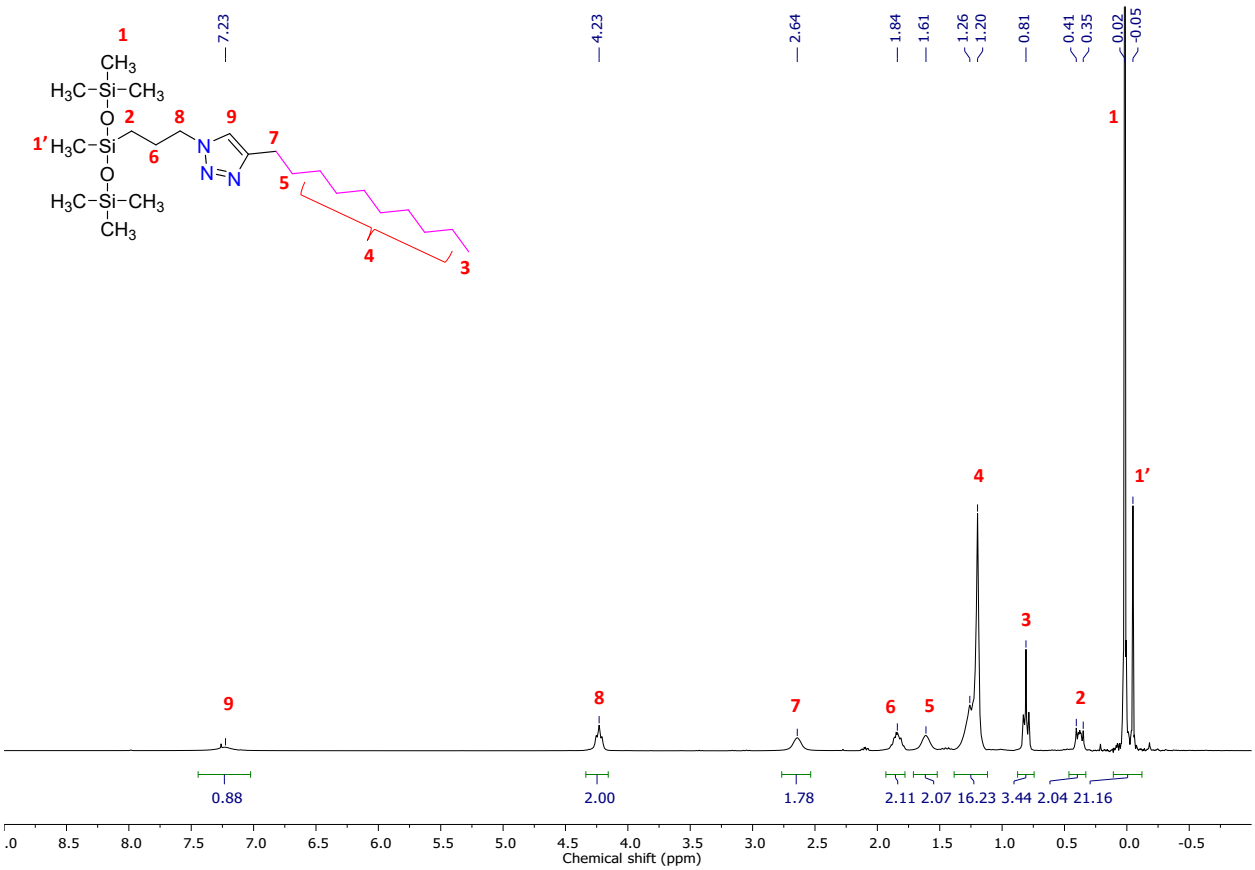

Figure S3. ^{1}H NMR spectrum of 1-1

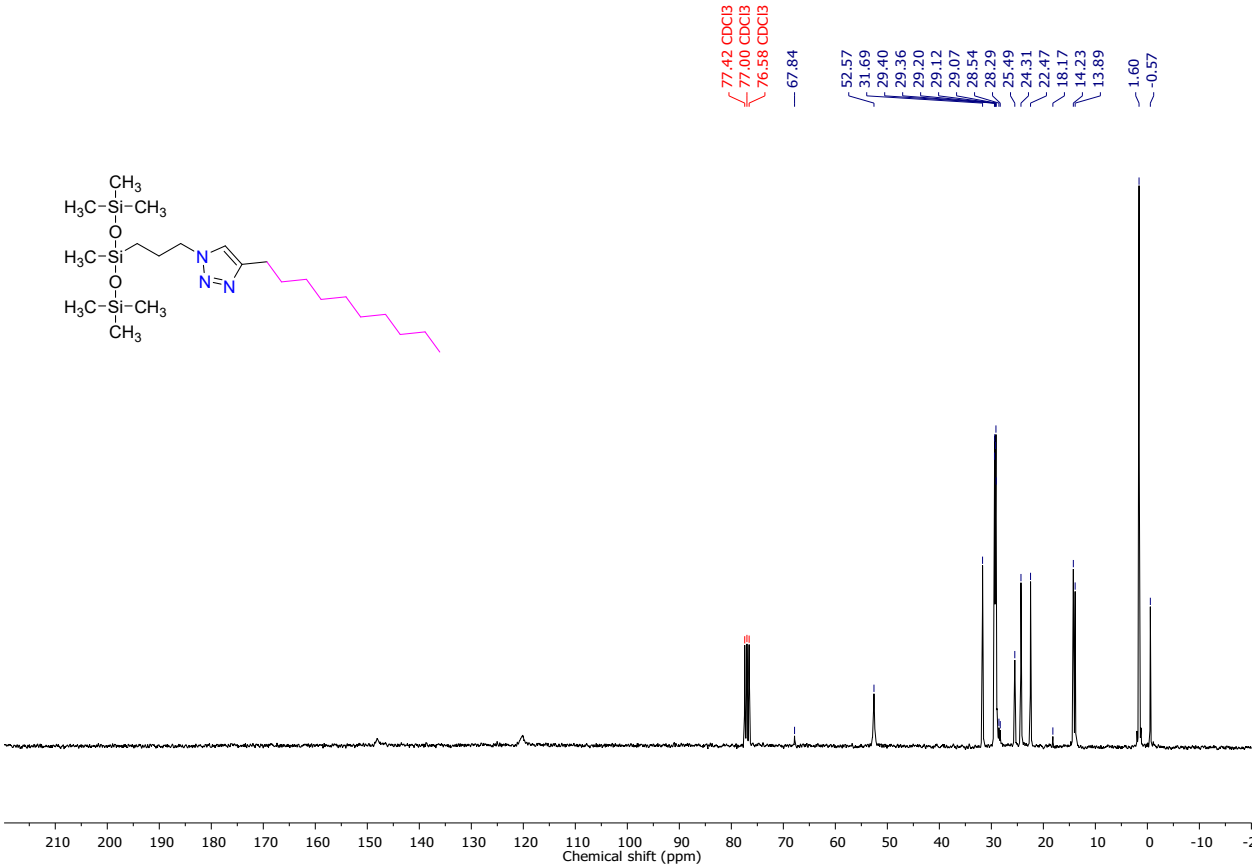

Figure S4. ^{13}C NMR spectrum of 1-1

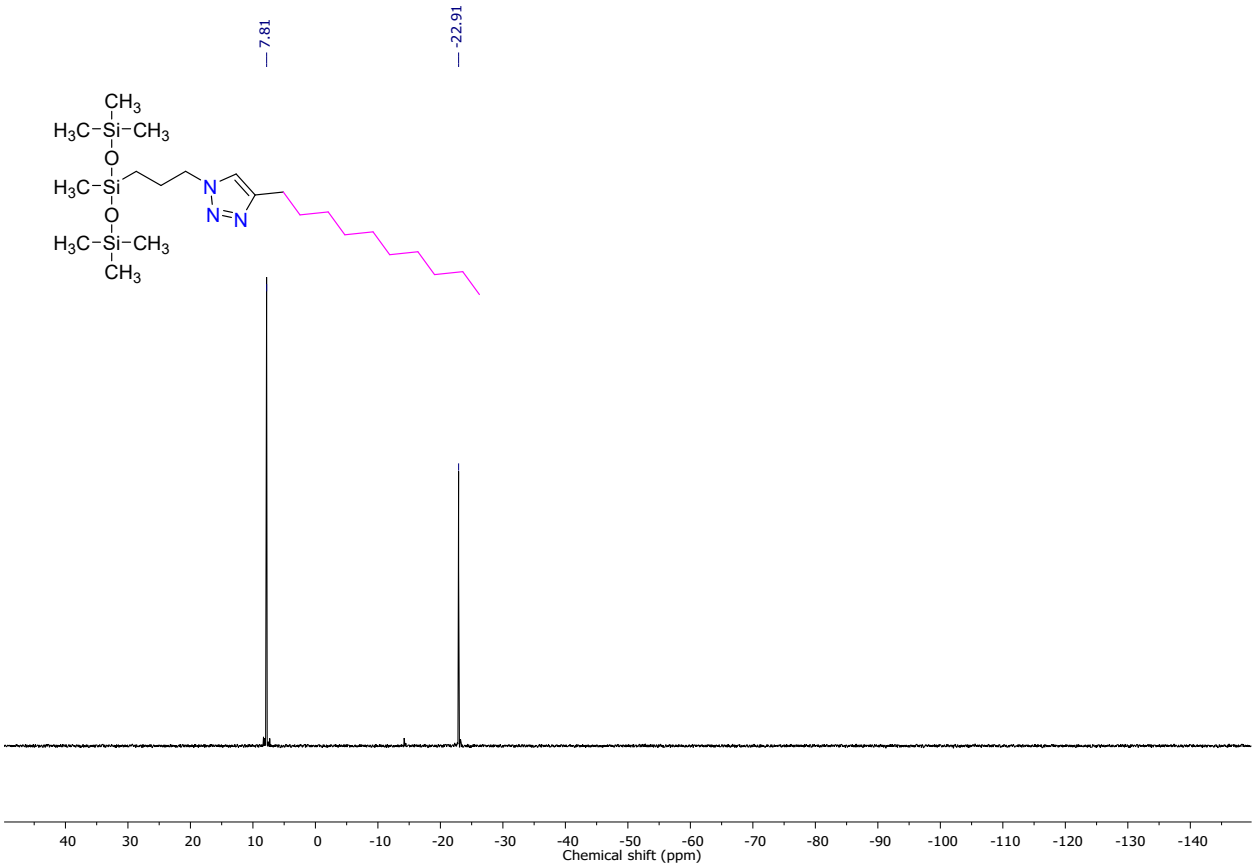

Figure S5. ^{29}Si NMR spectrum of 1-1

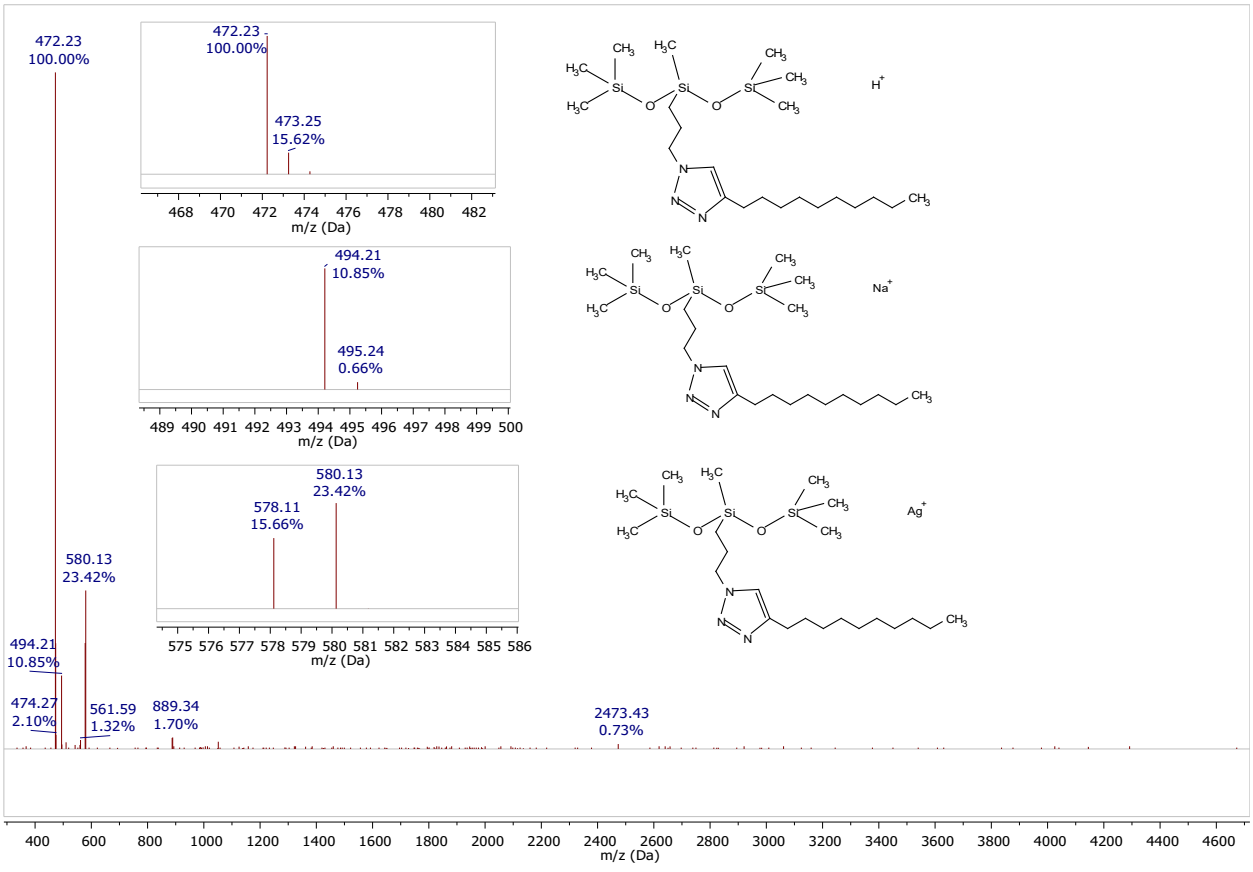

Figure S5. Mass spectrum MALDI-ToF of compound 1-1

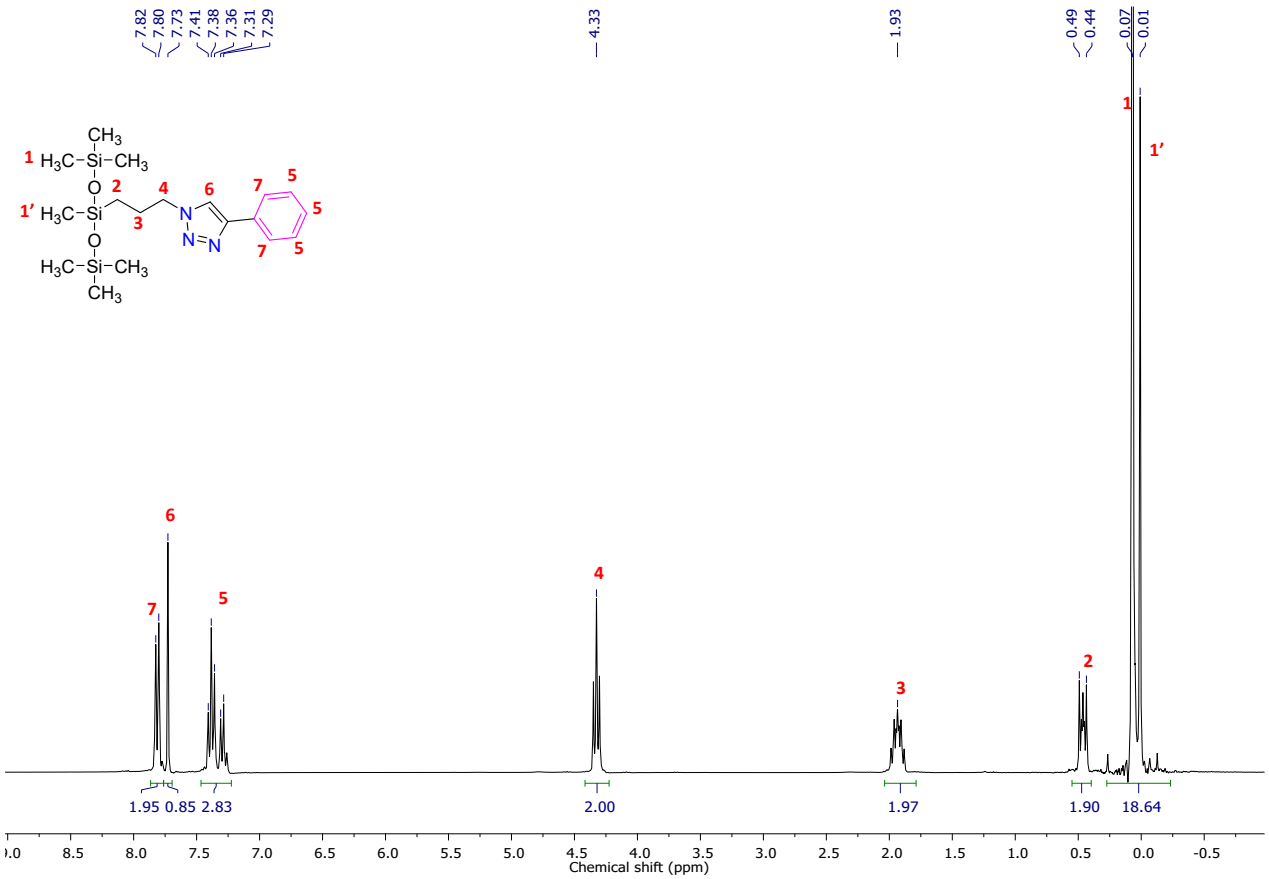

Figure S7. ^{1}H NMR spectrum of 1-2

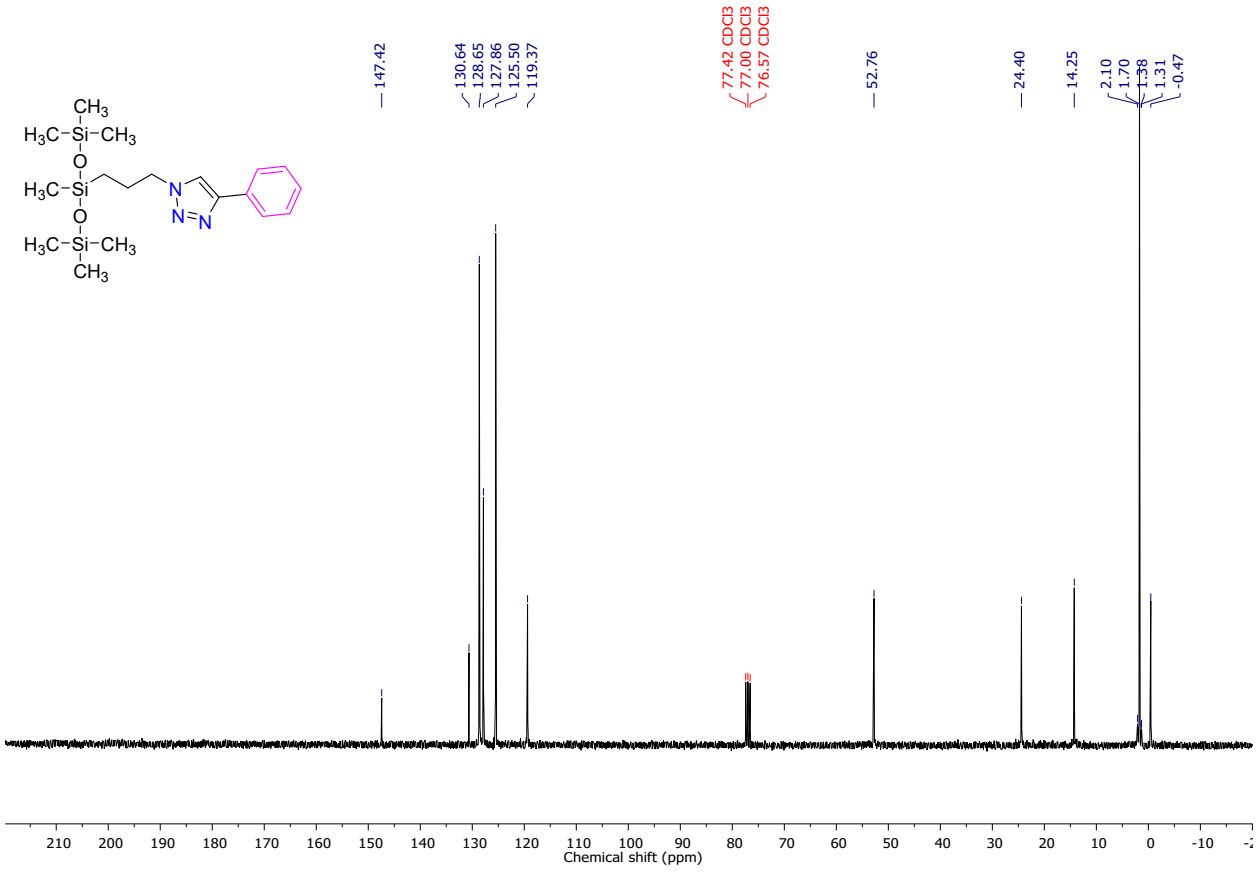

Figure S8. ^{13}C NMR spectrum of 1-2

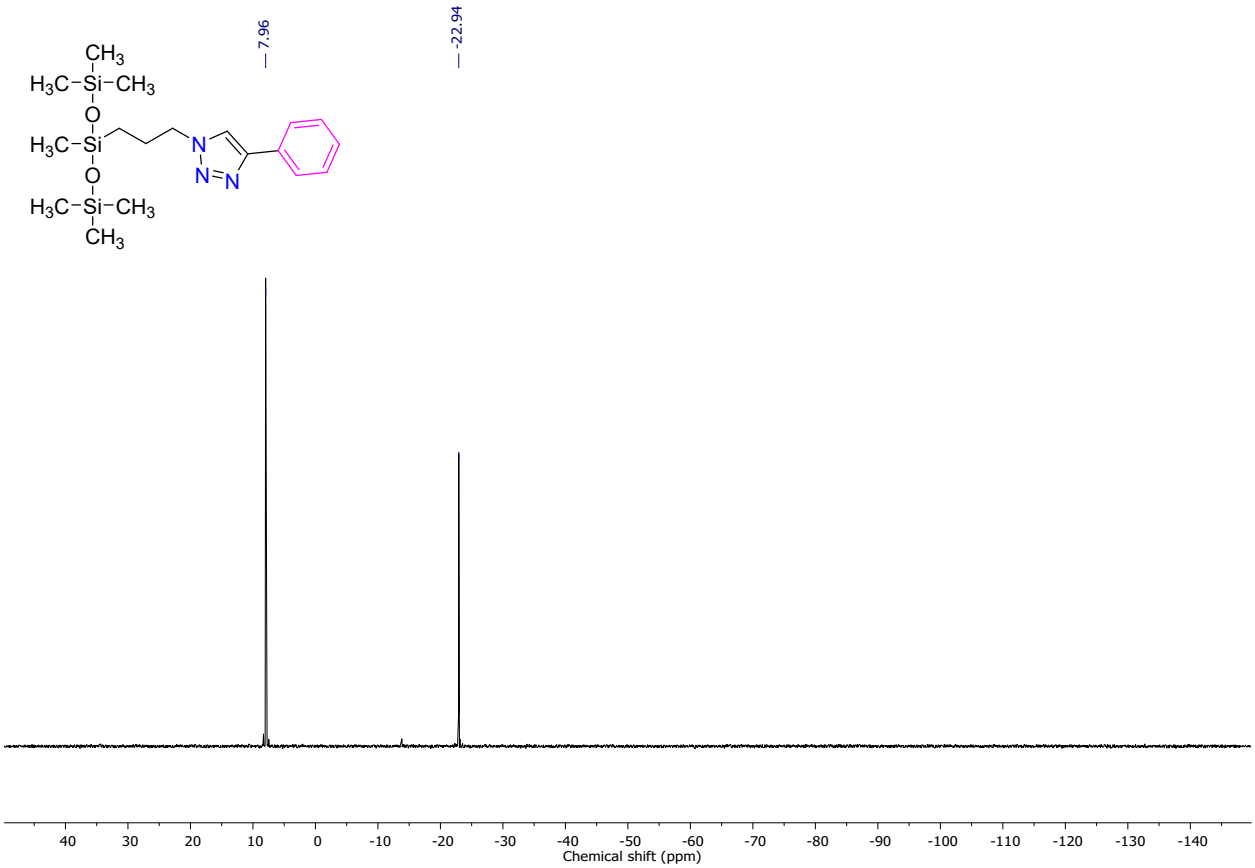

Figure S9. ^{29}Si NMR spectrum of 1-2

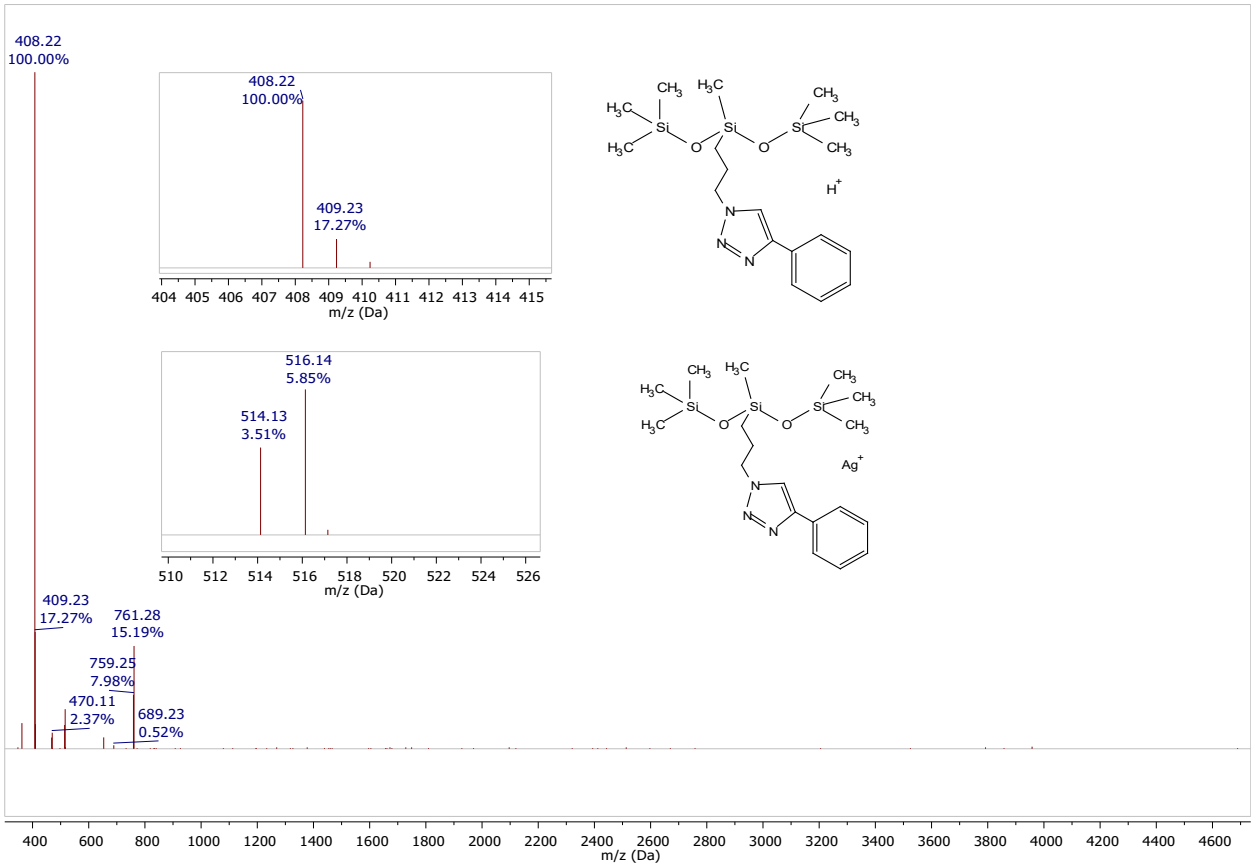

Figure S10. Mass spectrum MALDI-ToF of compound 1-2

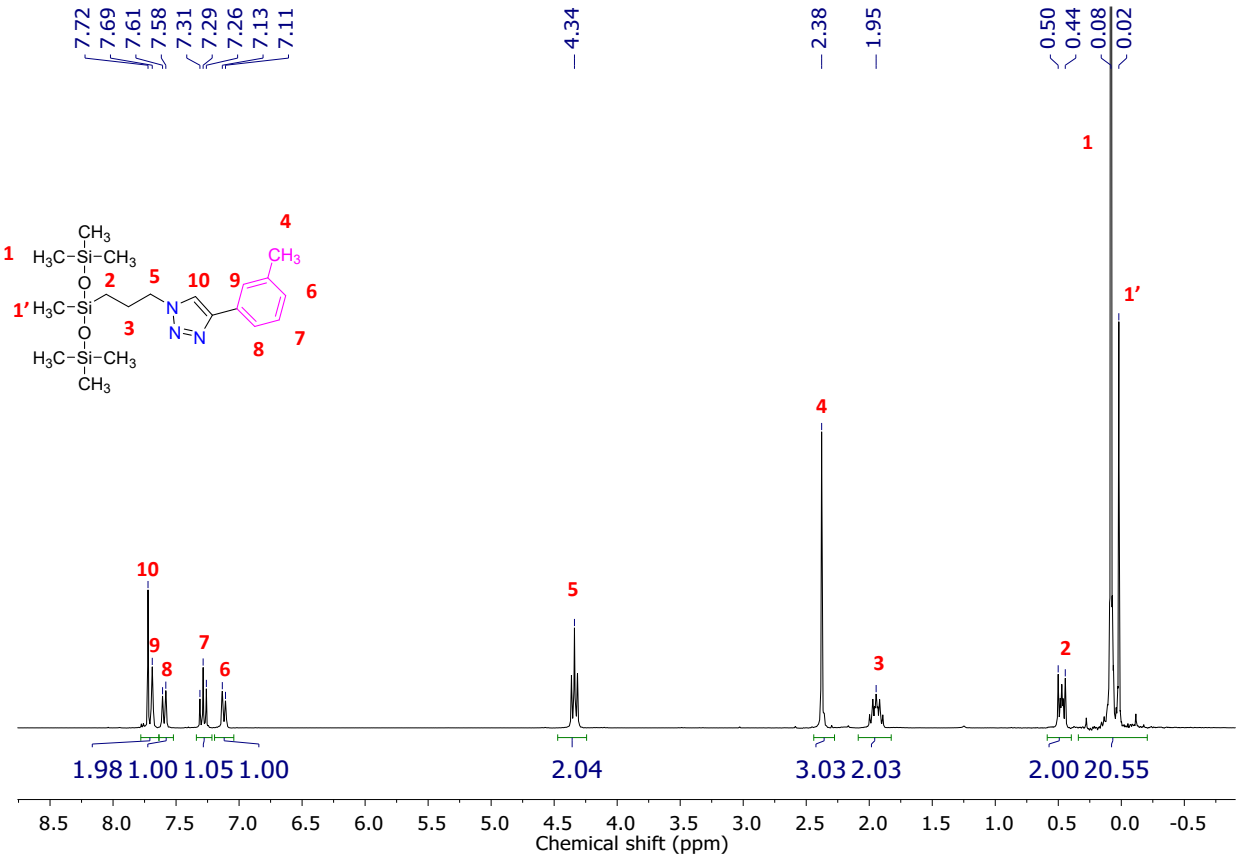

Figure S11. ^{1}H NMR spectrum of 1-3

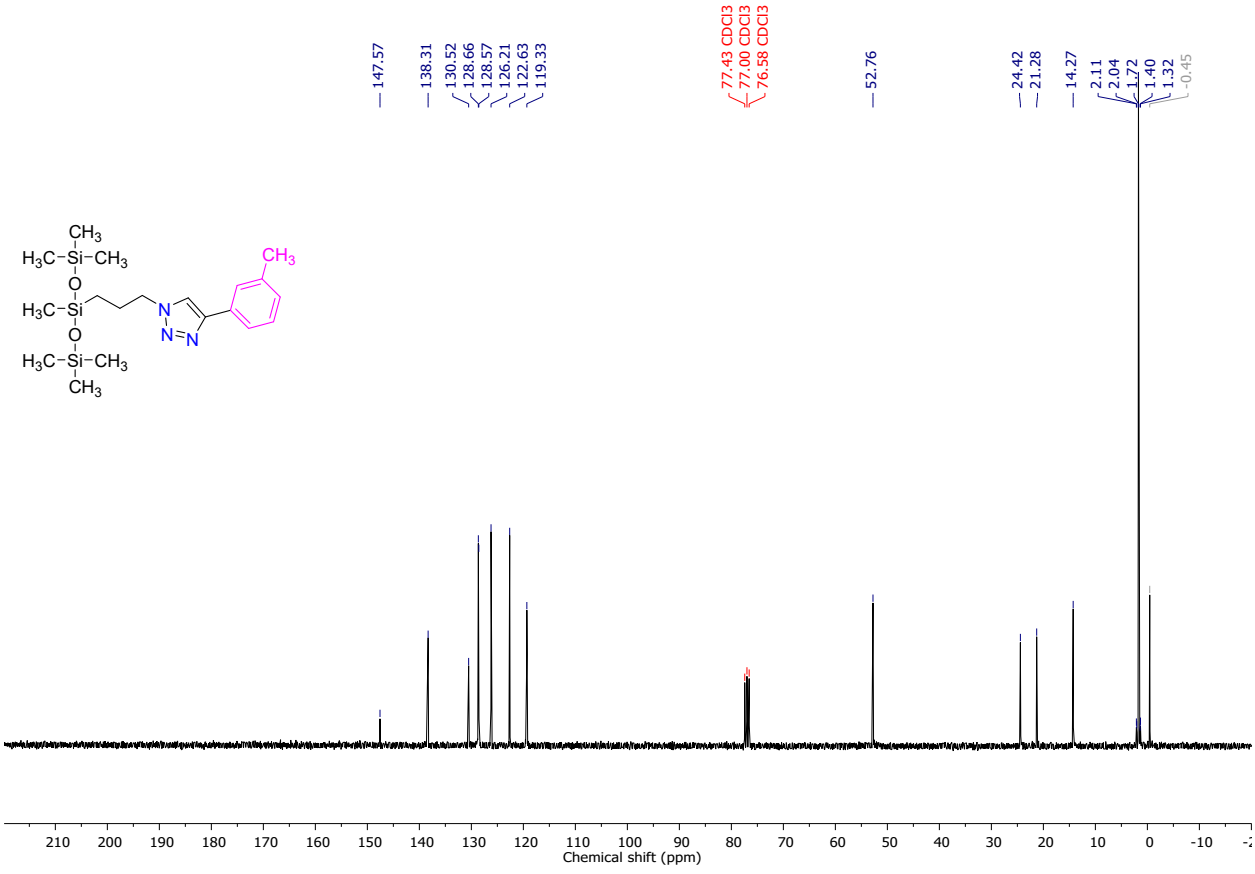

Figure S12. ^{13}C NMR spectrum of 1-3

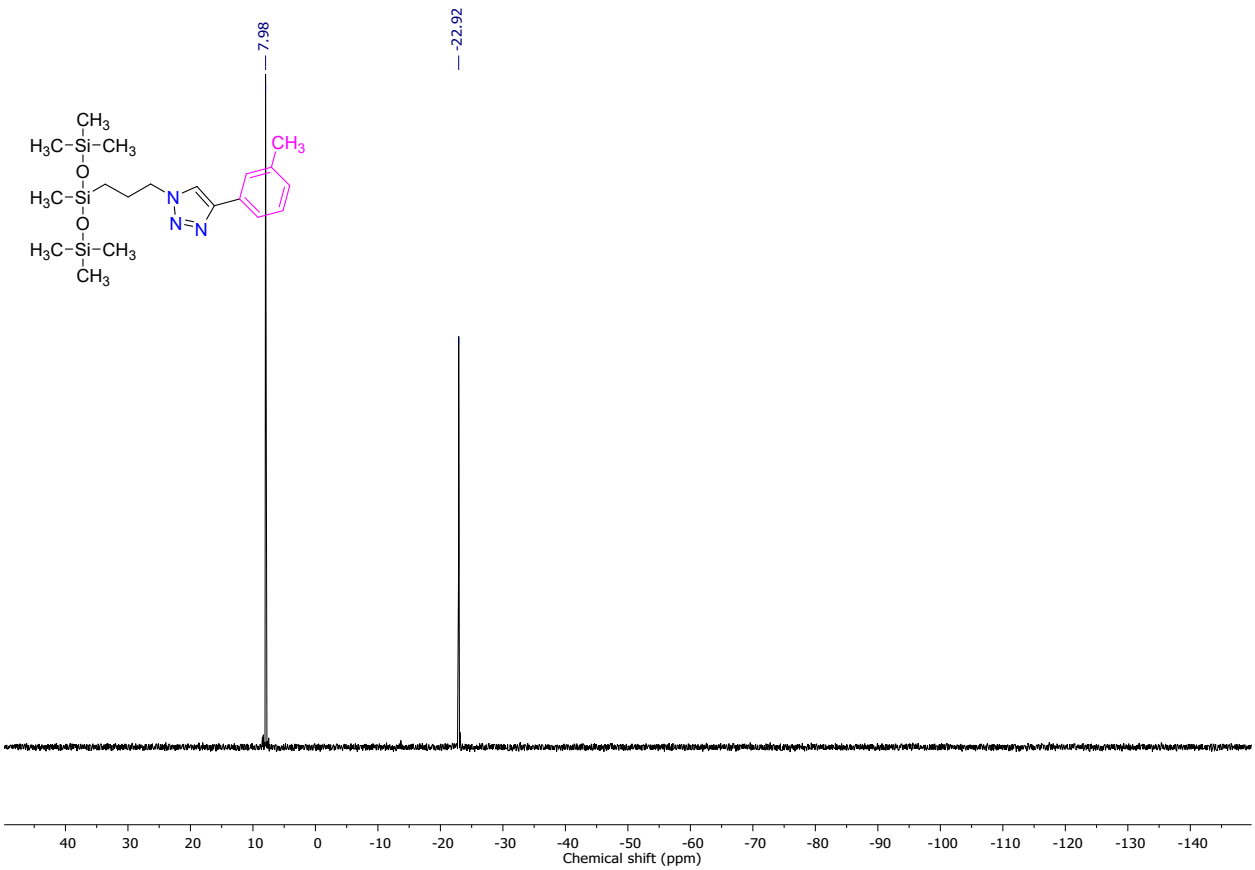

Figure S13. ^{29}Si NMR spectrum of 1-3

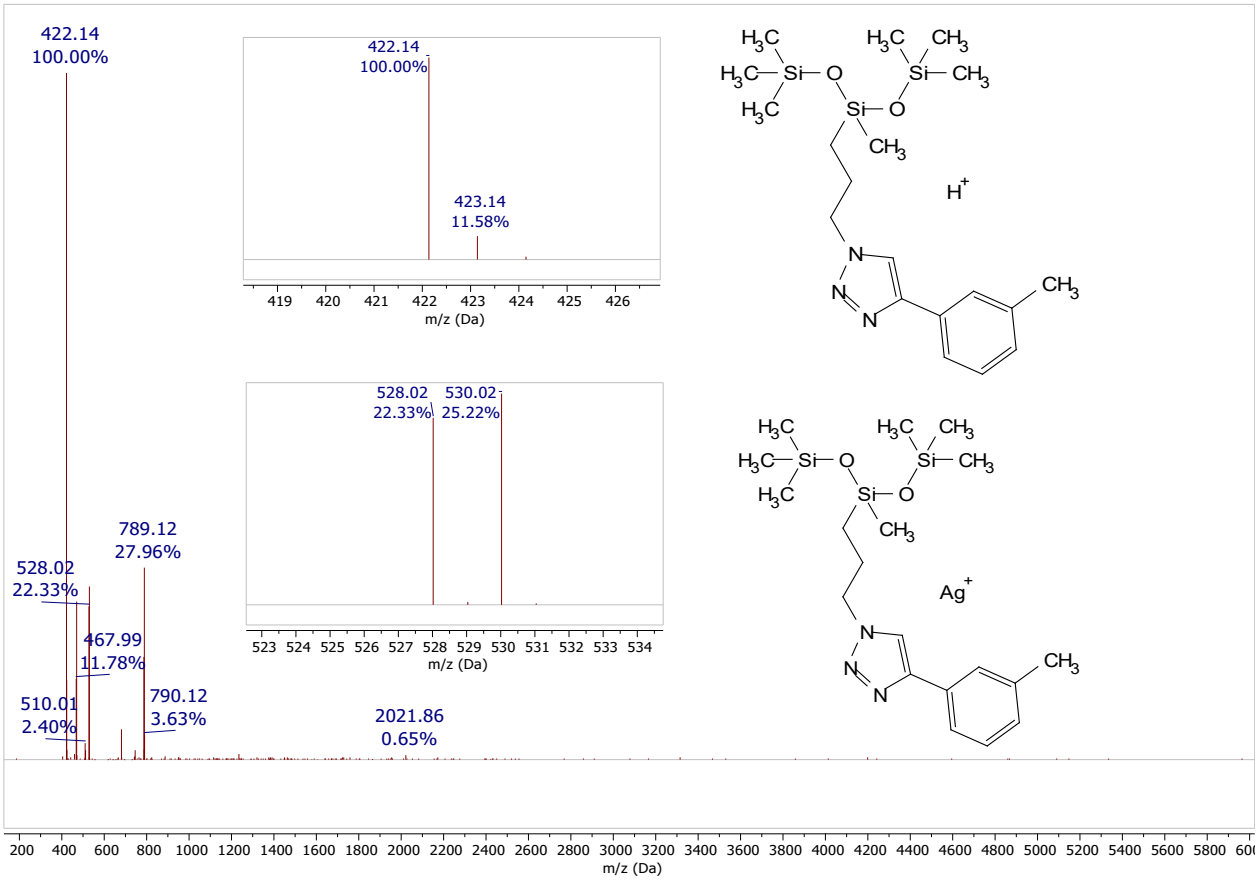

Figure S14. Mass spectrum MALDI-ToF of compound 1-3

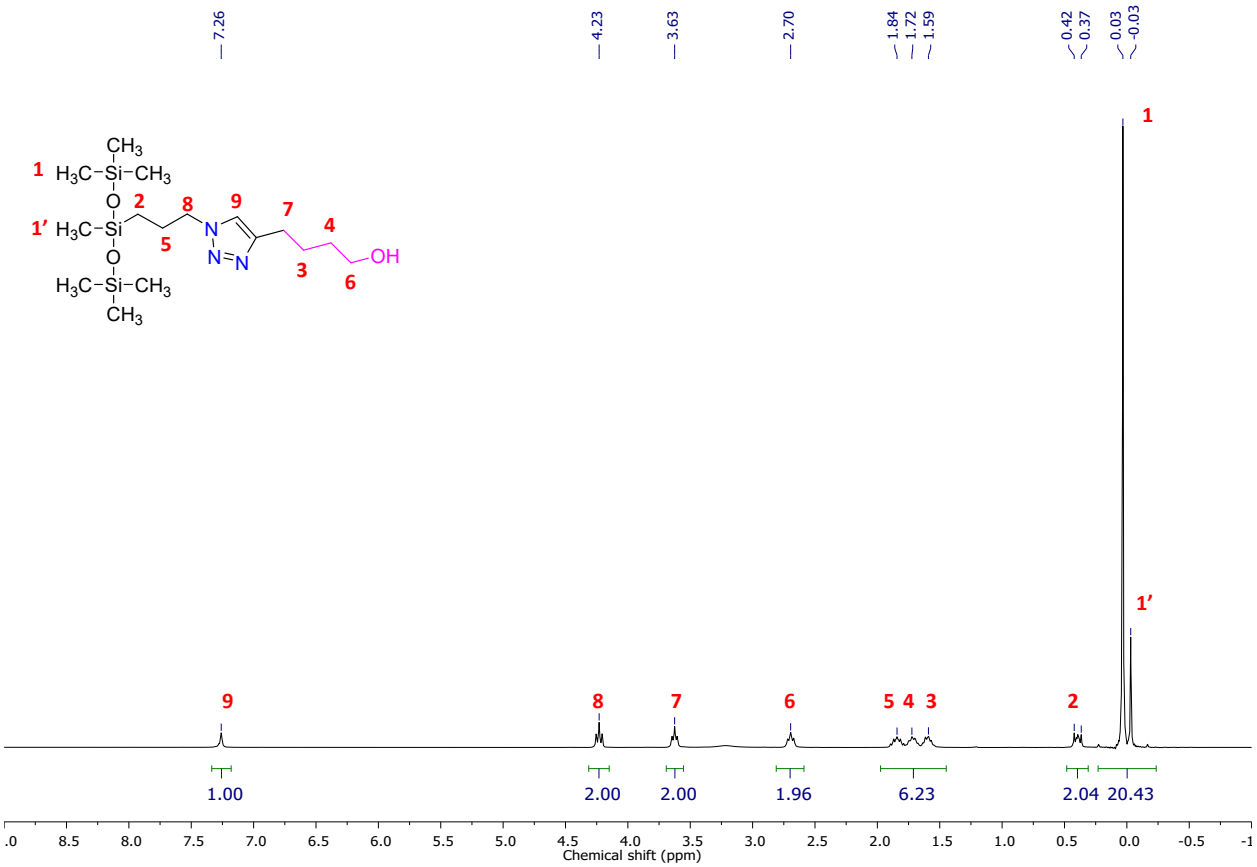

Figure S15. ^{1}H NMR spectrum of 1-4

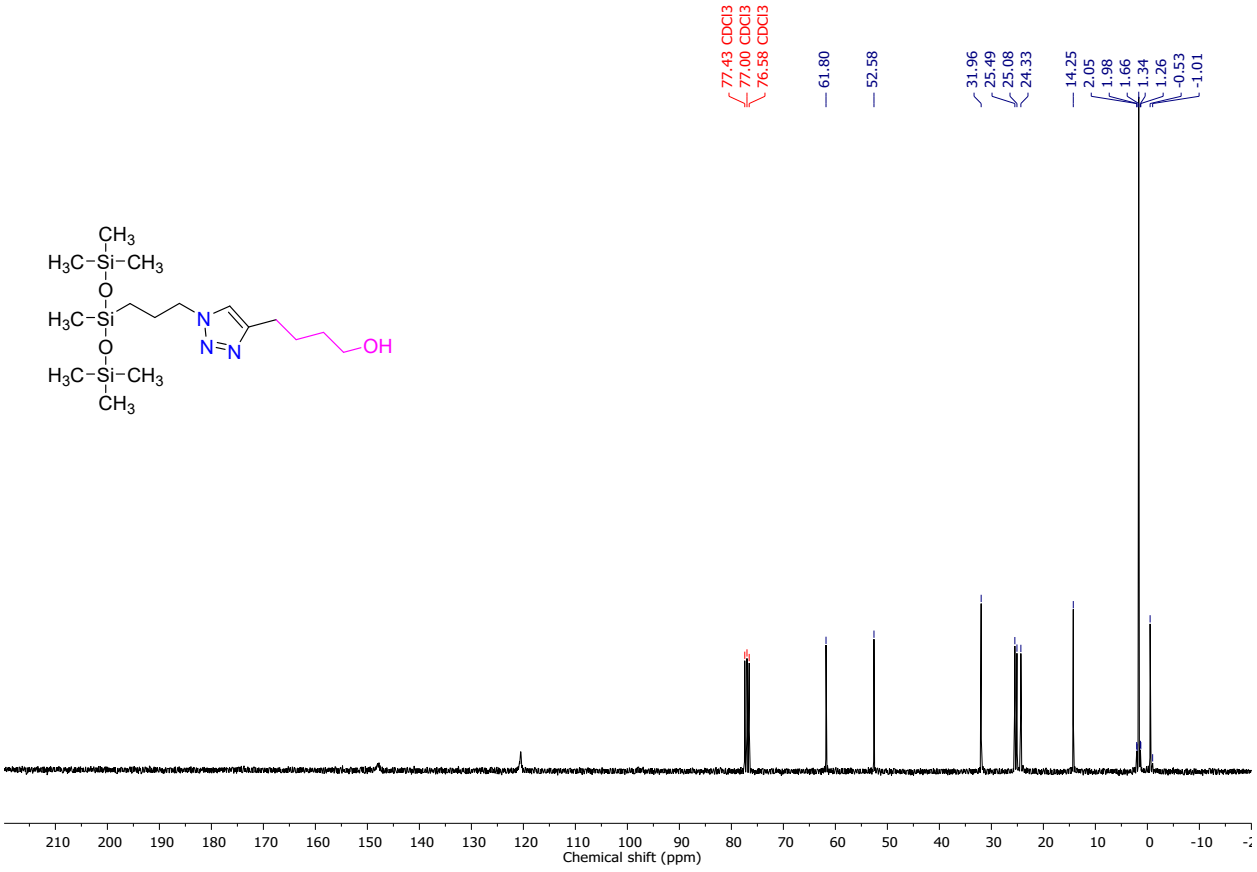

Figure S16. ^{13}C NMR spectrum of 1-4

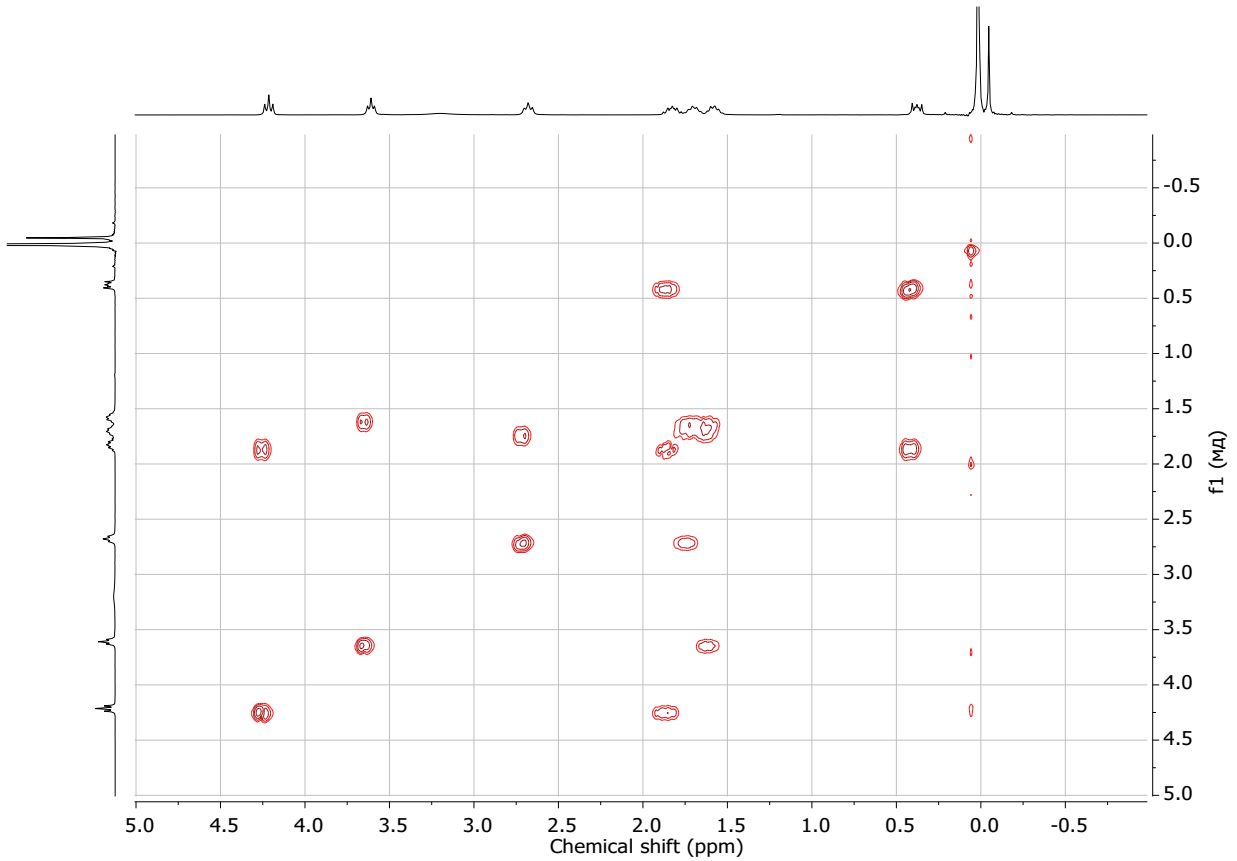

Figure S17. COSY NMR spectrum of 1-4

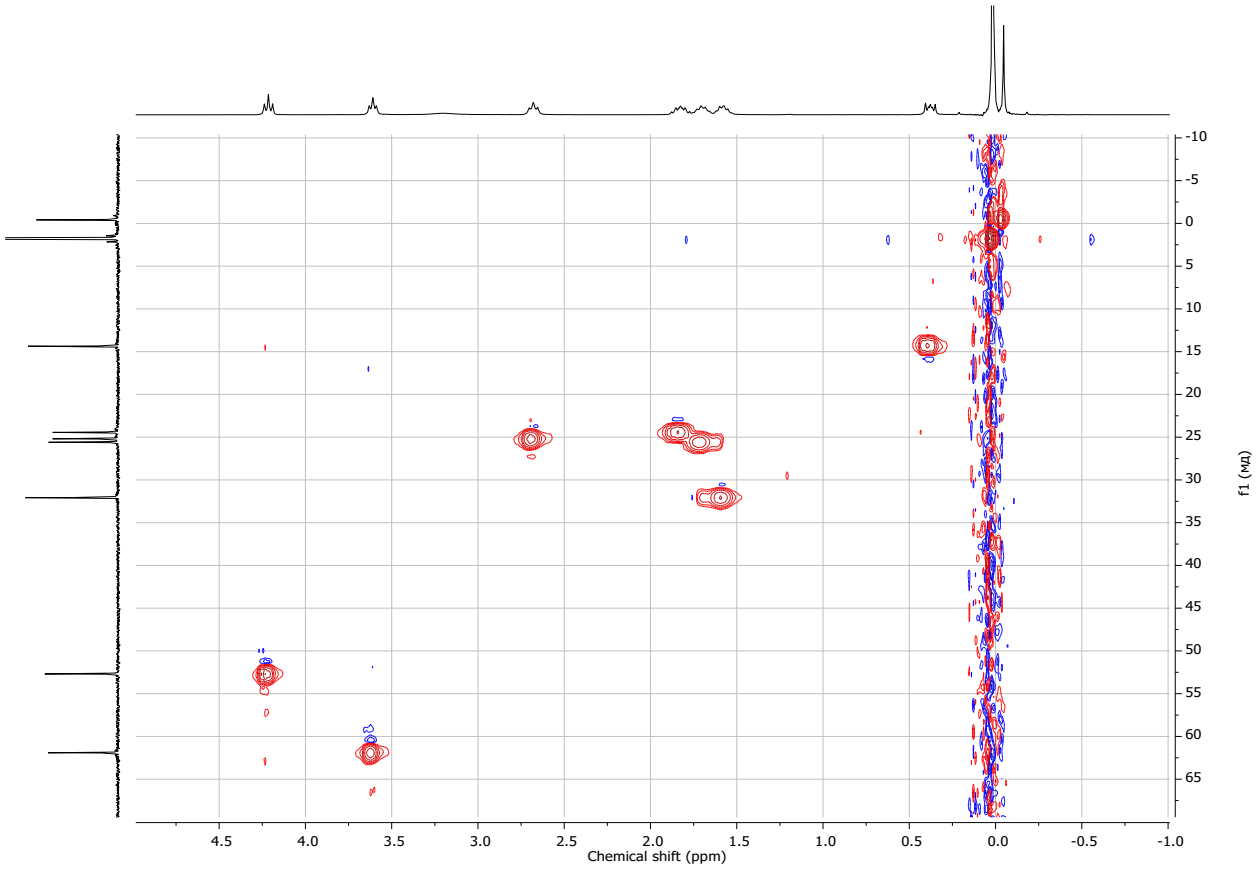

Figure S18. $^{1}H,^{13}C$-HSQC NMR spectrum of 1-4

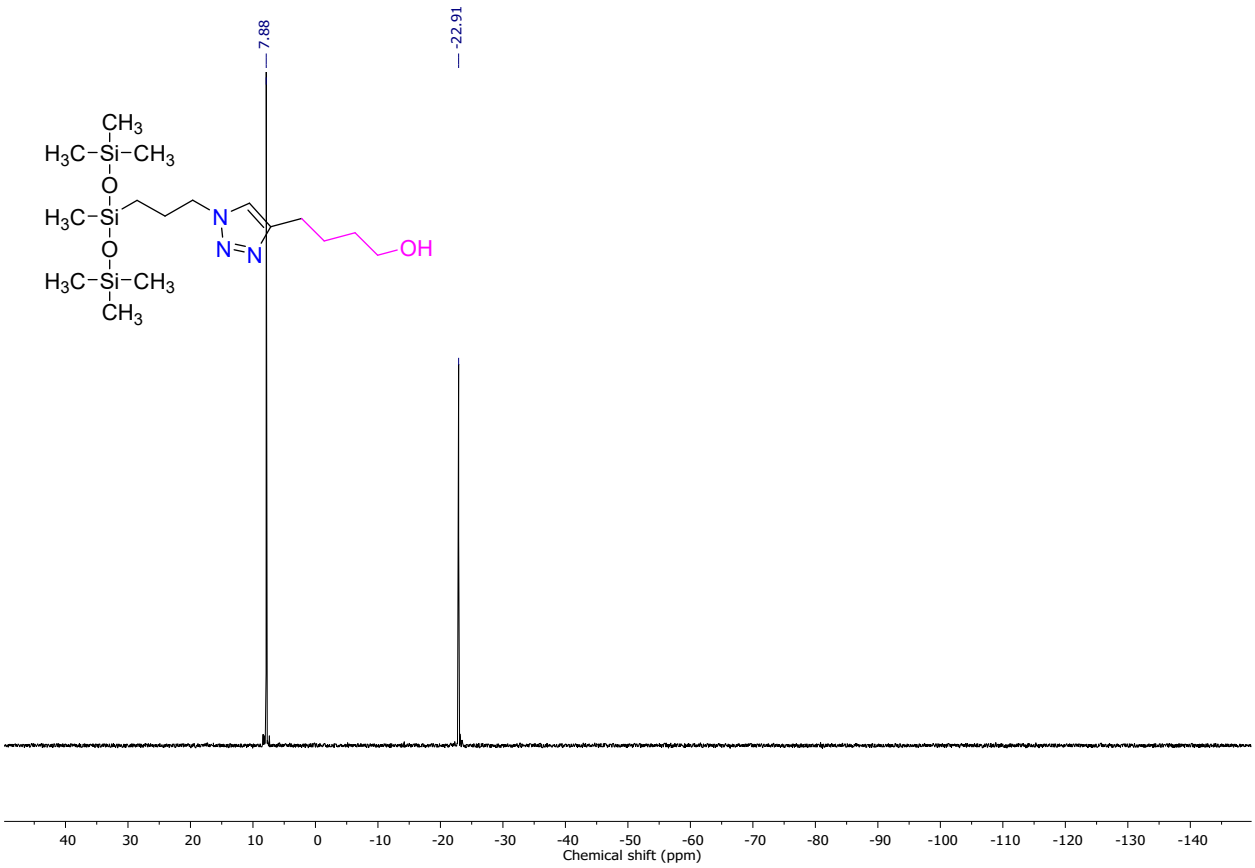

Figure S19. ^{29}Si NMR spectrum of 1-4

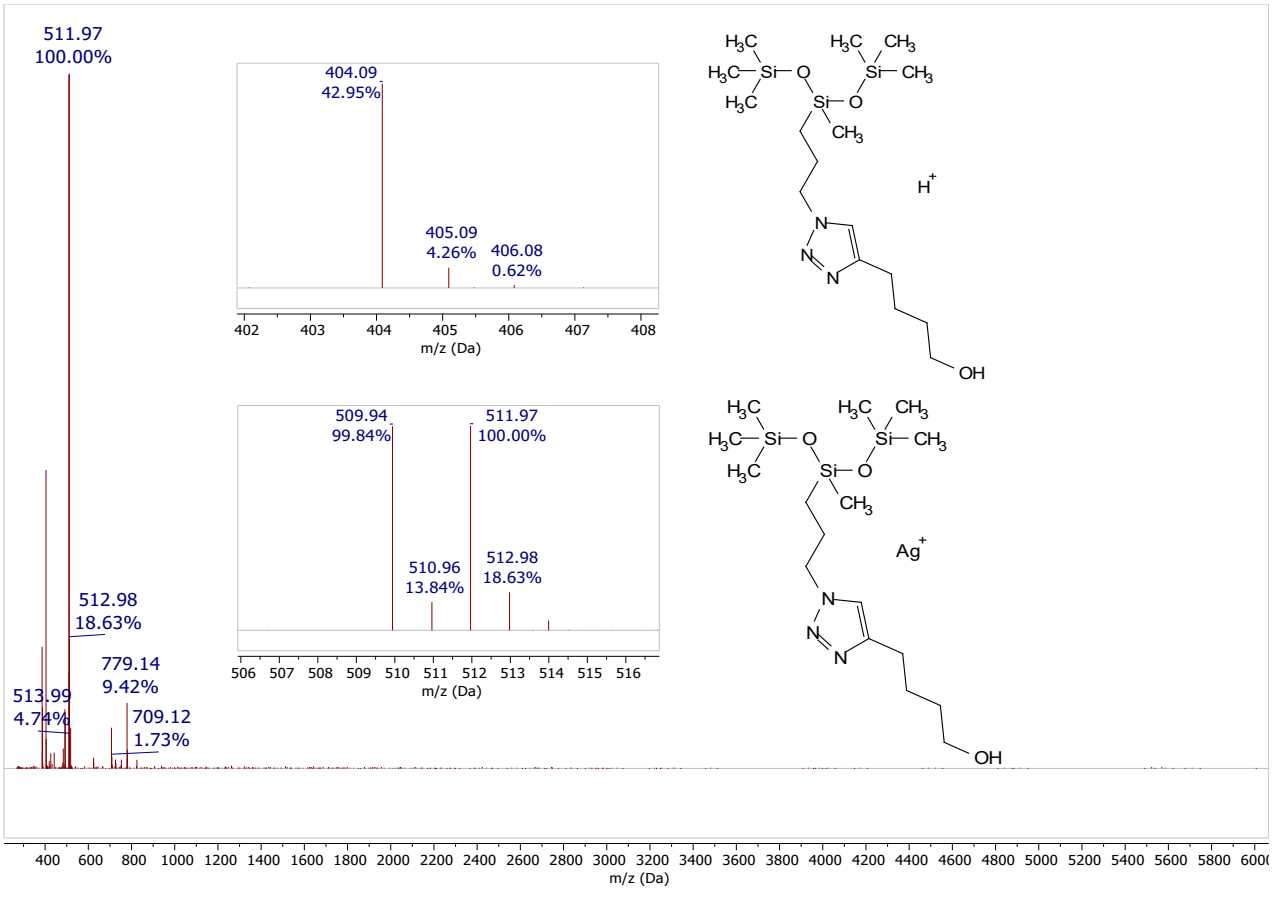

Figure S20. Mass spectrum MALDI-ToF of compound 1-4

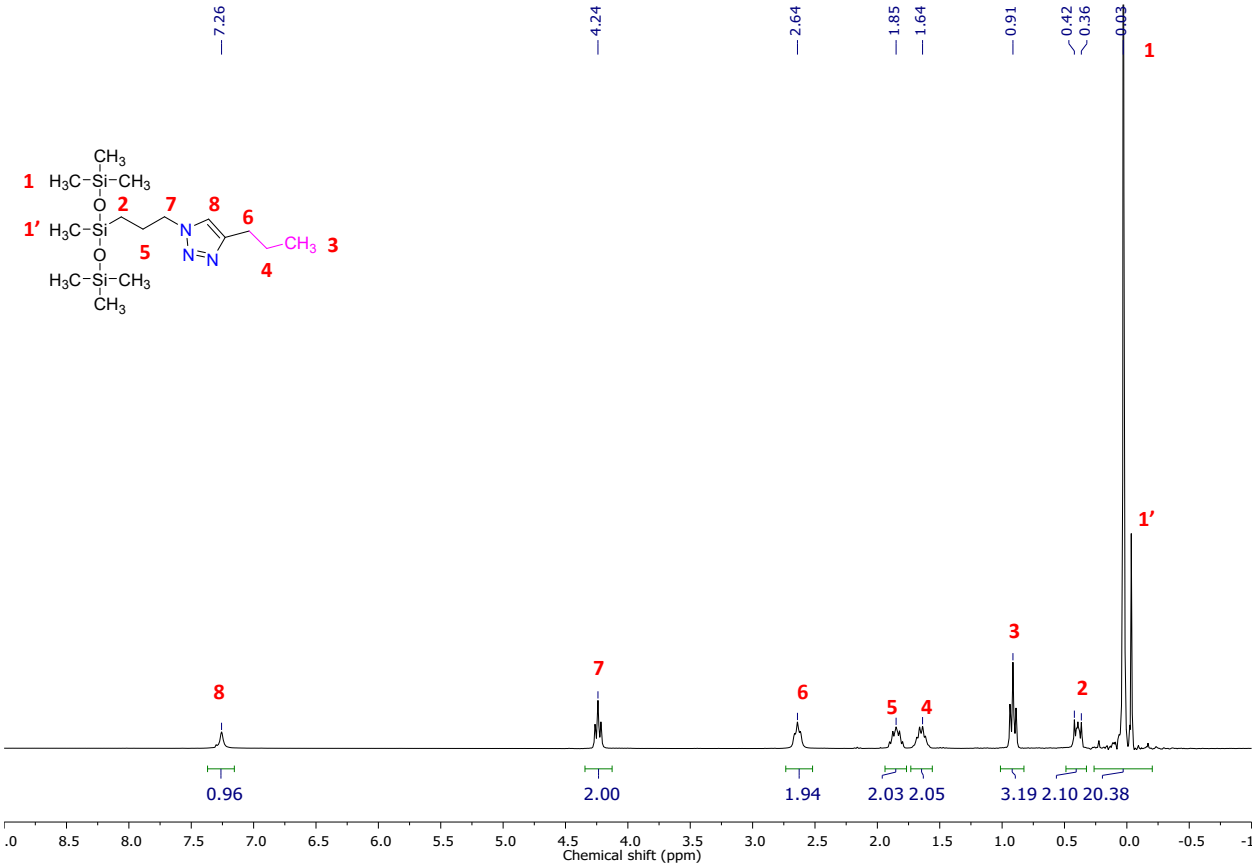

Figure S21. ^{1}H NMR spectrum of 1-5

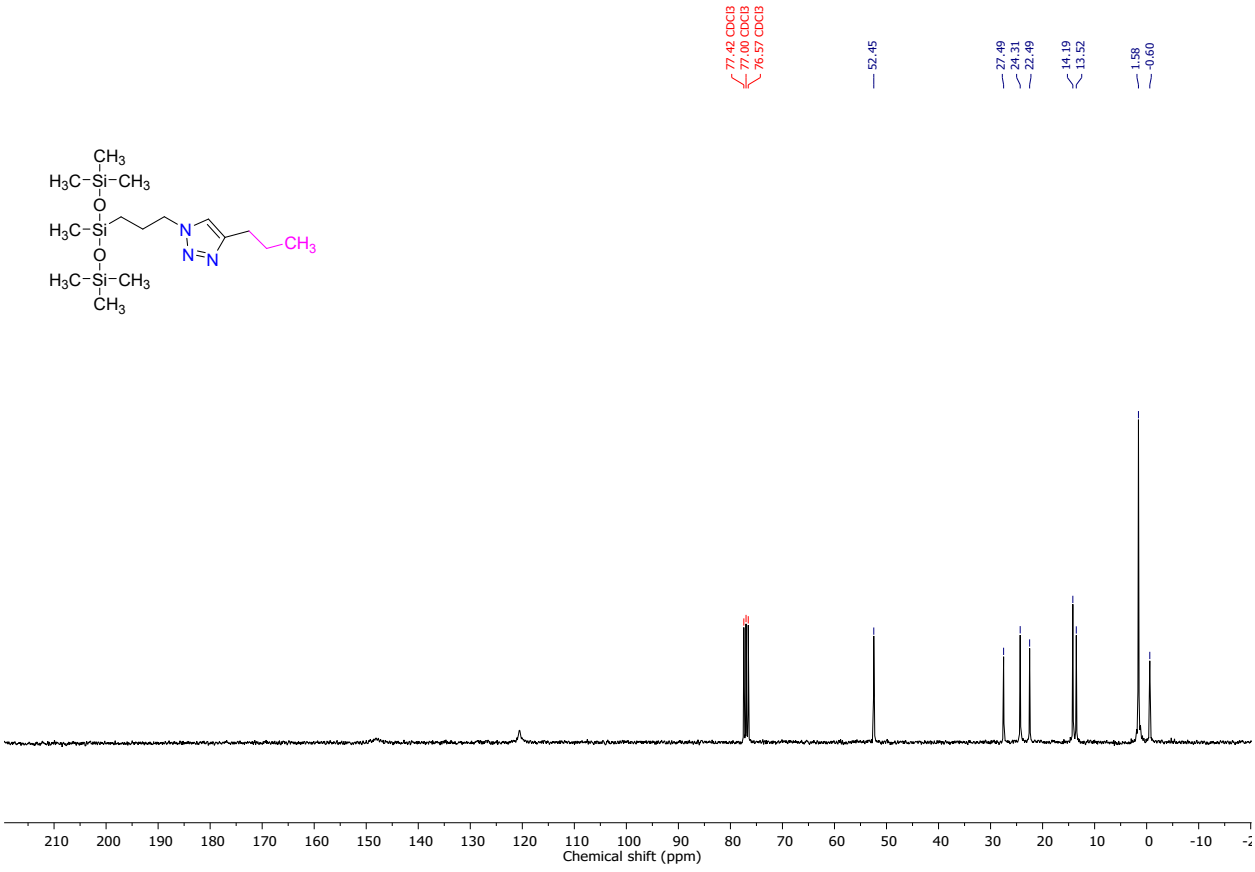

Figure S22. ^{13}C NMR spectrum of 1-5

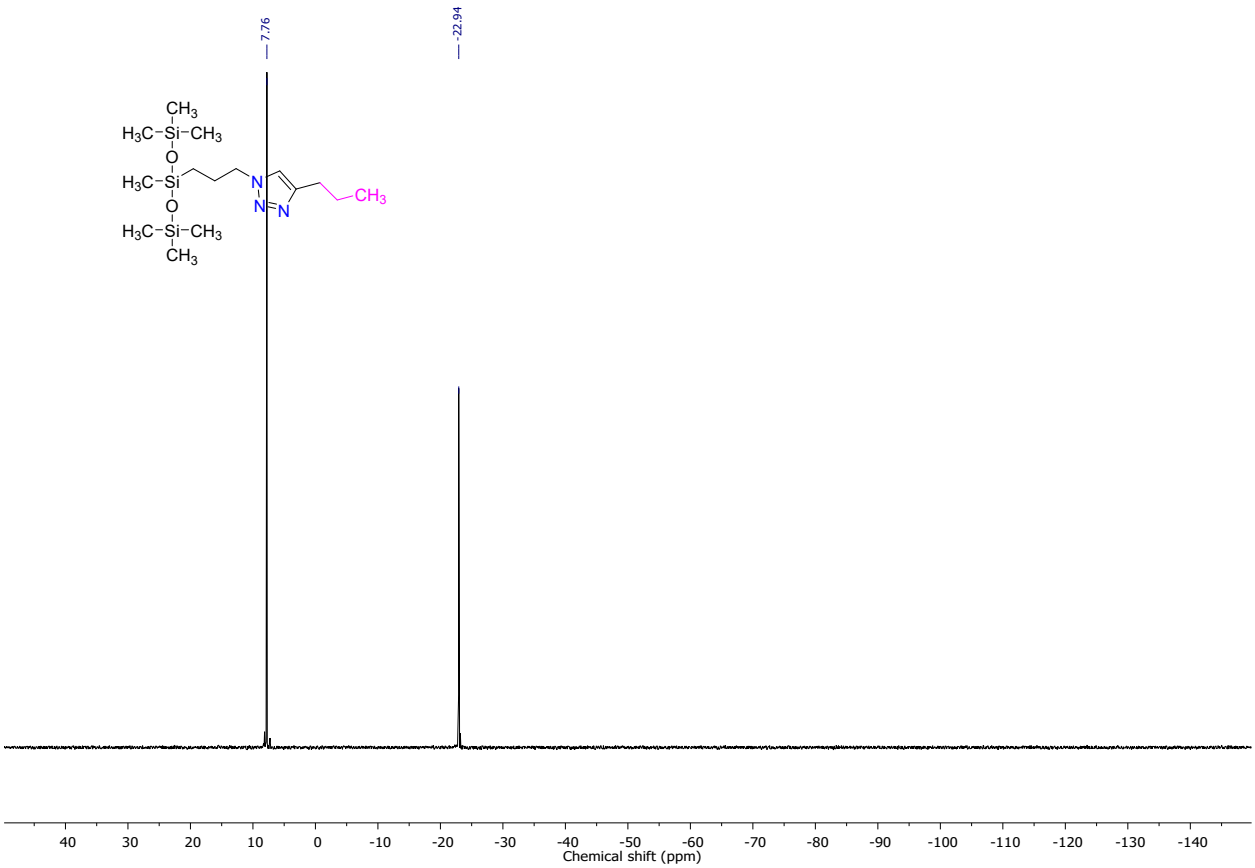

Figure S23. ^{29}Si NMR spectrum of 1-5

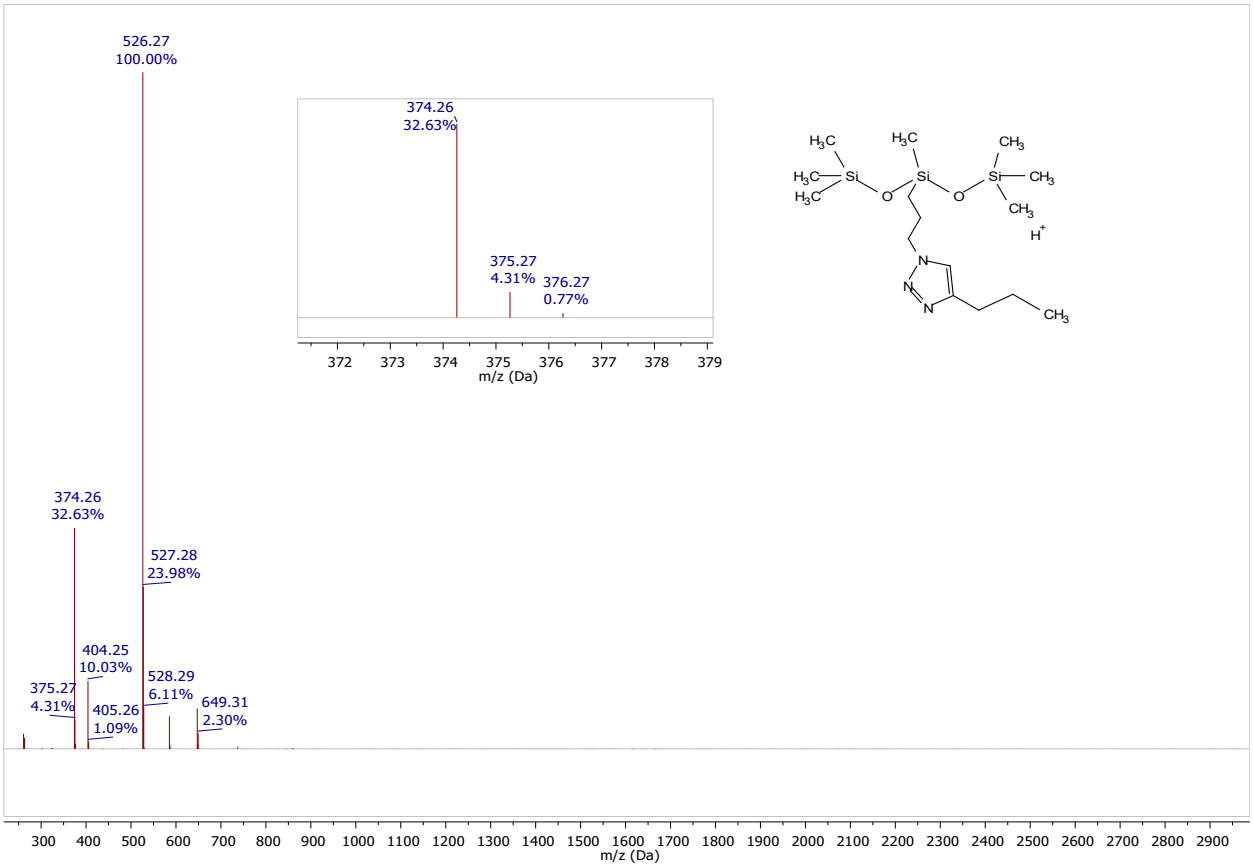

Figure S24. Mass spectrum MALDI-ToF of compound 1-5

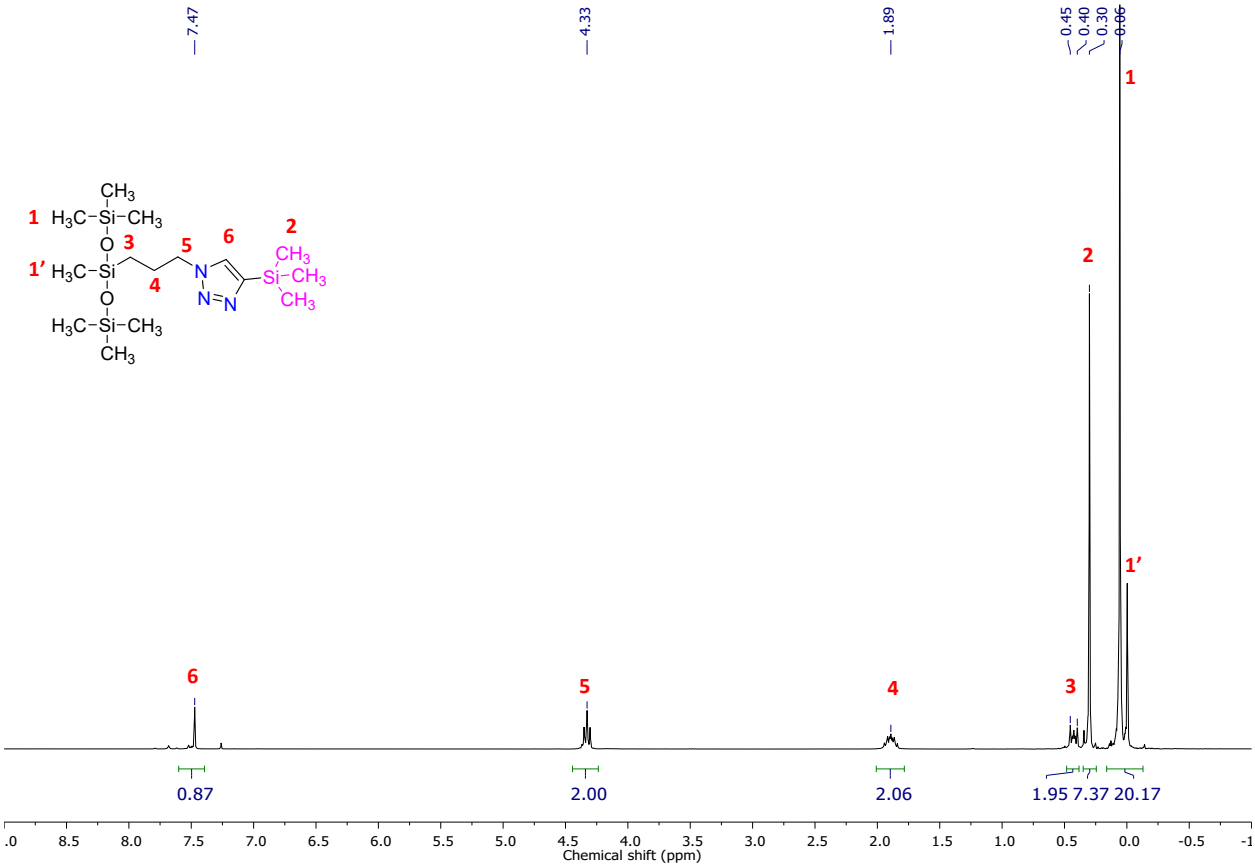

Figure S25. ^{1}H NMR spectrum of 1-6

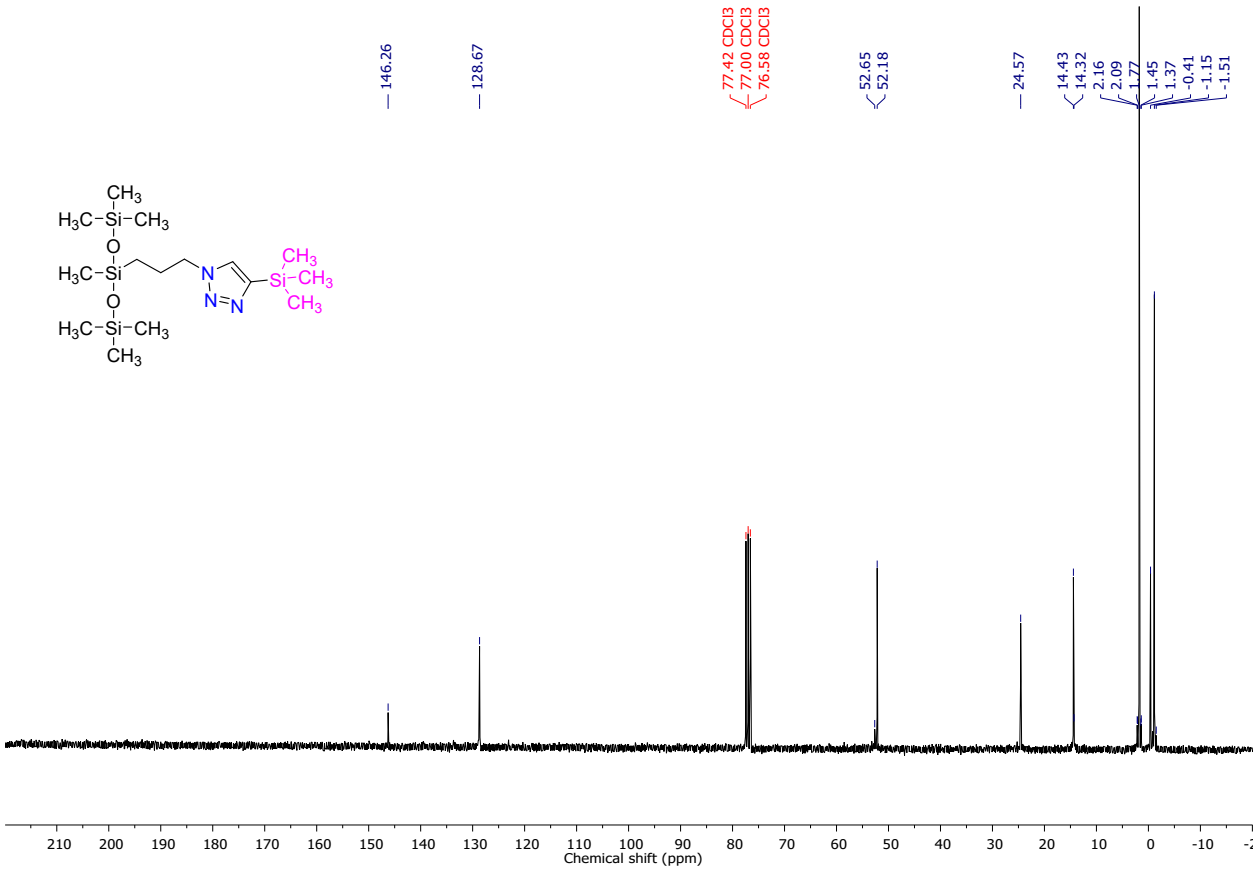

Figure S26. ^{13}C NMR spectrum of 1-6

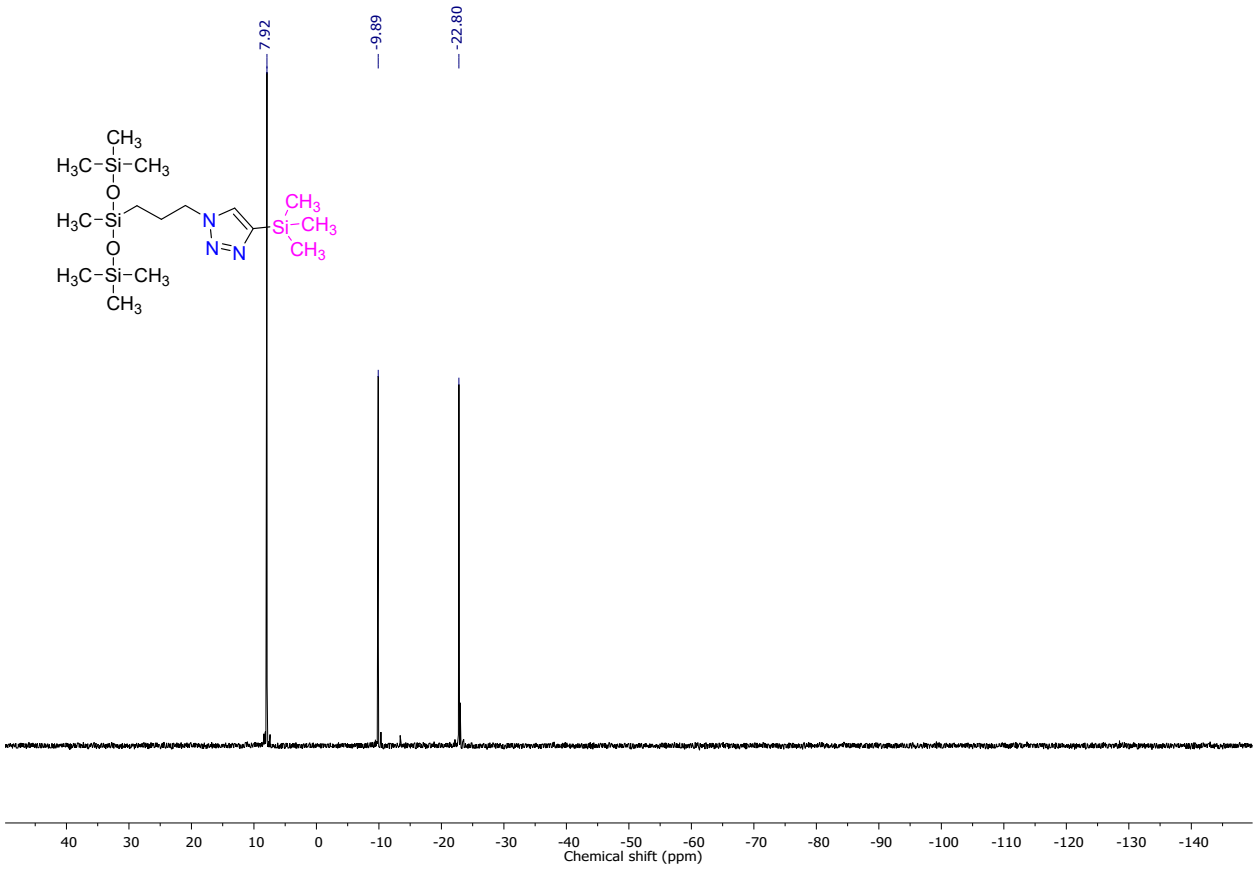

Figure S27. ^{29}Si NMR spectrum of 1-6

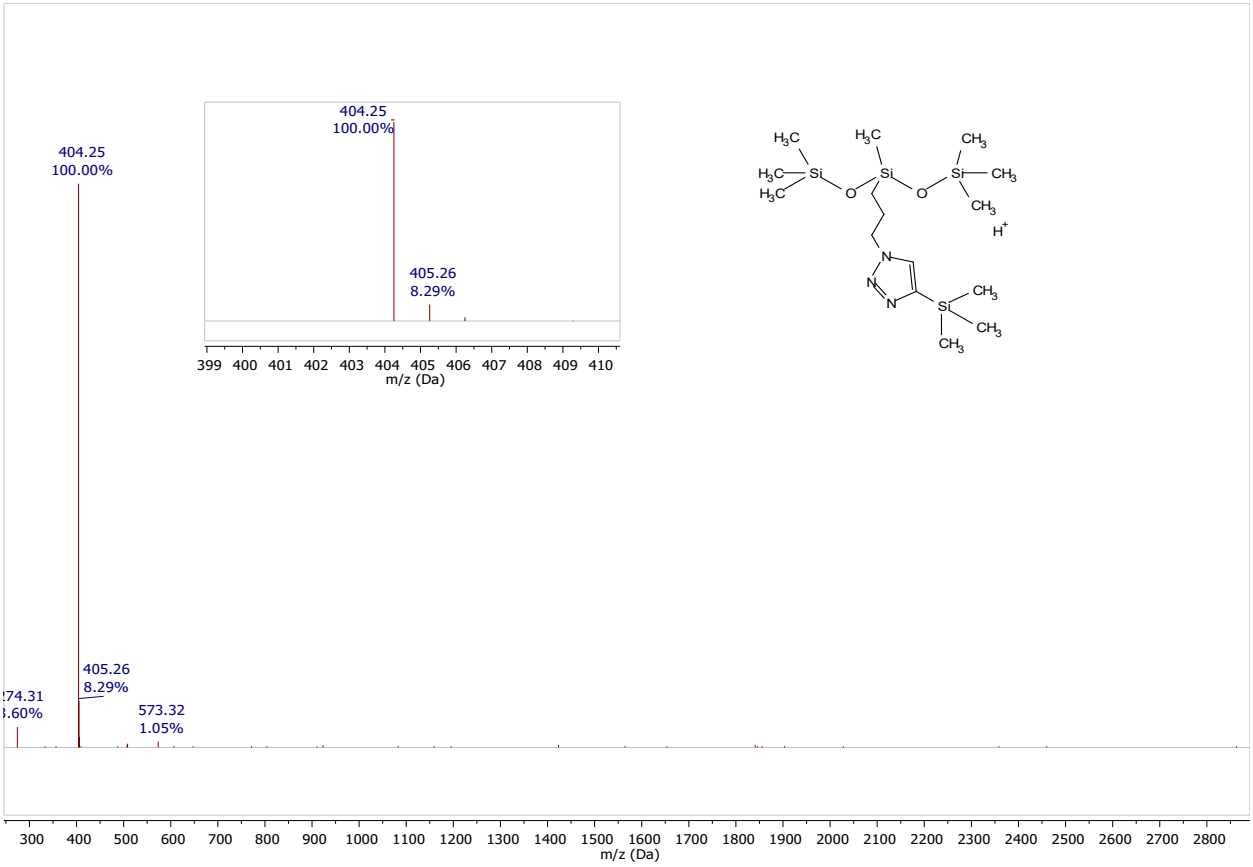

Figure S28. Mass spectrum MALDI-ToF of compound 1-6

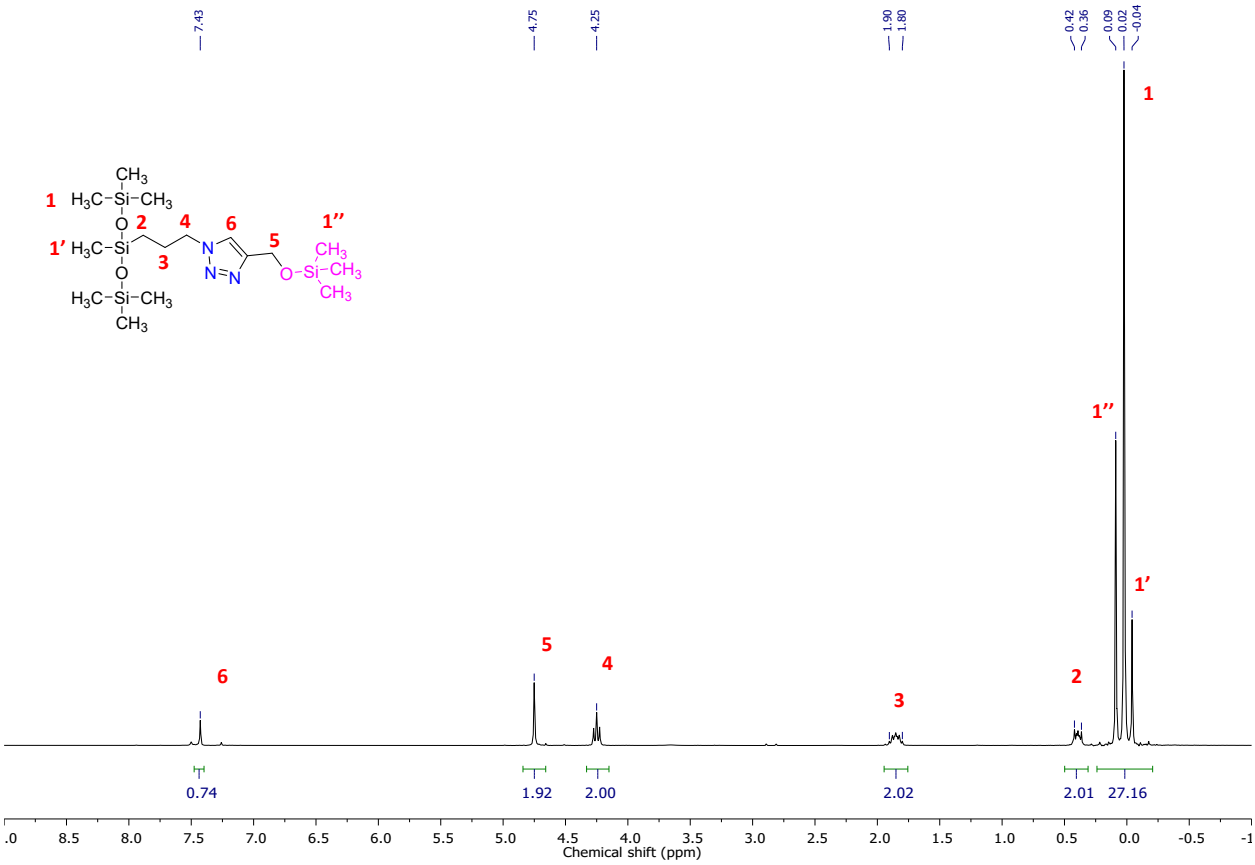

Figure S29. ^{1}H NMR spectrum of 1-7

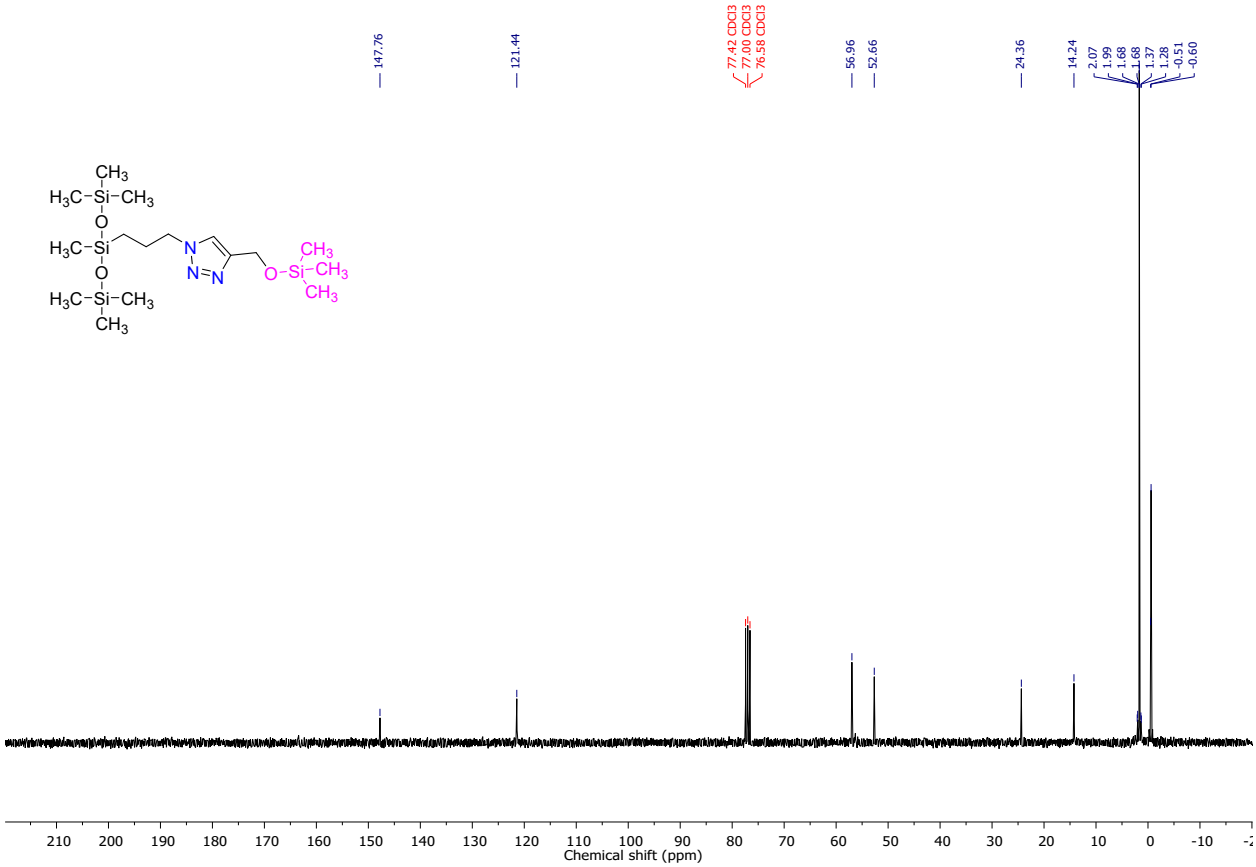

Figure S30. ^{13}C NMR spectrum of 1-7

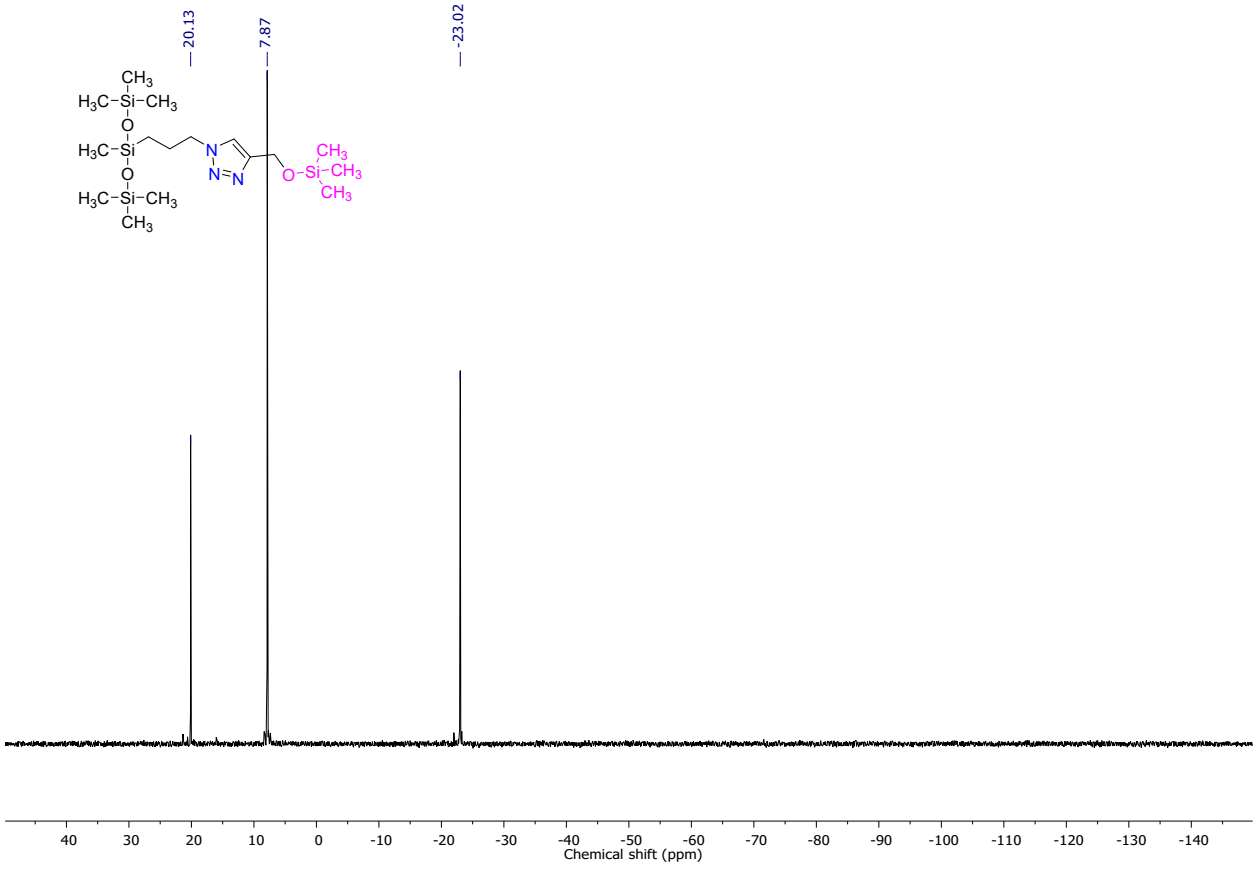

Figure S31. ^{29}Si NMR spectrum of 1-7

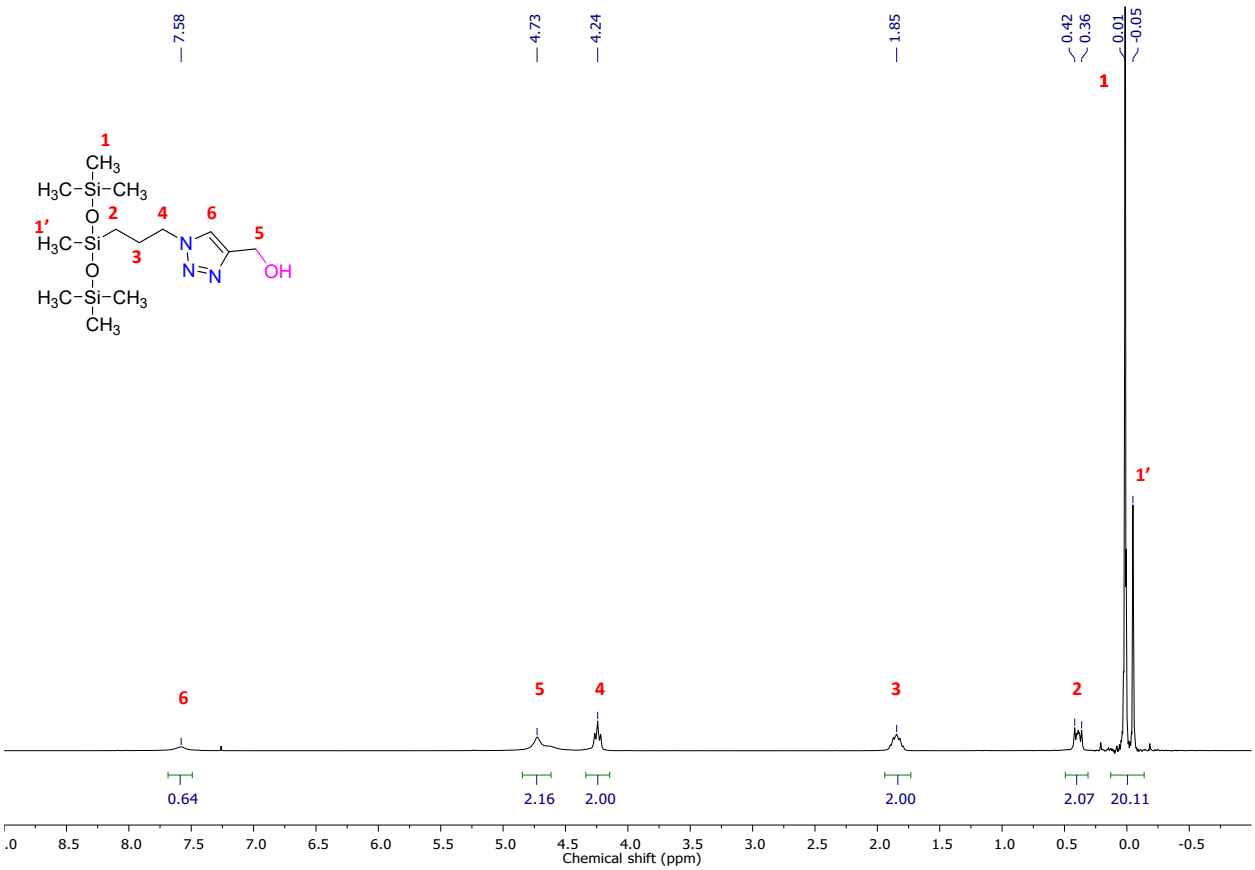

Figure S32. ^{1}H NMR spectrum of 1-8

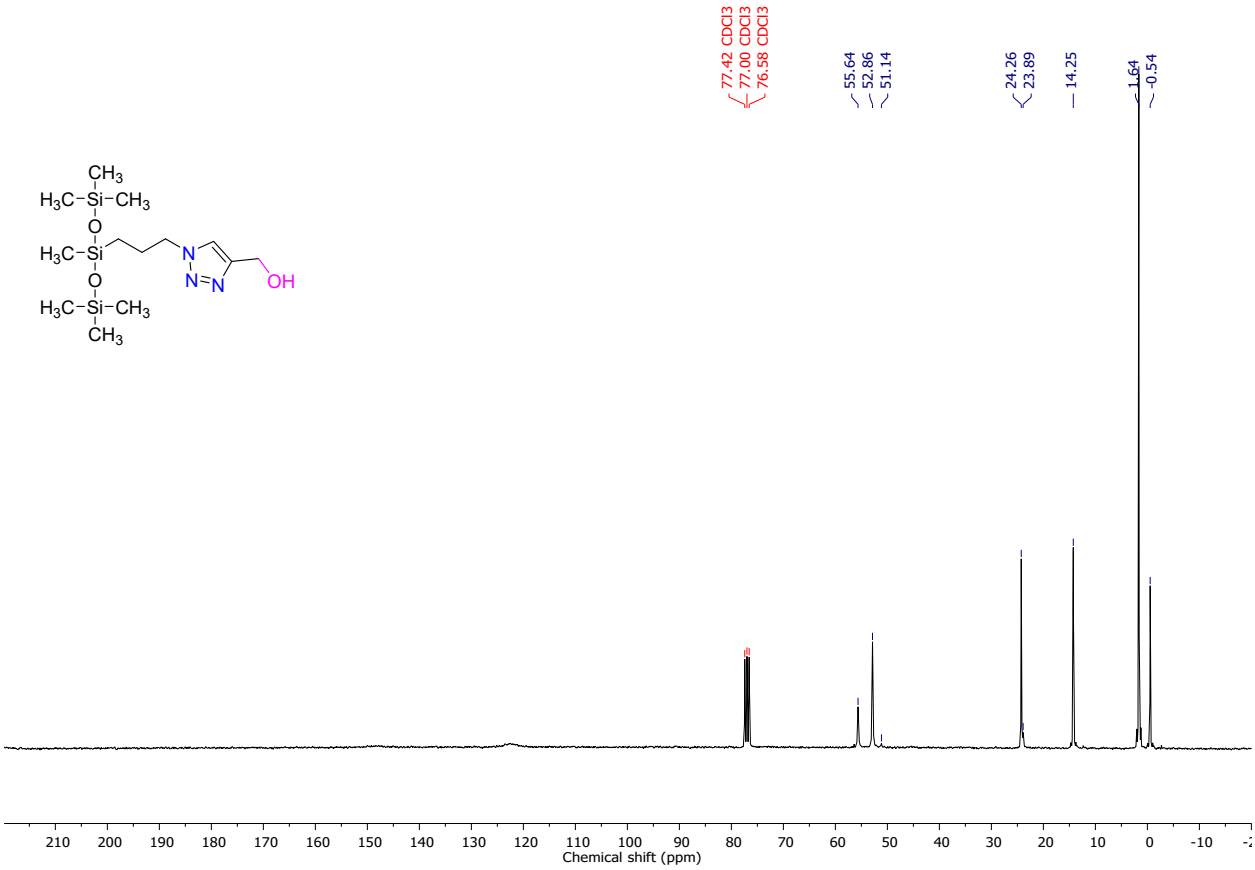

Figure S33. ^{13}C NMR spectrum of 1-8

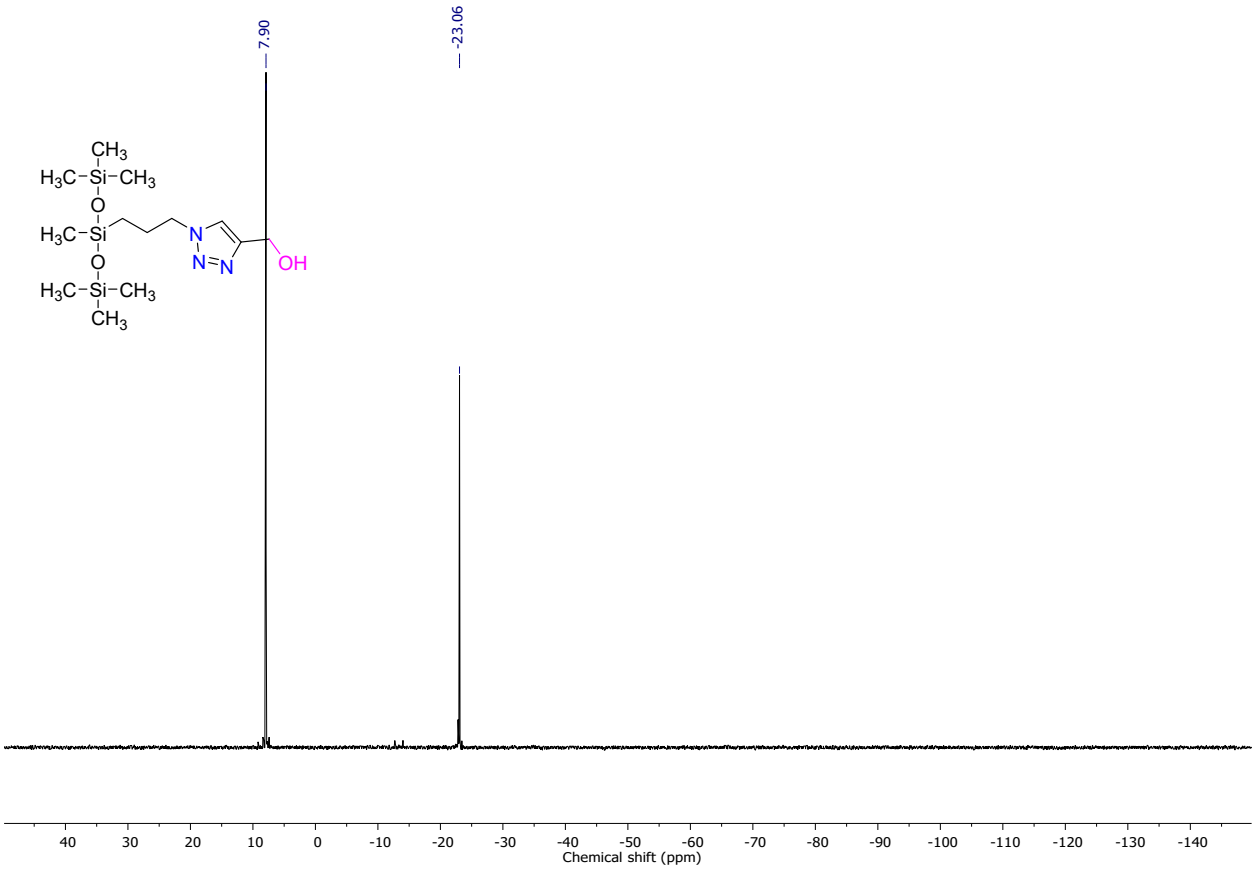

Figure S34. ^{29}Si NMR spectrum of 1-8

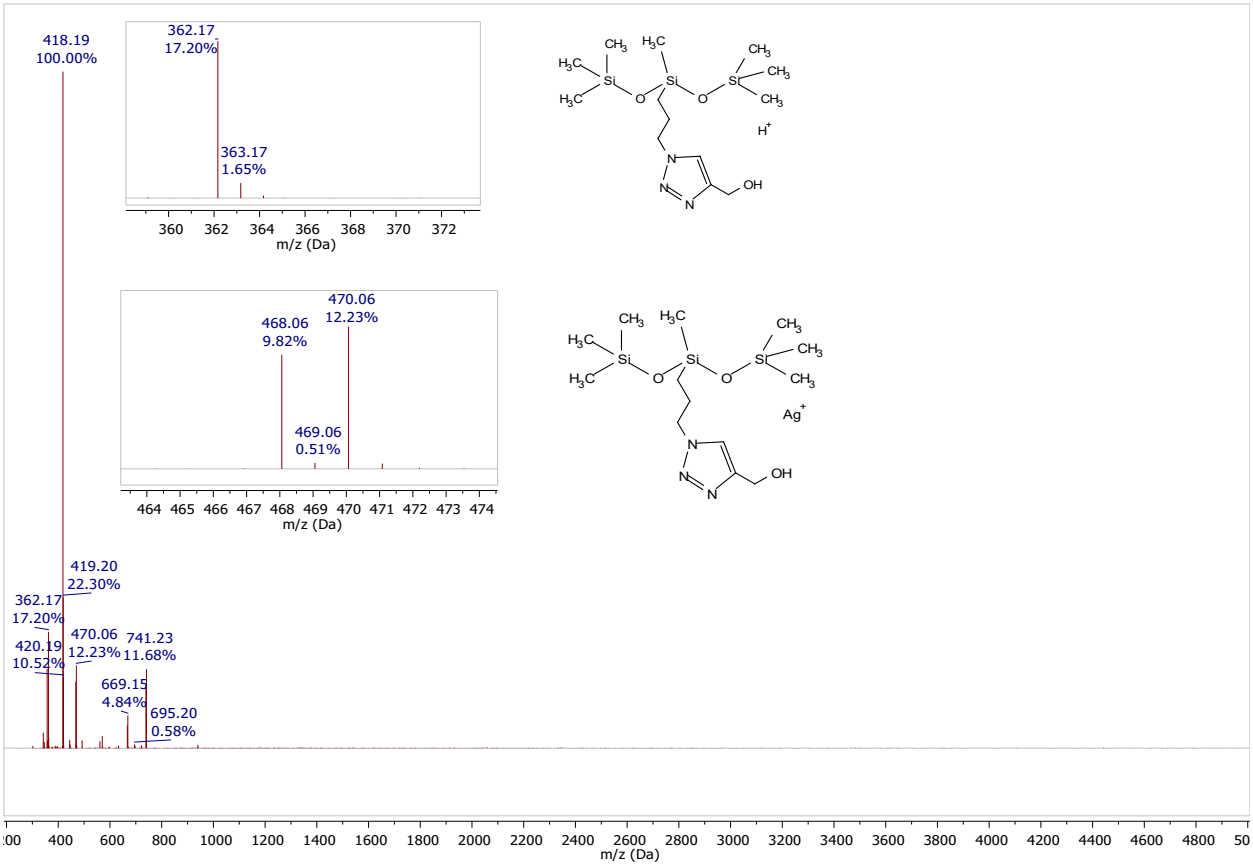

Figure S35. Mass spectrum MALDI-ToF of compound 1-8

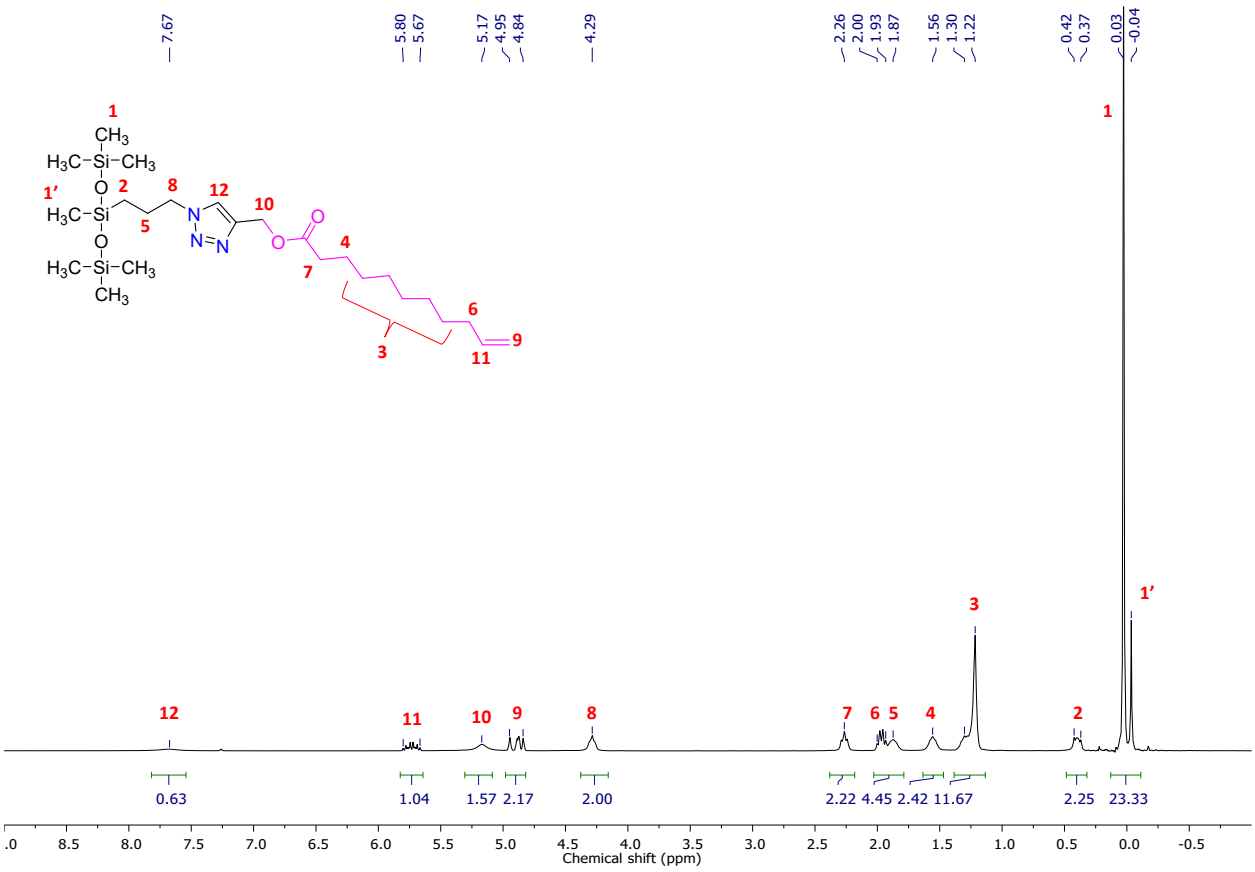

Figure S36. ^{1}H NMR spectrum of 1-9

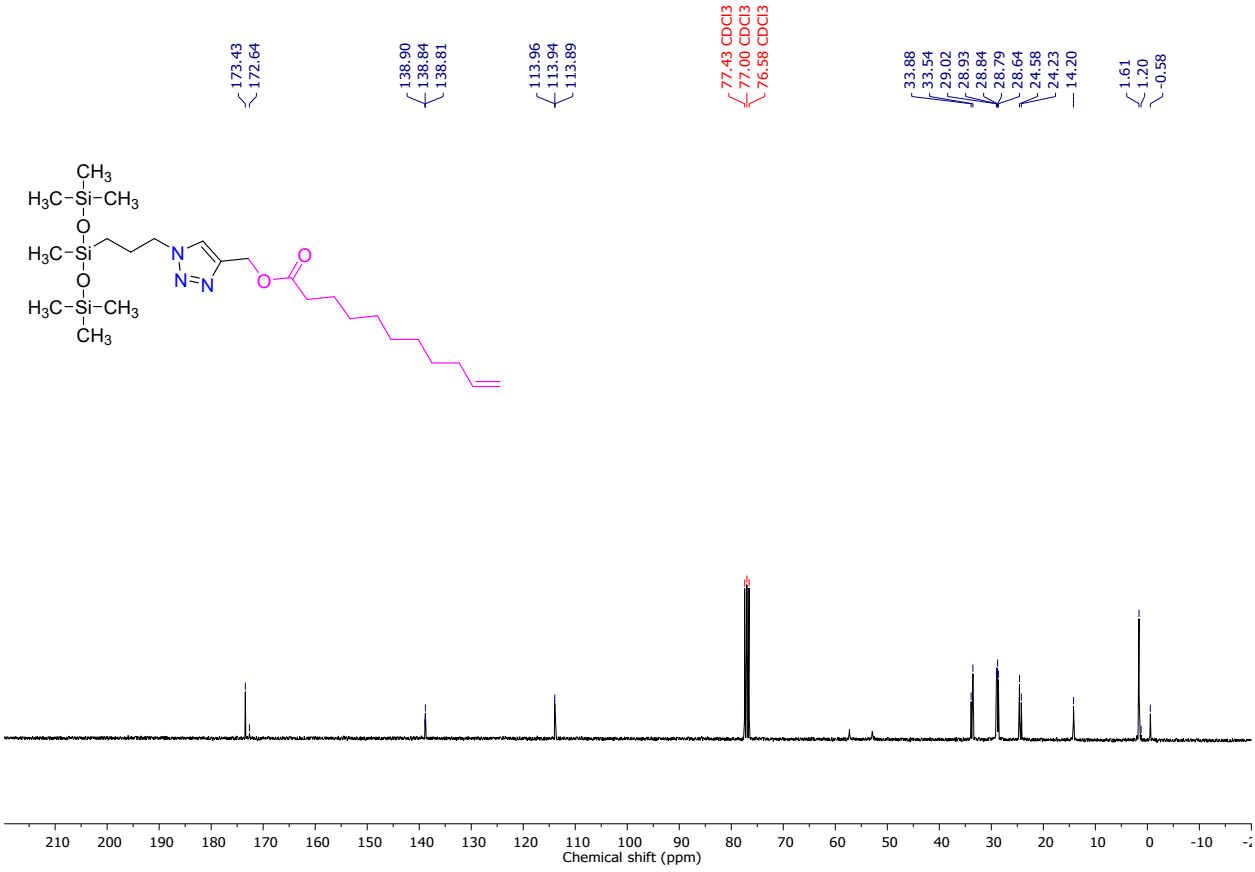

Figure S37. ^{13}C NMR spectrum of 1-9

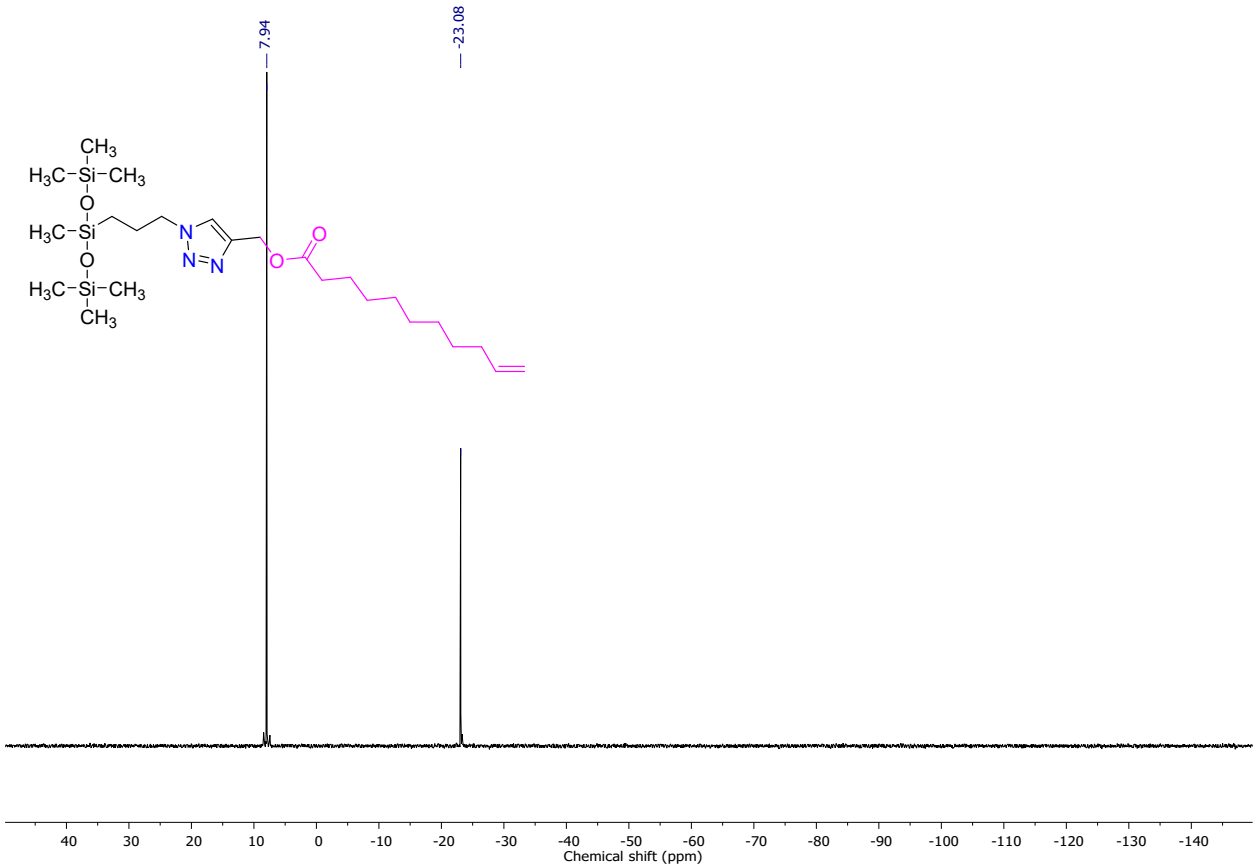

Figure S38. ^{29}Si NMR spectrum of 1-9

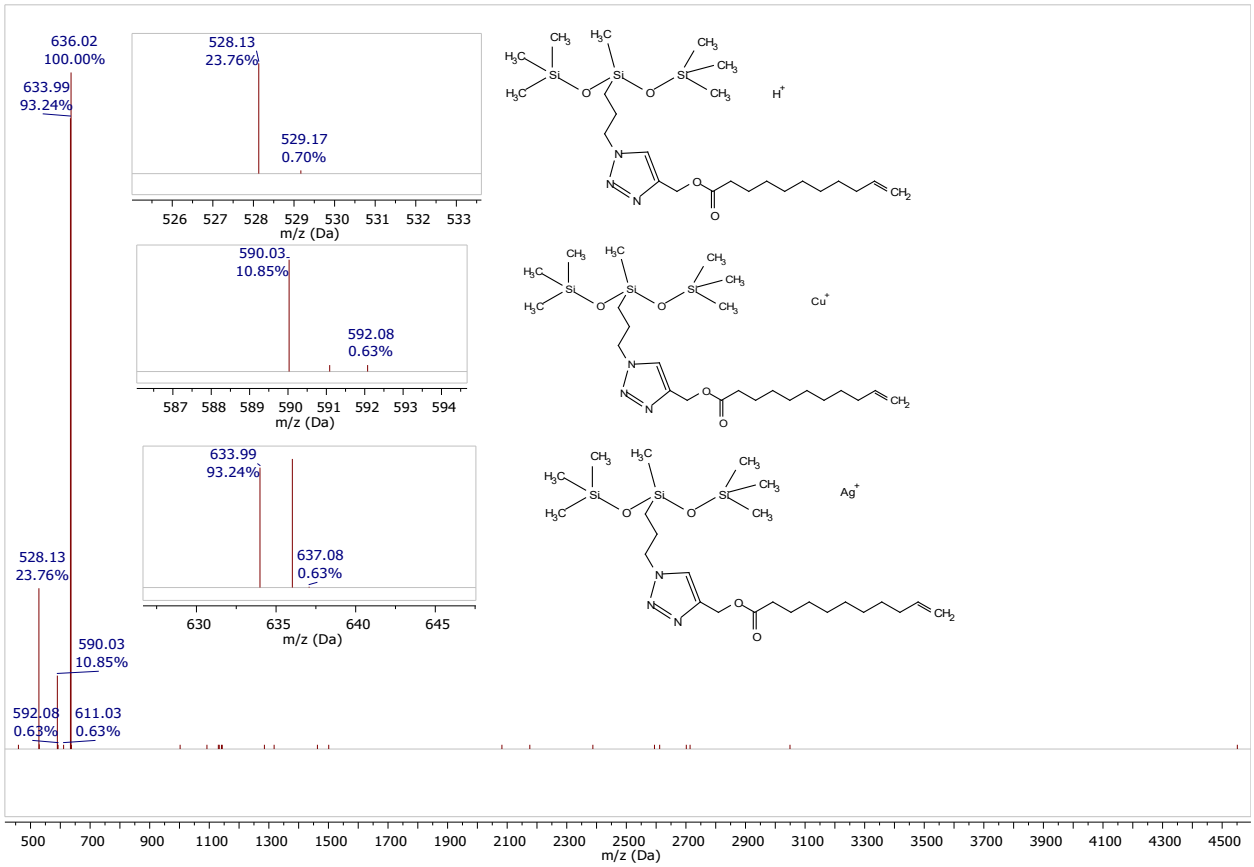

Figure S39. Mass spectrum MALDI-ToF of compound 1-9

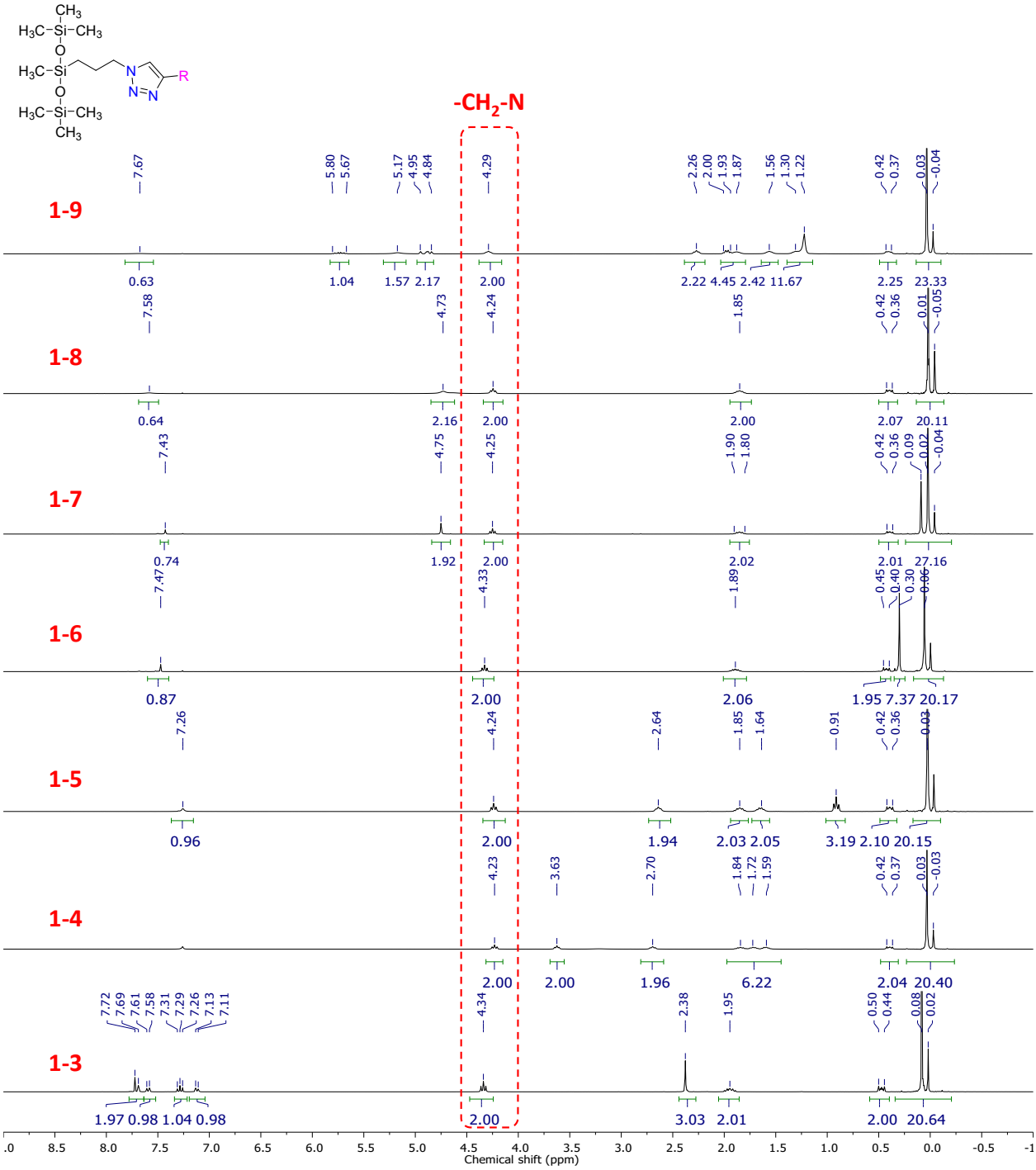

Figure S40. ^{1}H NMR spectra of triazole-functional silanes

3. NMR spectra and GPC curves of ethynylfunctional polydimethylsiloxanes

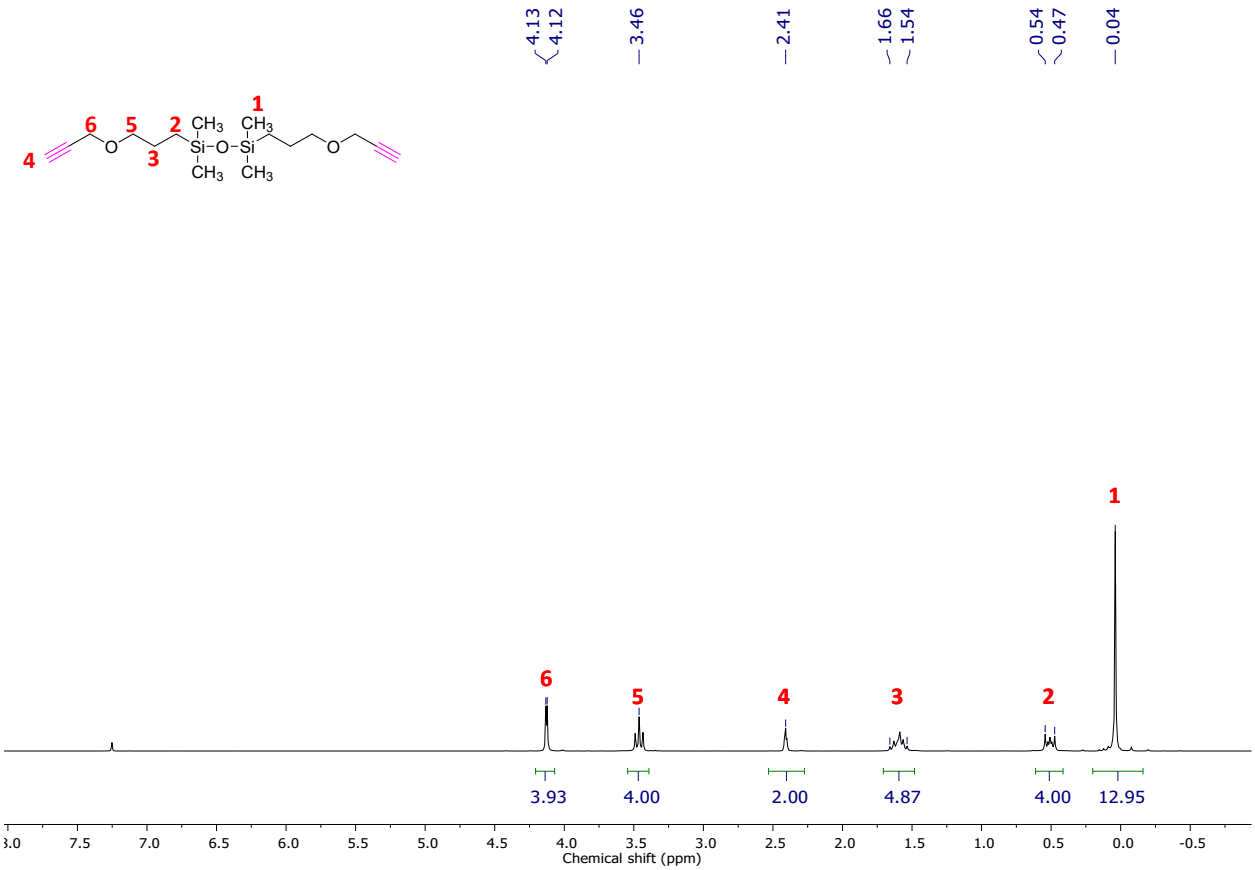

Figure S41. ^{1}H NMR spectrum of bis-(3-propargyloxy)tetramethyldisiloxane

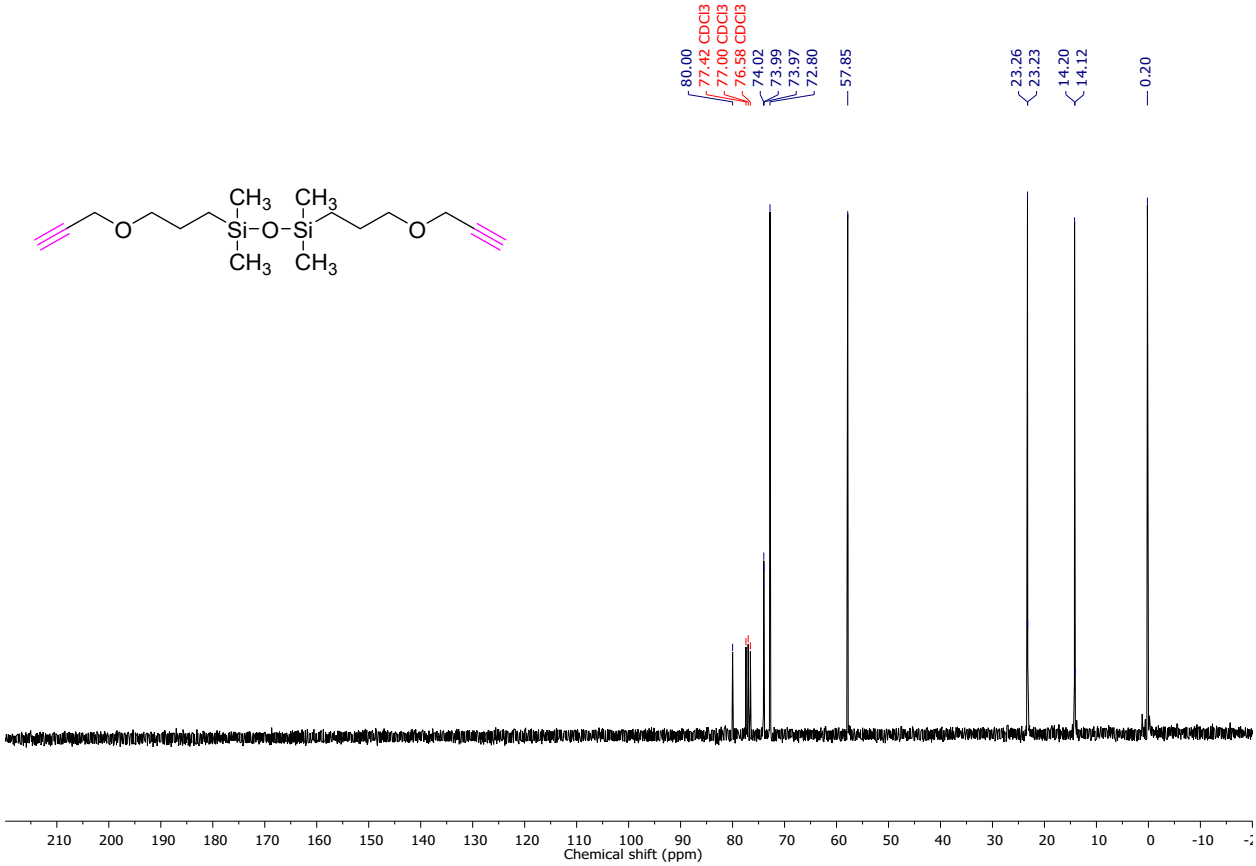

Figure S42. ^{13}C NMR spectrum of bis-(3-propargyloxy)tetramethyldisiloxane

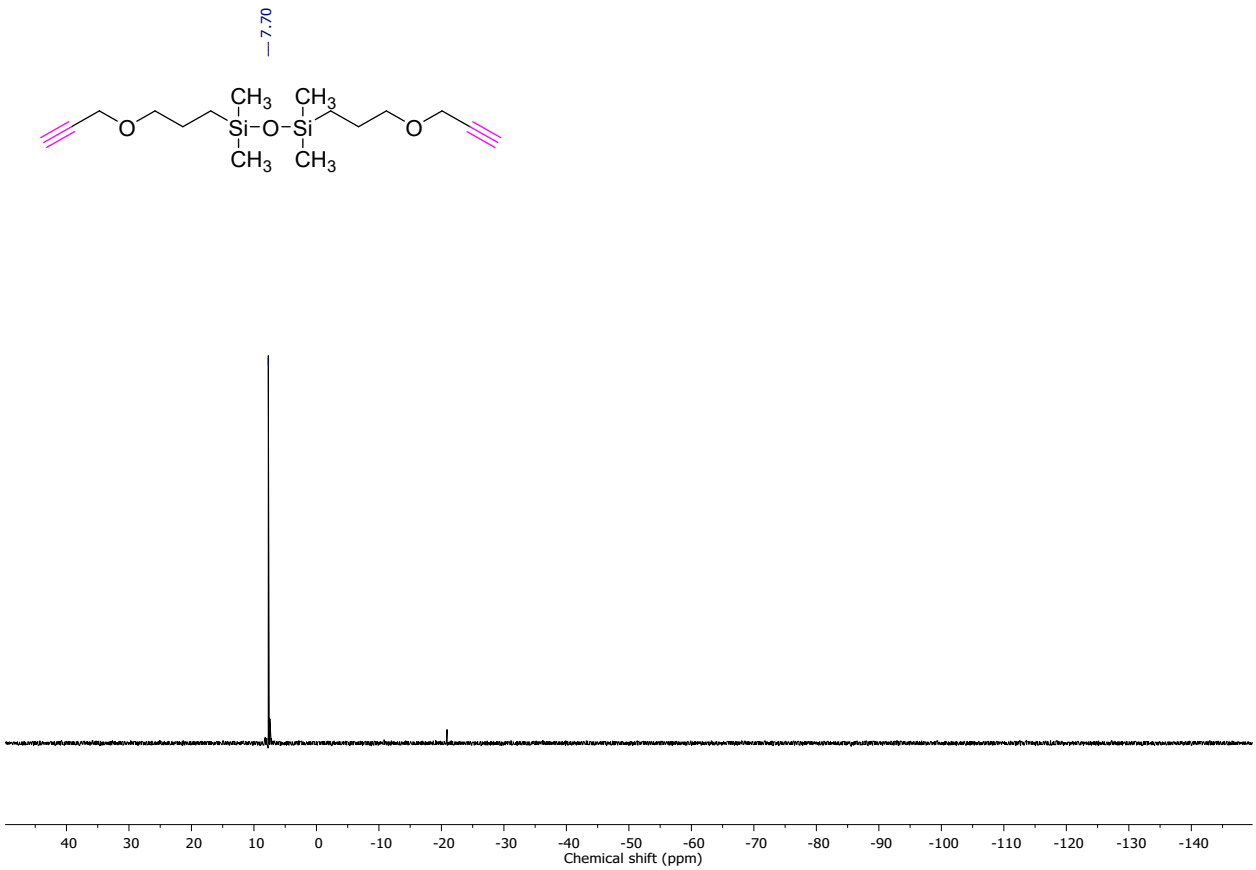

Figure S43. ^{29}Si NMR spectrum of bis-(3-propargyloxy)tetramethyldisiloxane

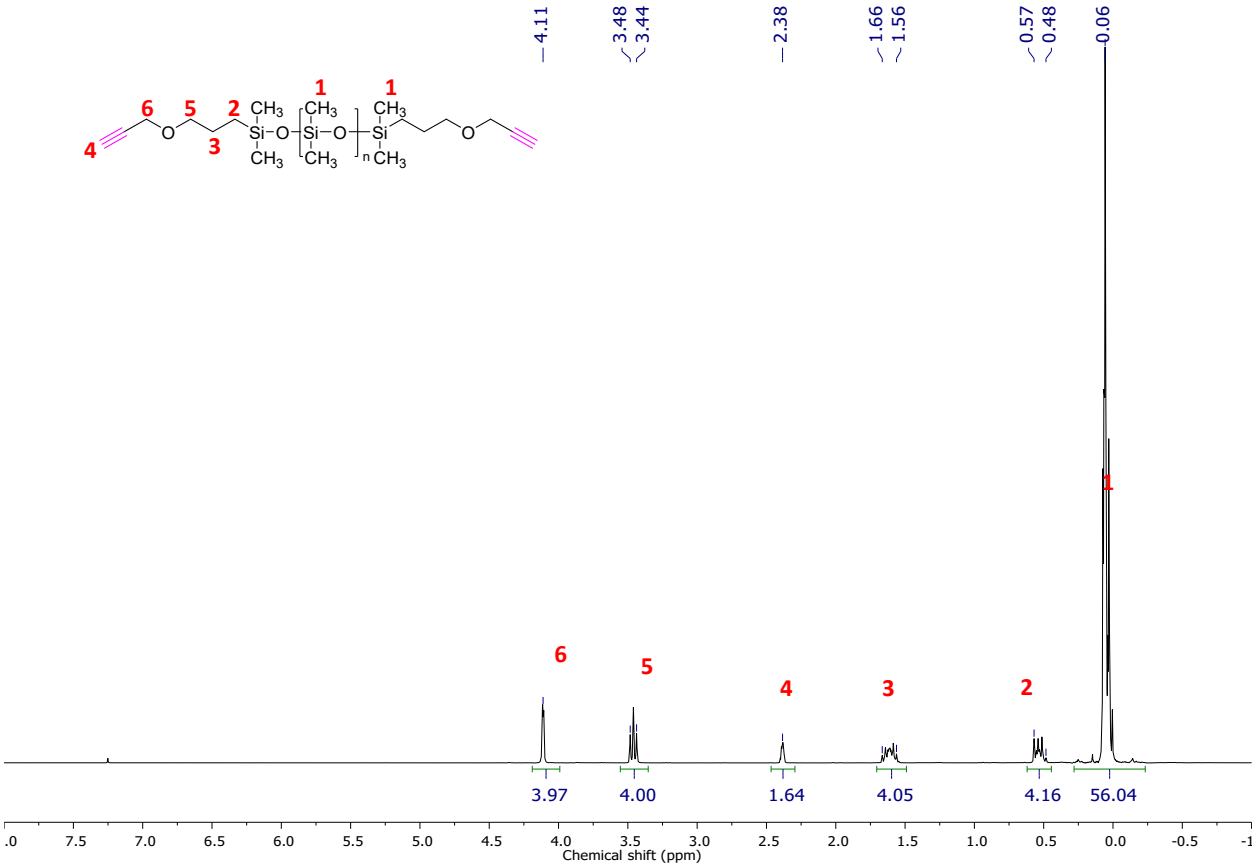

Figure S44. ^{1}H NMR spectrum of 2-1

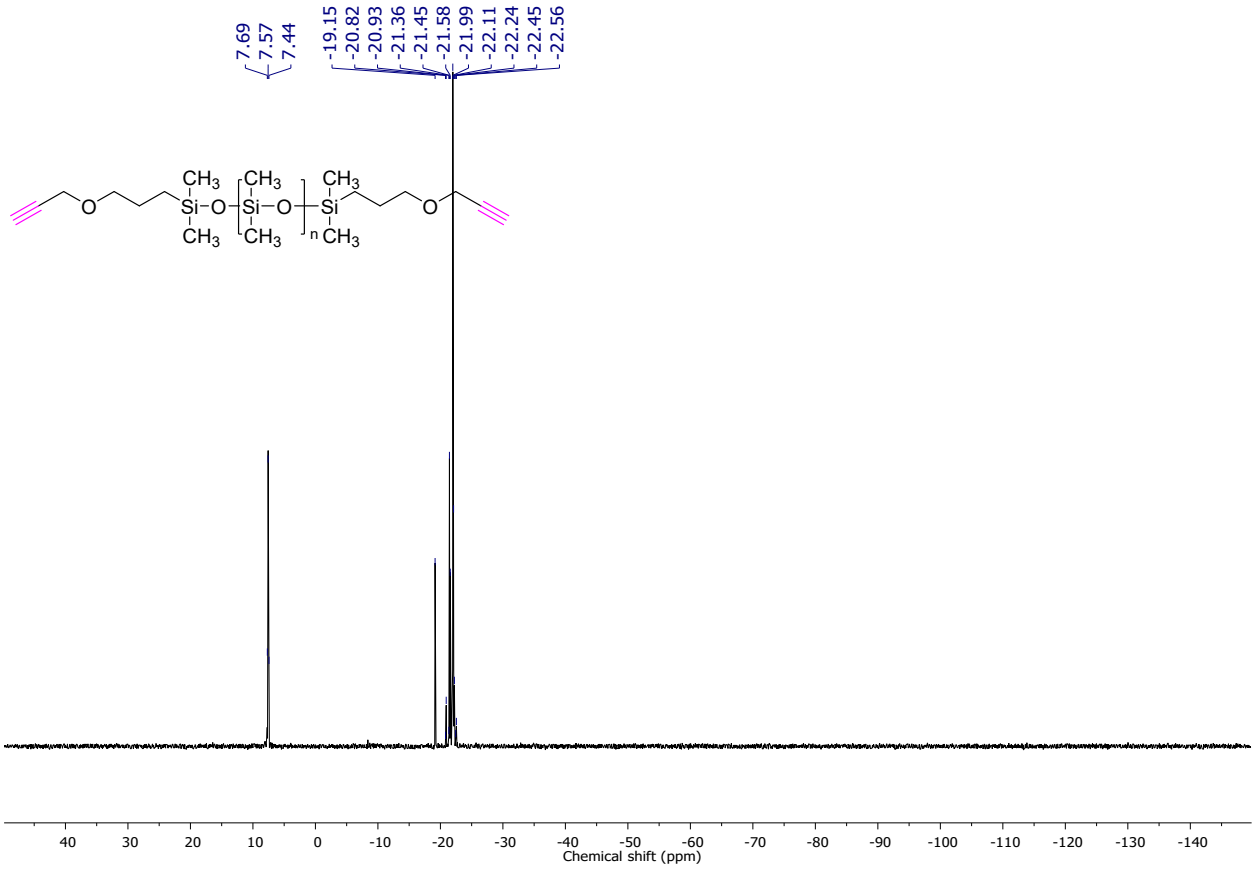

Figure S45. ^{29}Si NMR spectrum of 2-1

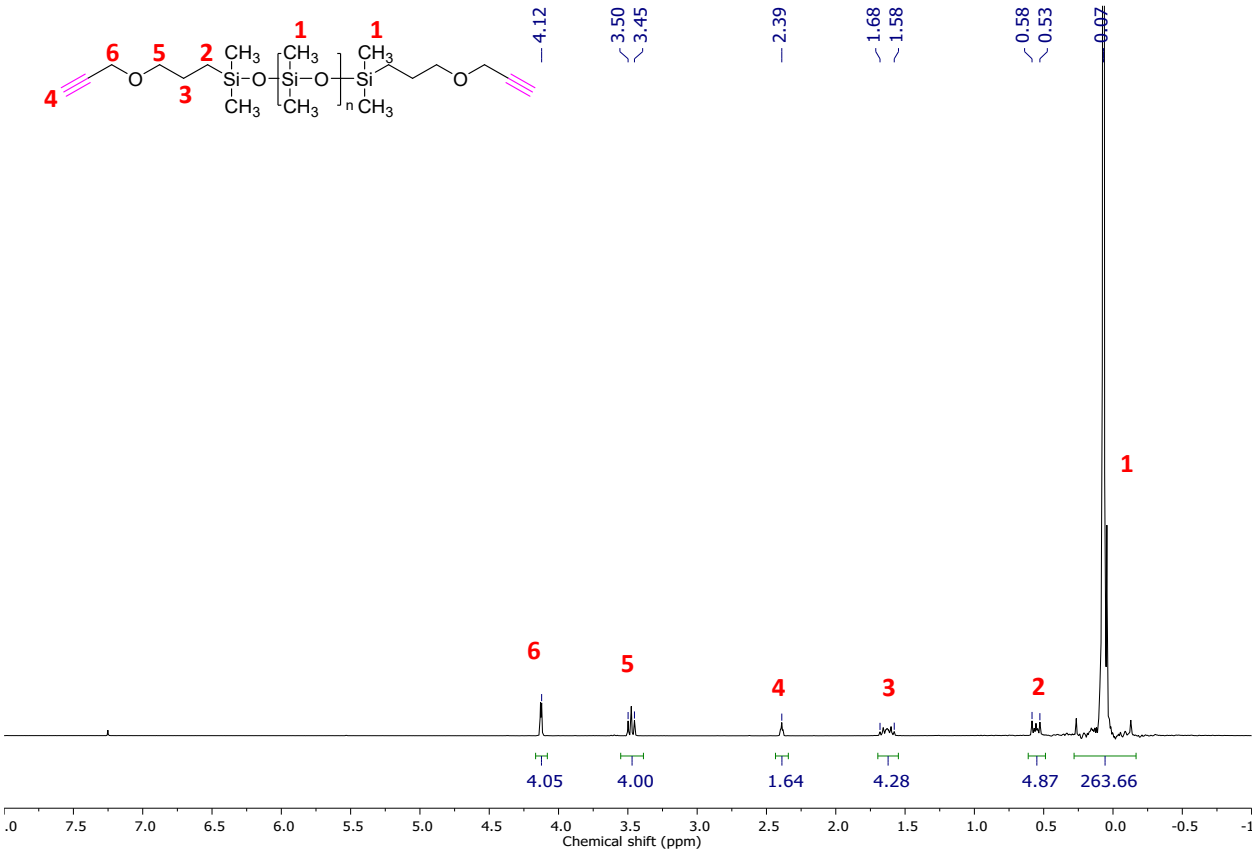

Figure S46. ^{1}H NMR spectrum of 2-2

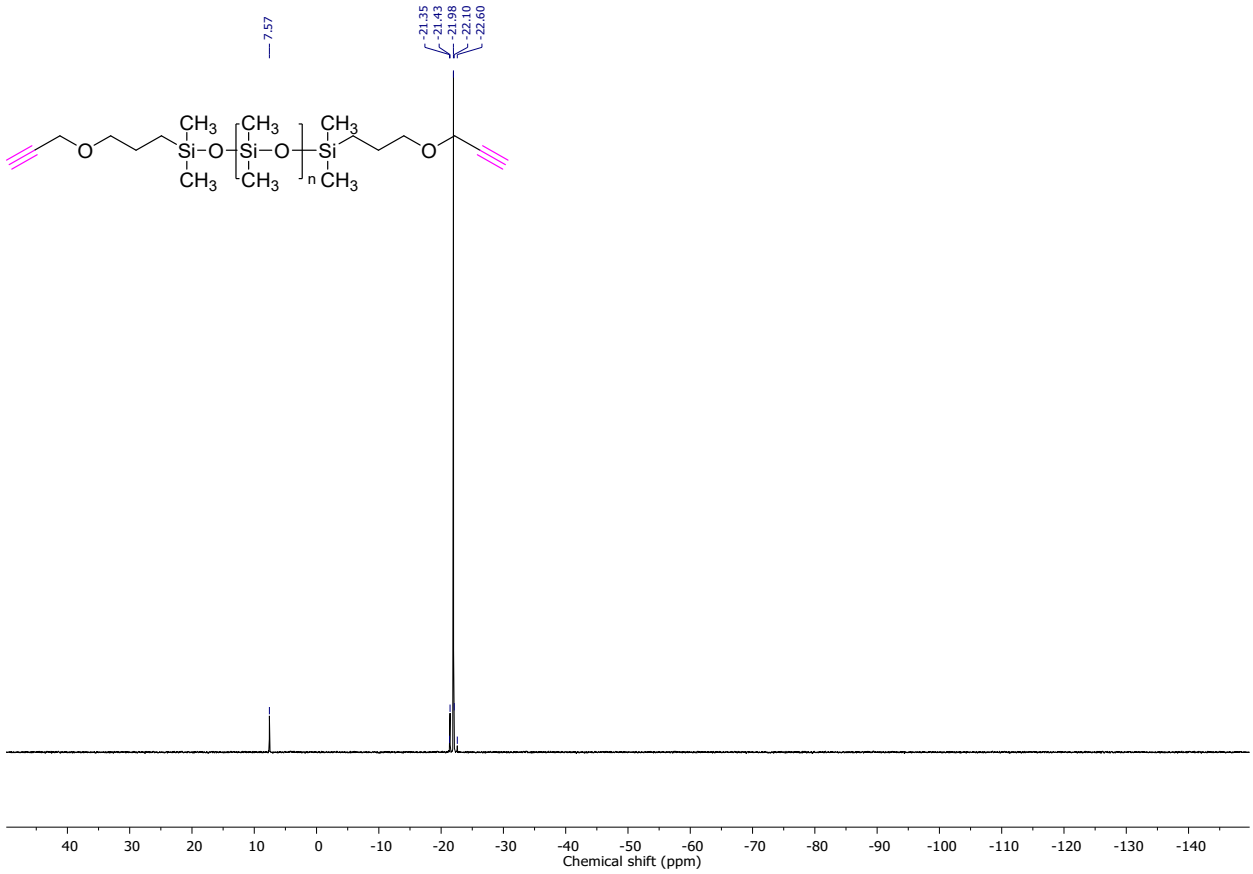

Figure S47. ^{29}Si NMR spectrum of 2-2

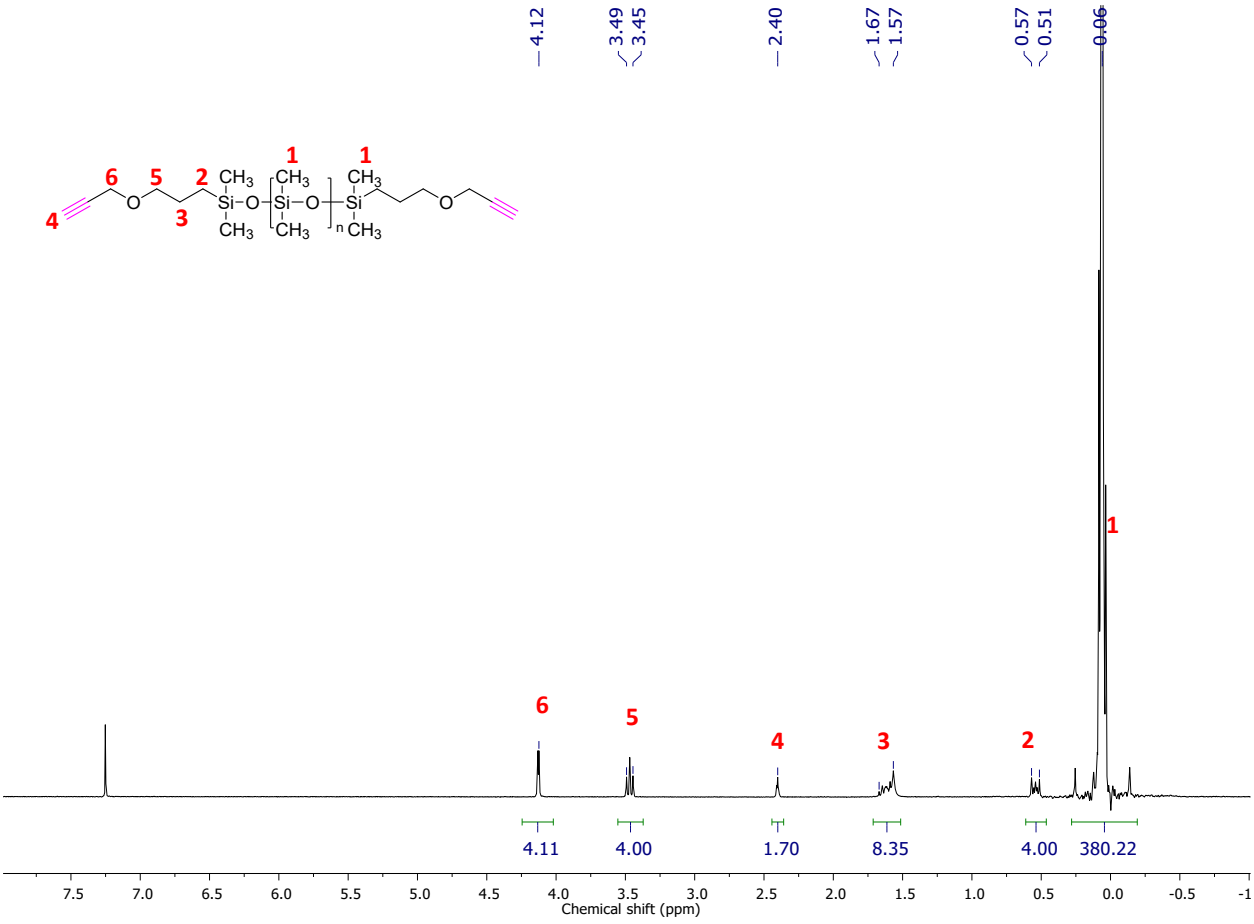

Figure S48. ^{1}H NMR spectrum of 2-3

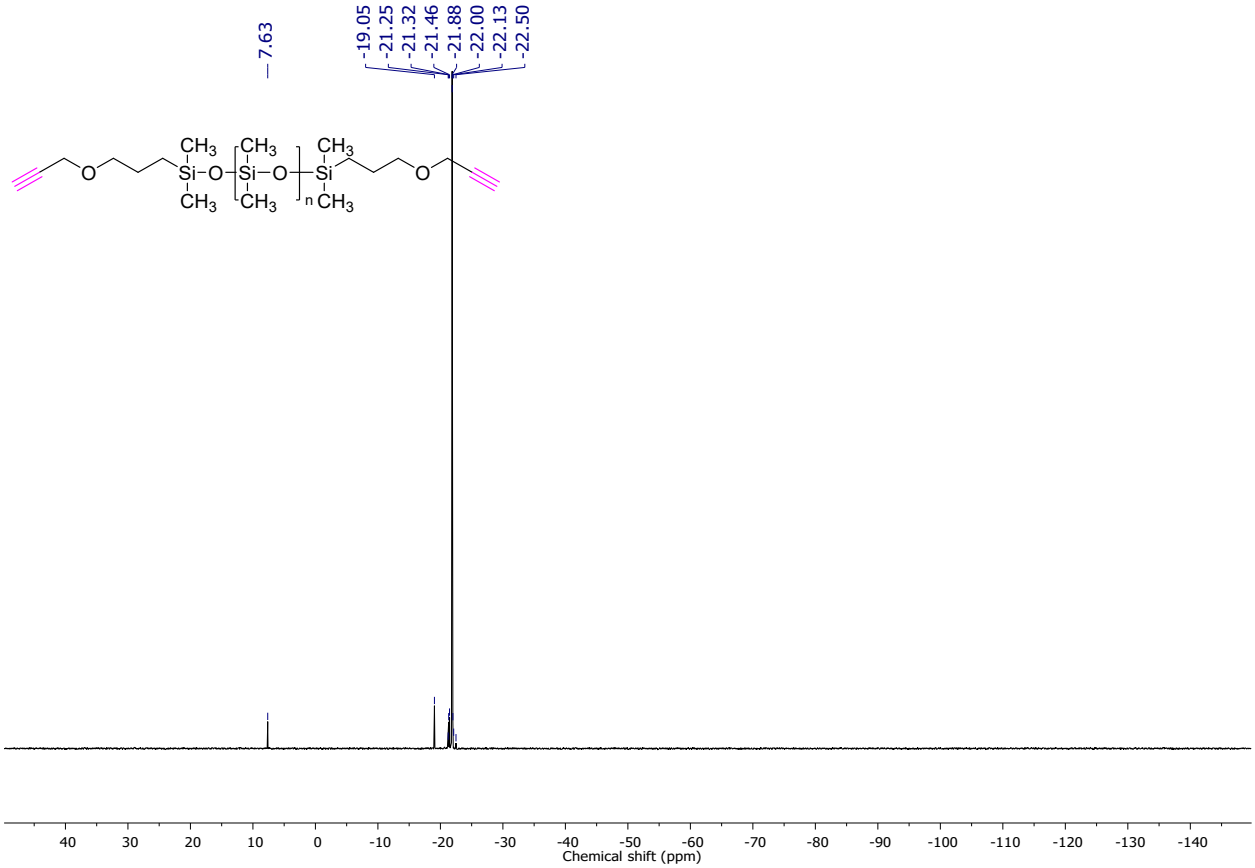

Figure S49. ^{29}Si NMR spectrum of 2-3

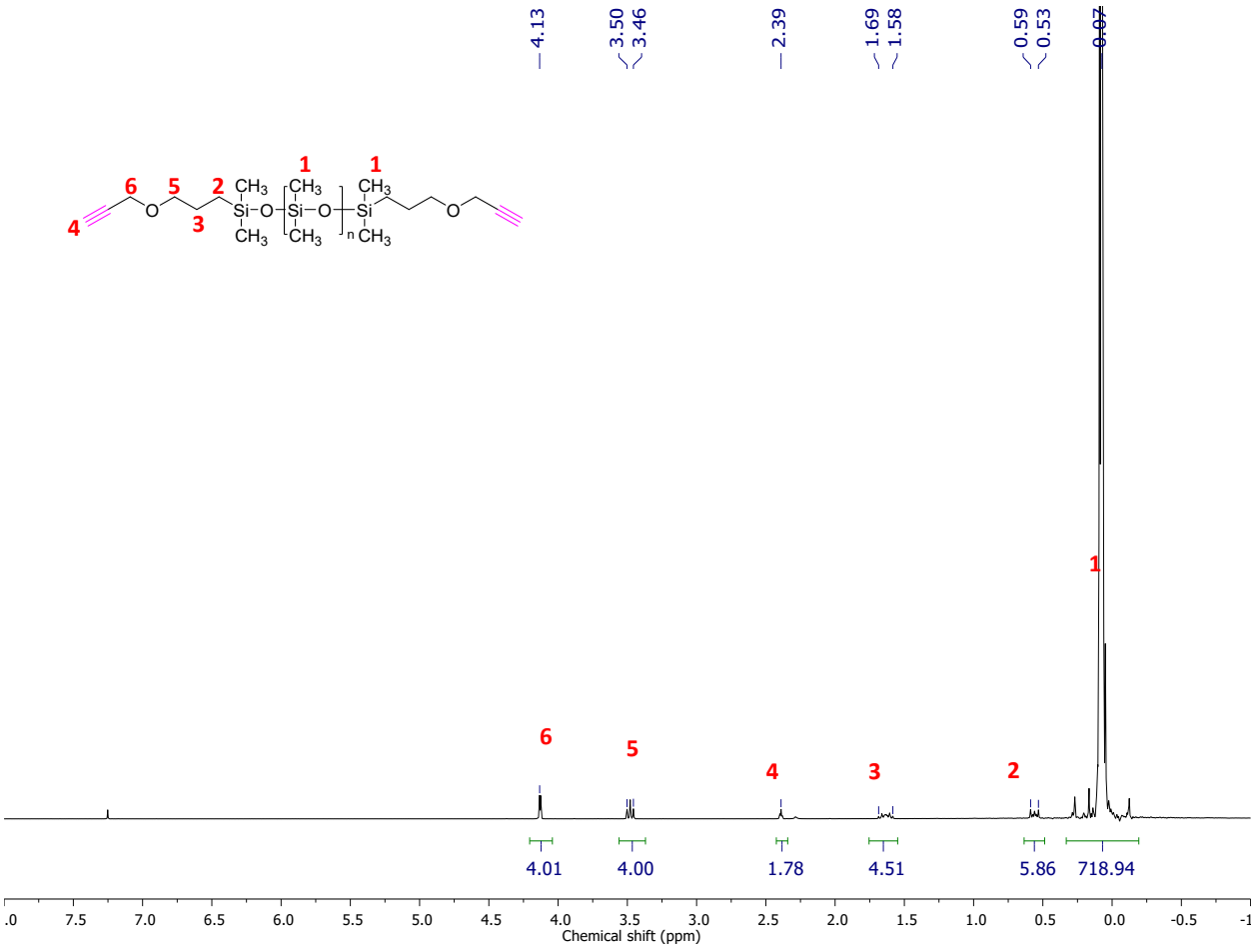

Figure S50. ^{1}H NMR spectrum of 2-4

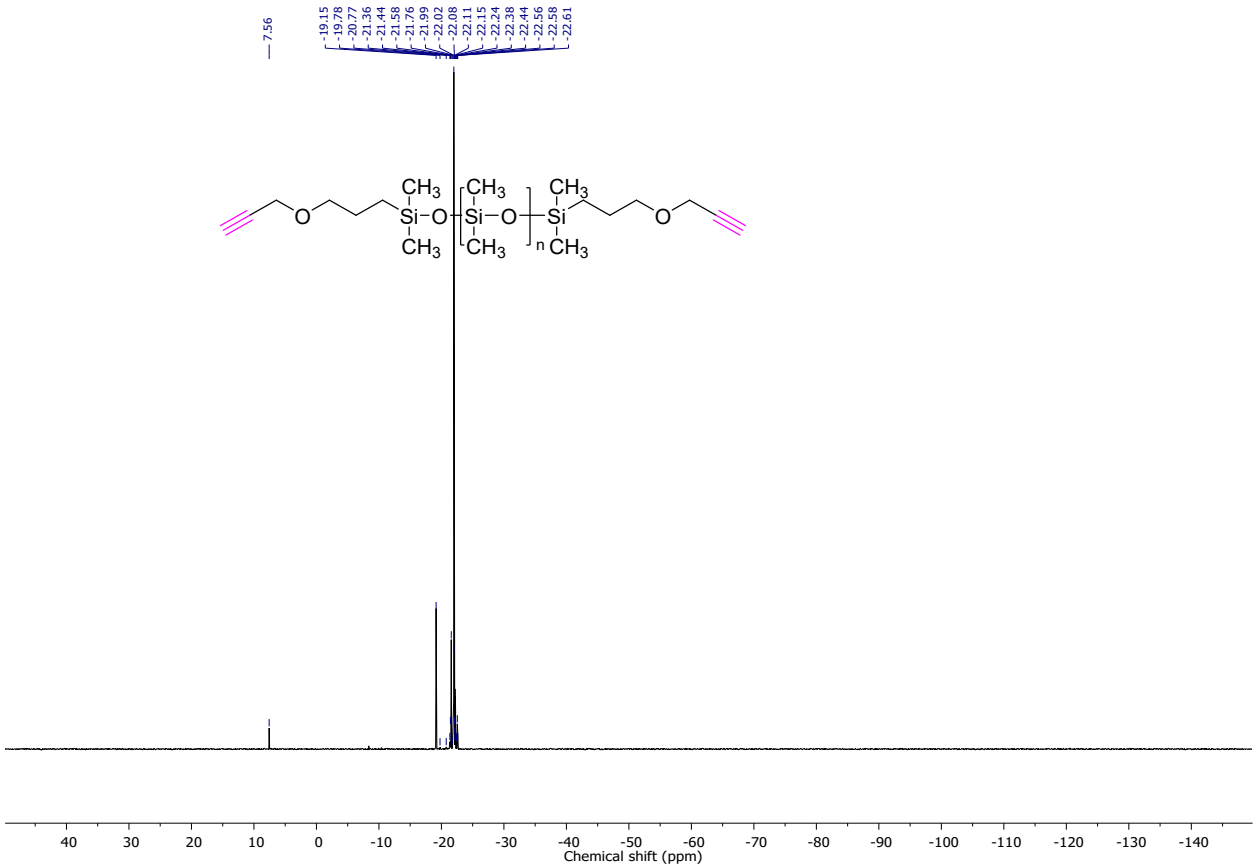

Figure S51. ^{29}Si NMR spectrum of 2-4

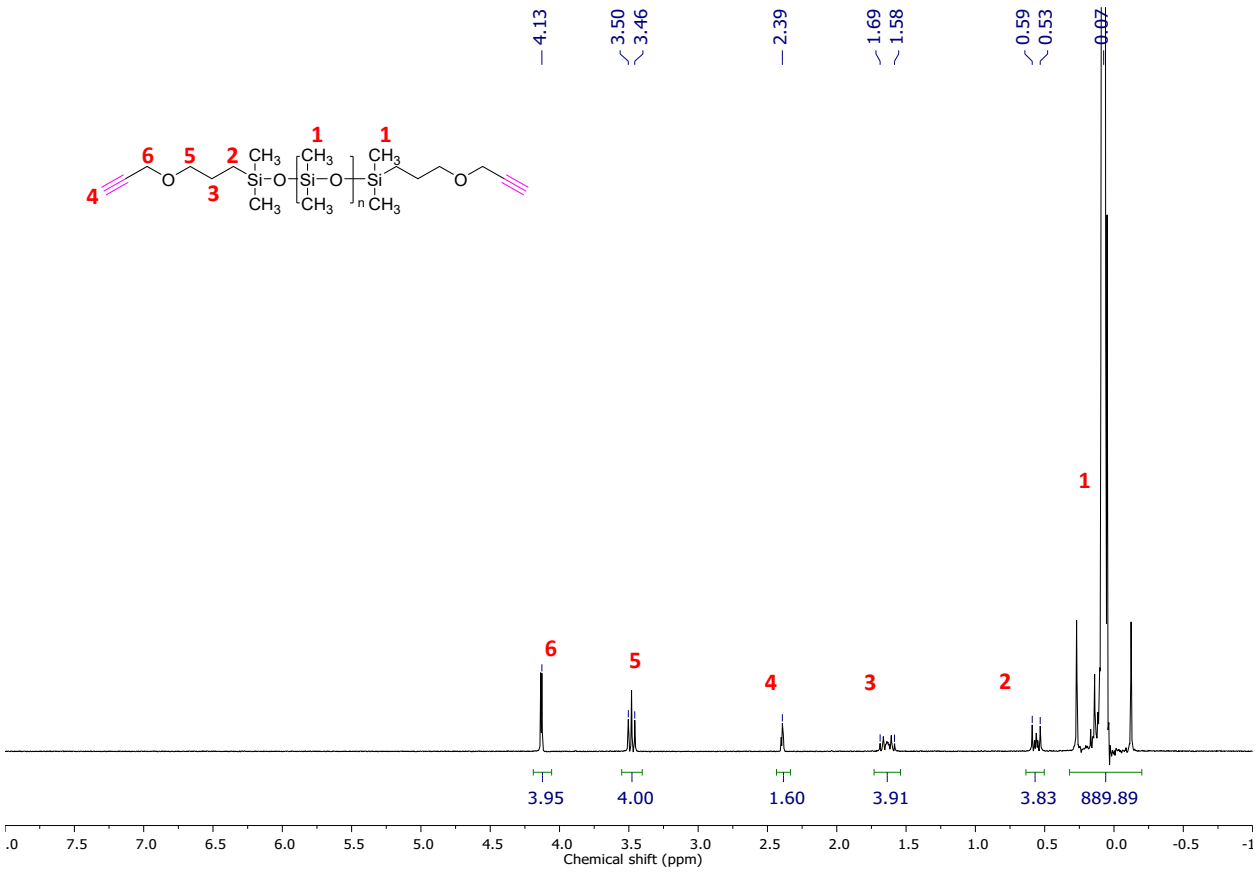

Figure S52. ^{1}H NMR spectrum of 2-5

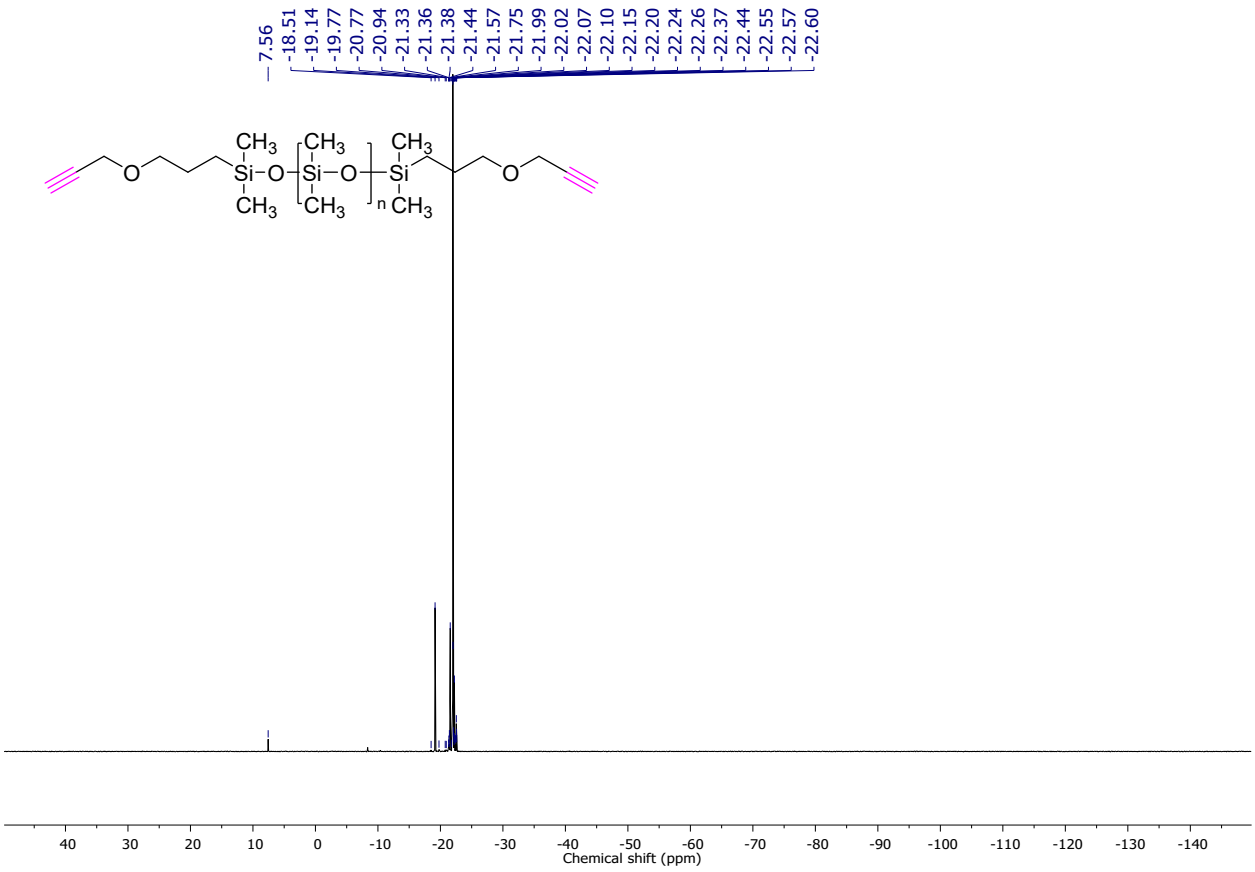

Figure S53. ^{29}Si NMR spectrum of 2-5

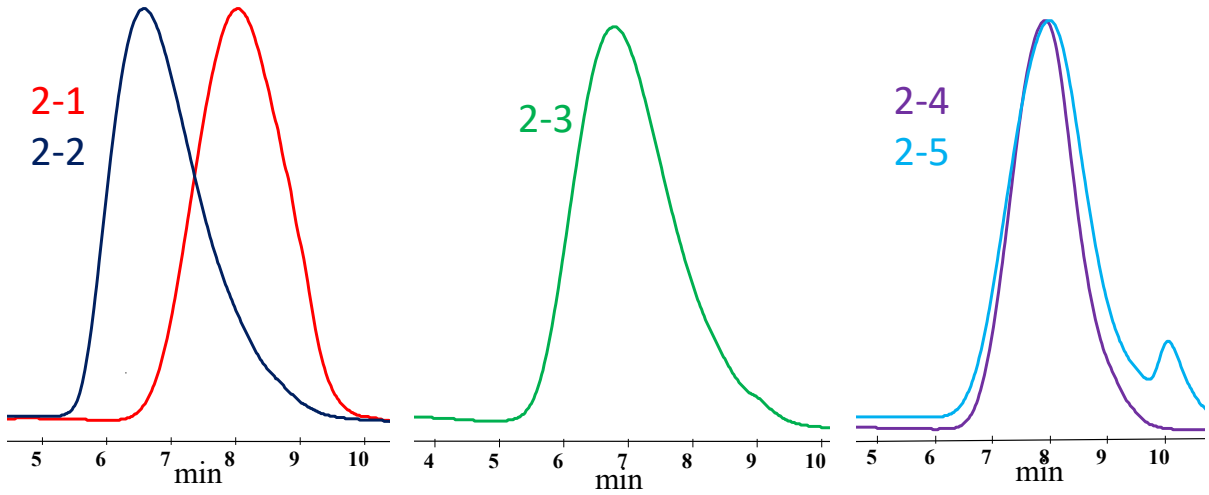

Figure S54. GPC curves of the obtained ethynyl-containing PDMS

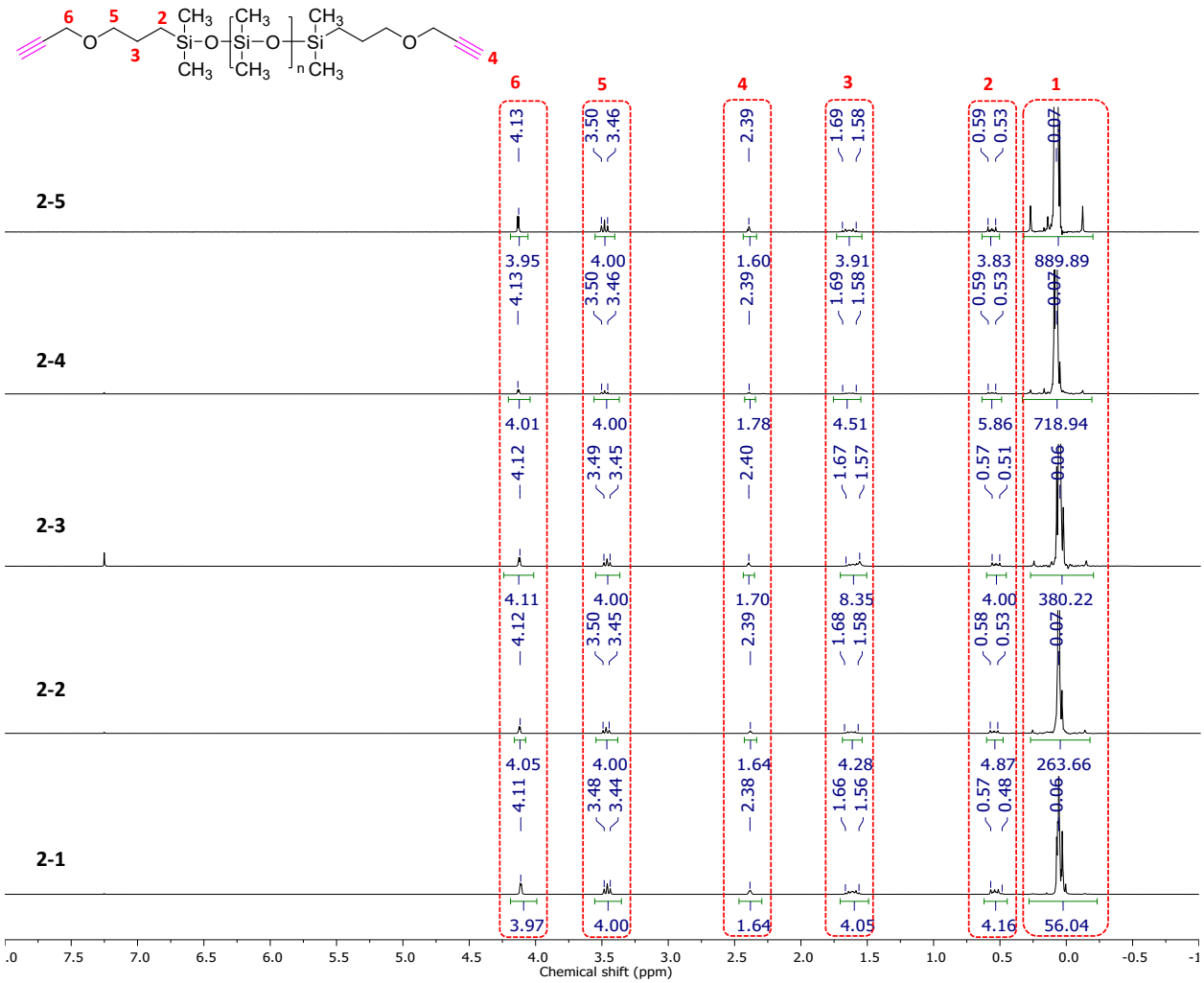

Figure S55. ^{1}H NMR spectra of the obtained ethynyl-containing PDMS

4. NMR spectra and GPC curves of functional siloxanes

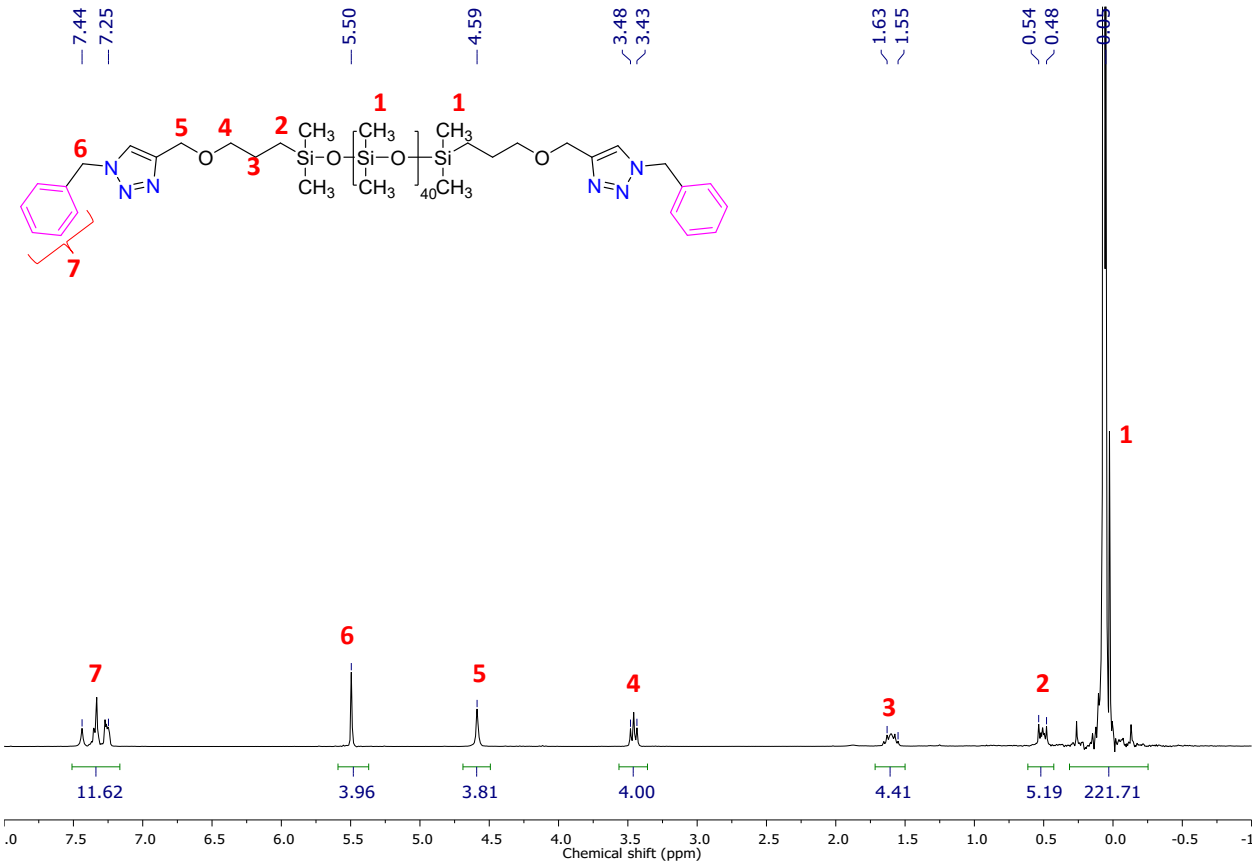

Figure S56. ^{1}H NMR spectrum of 3-1

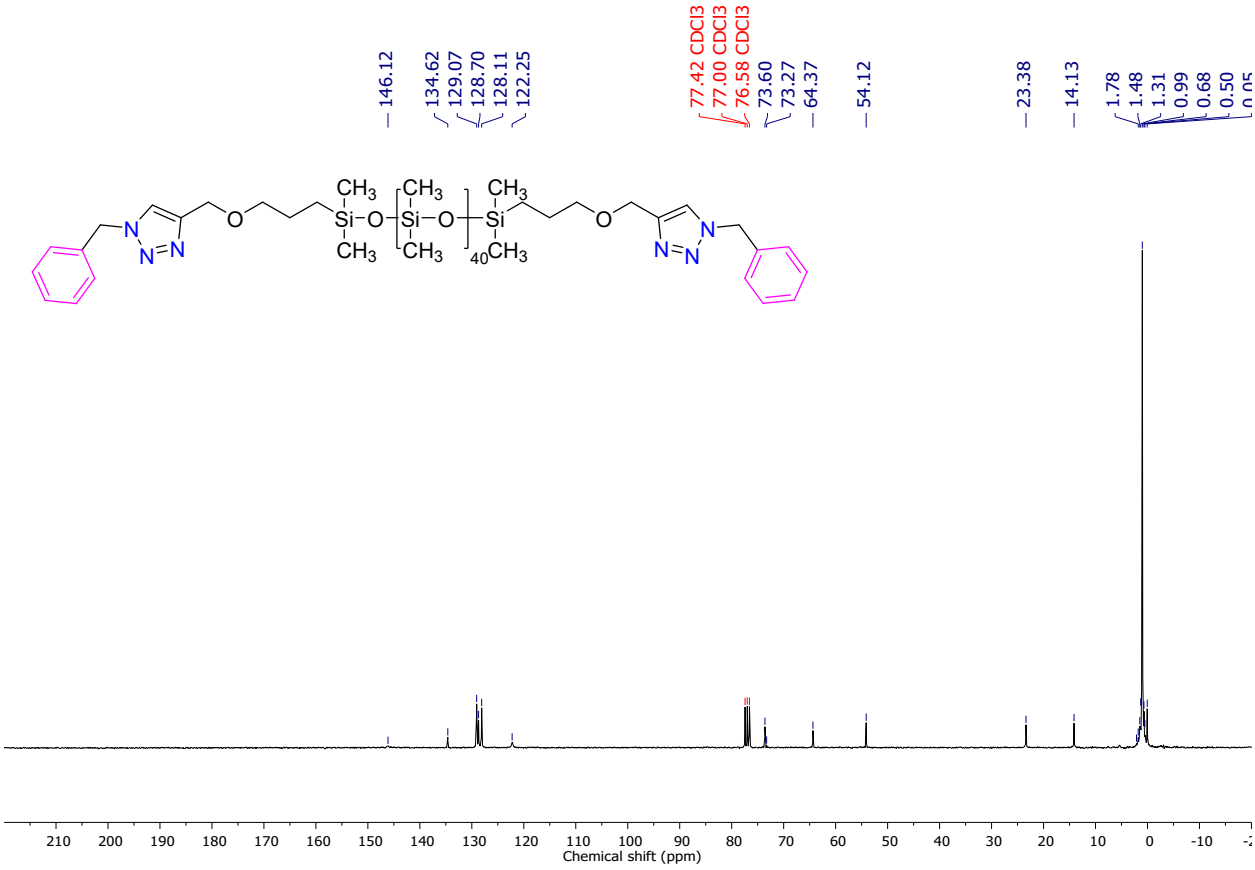

Figure S57. ^{13}C NMR spectrum of 3-1

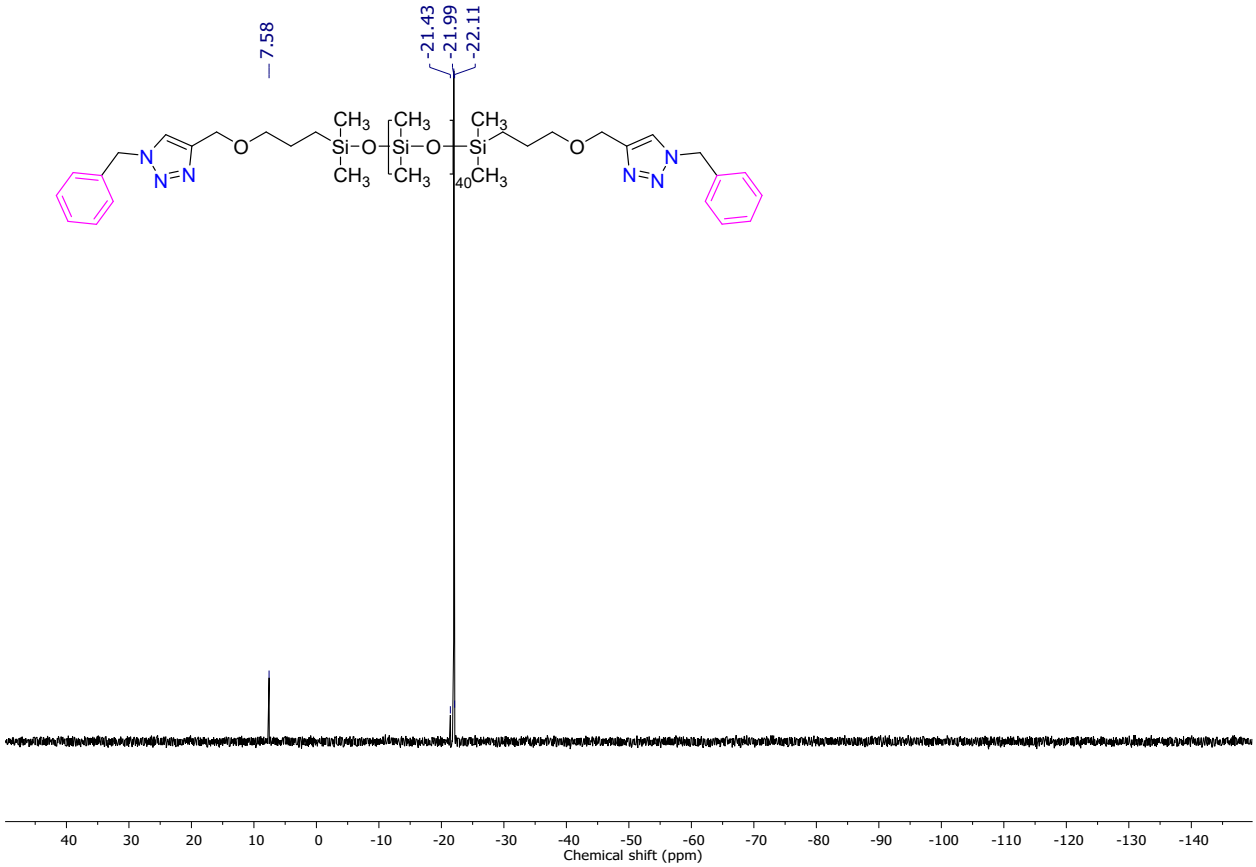

Figure S58. ^{29}Si NMR spectrum of 3-1

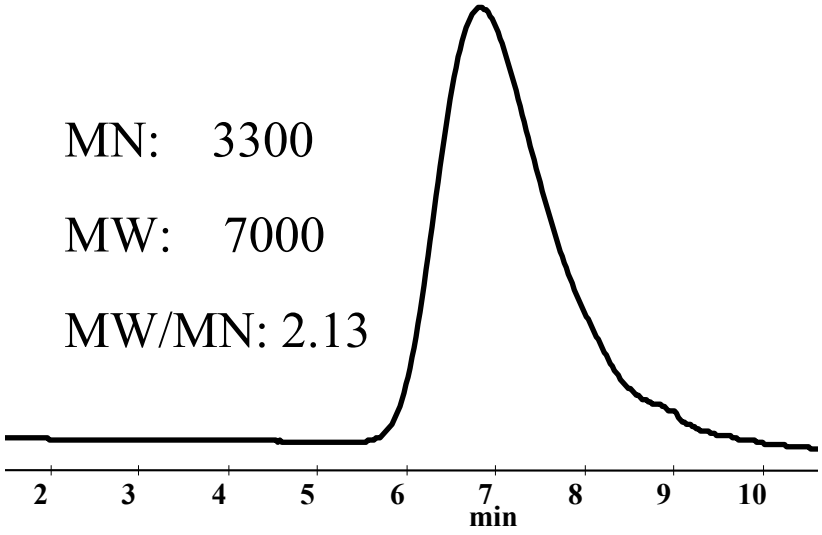

Figure S59. GPC curve of 3-1

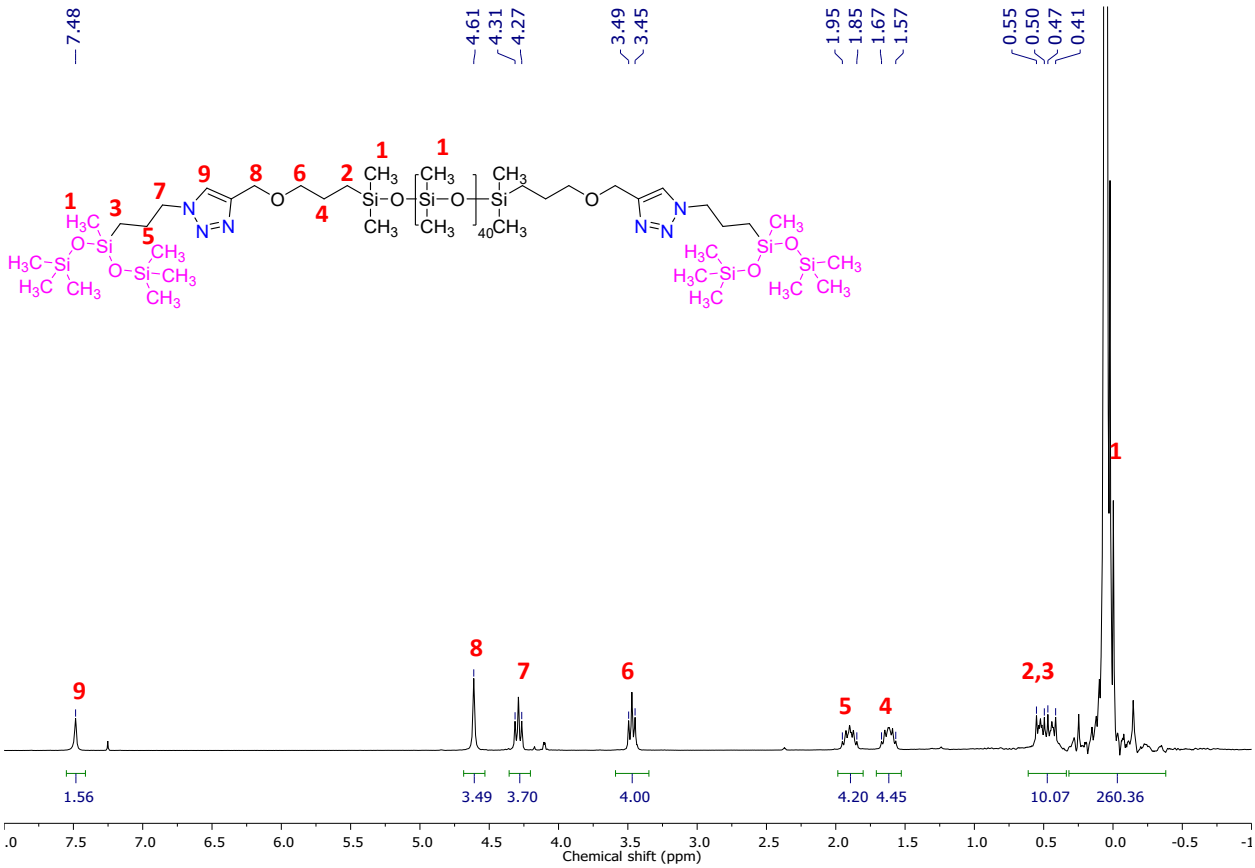

Figure S60. ^{1}H NMR spectrum of 3-2

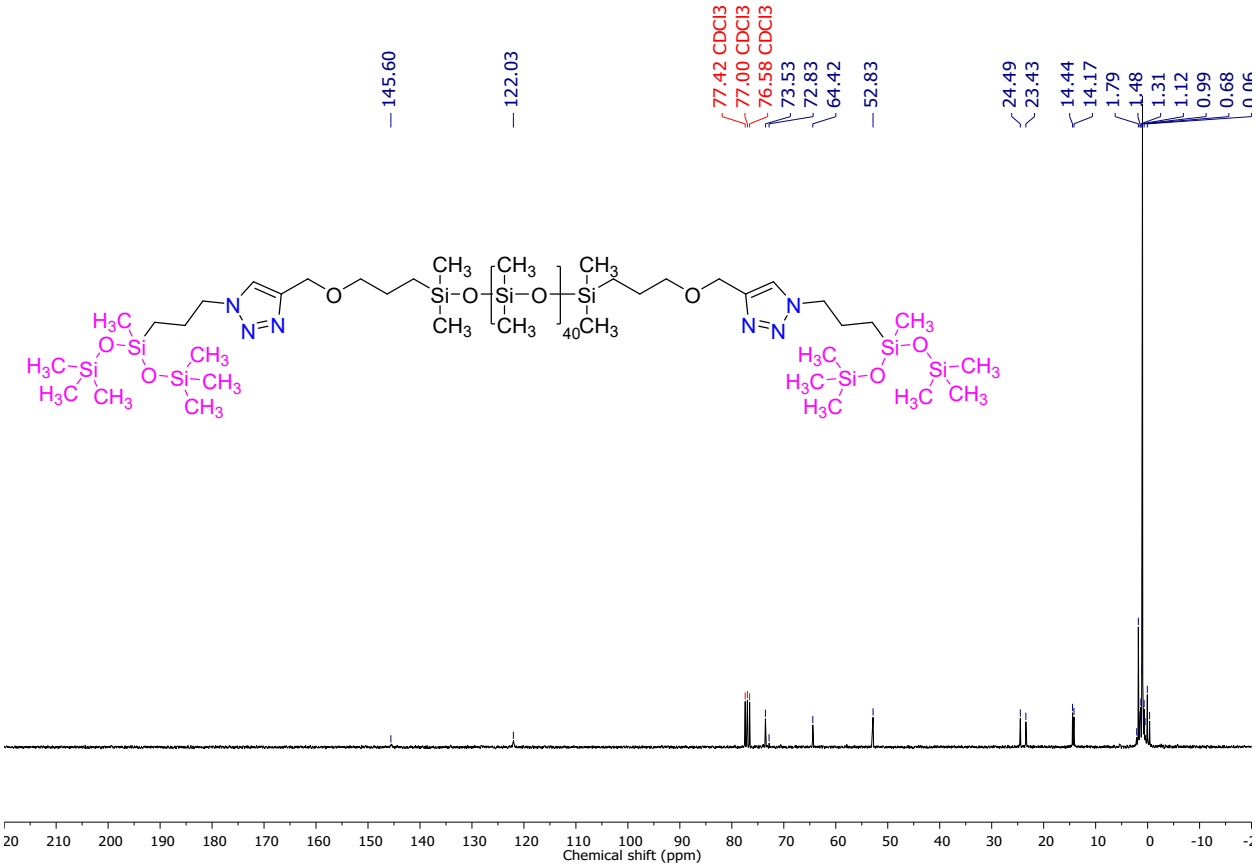

Figure S61. ^{13}C NMR spectrum of 3-2

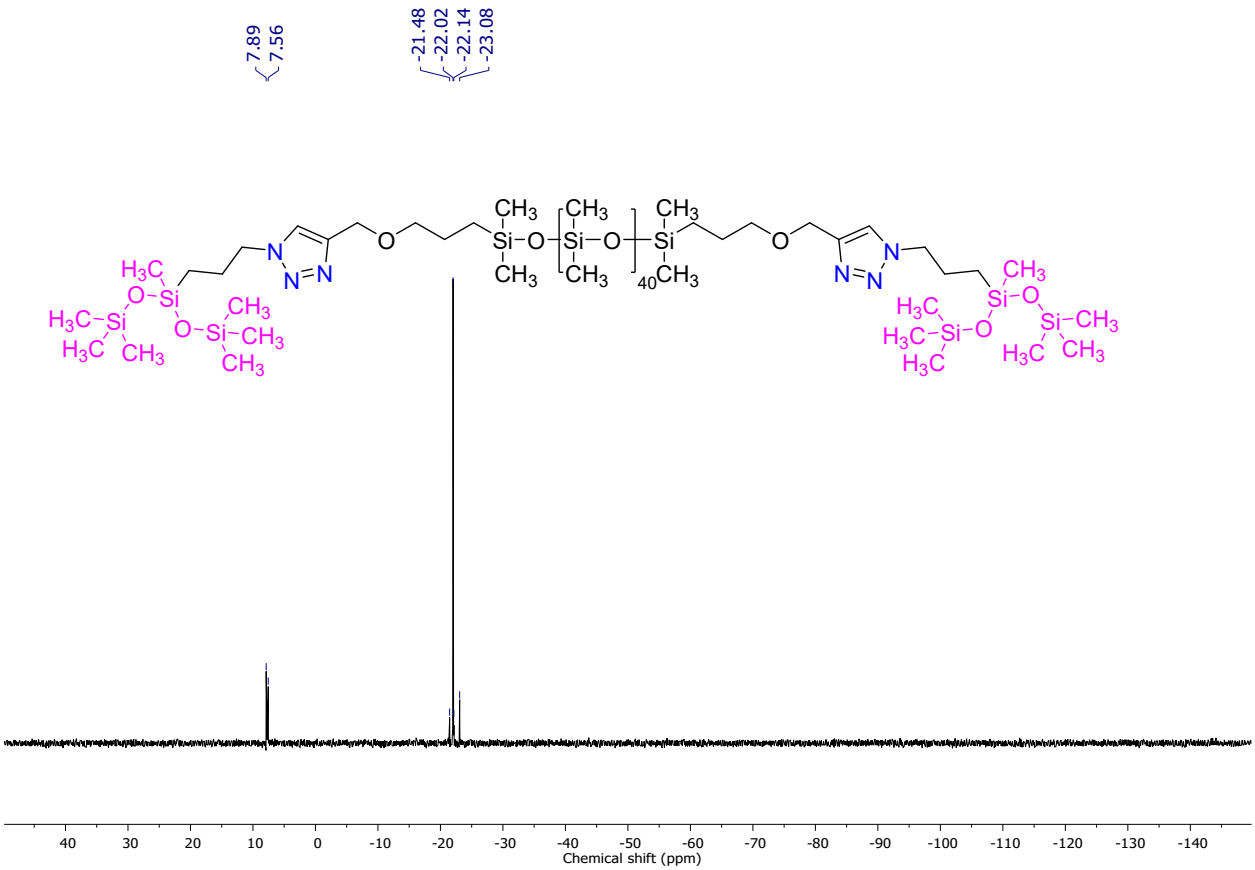

Figure S62. ^{29}Si NMR spectrum of 3-2

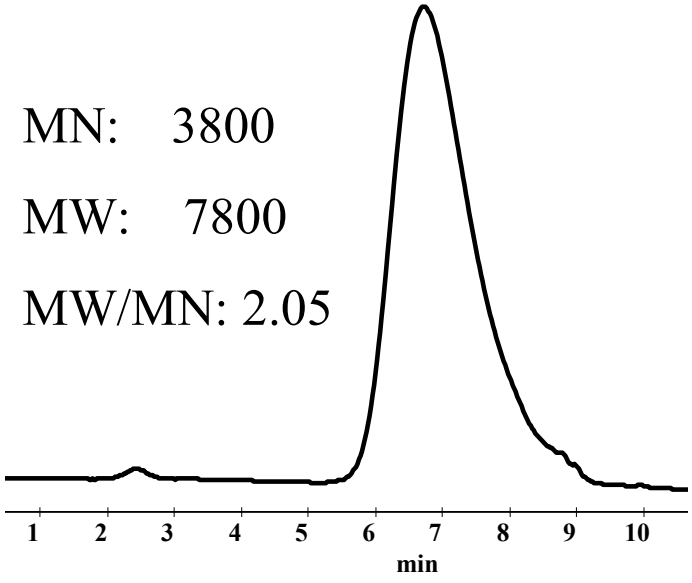

Figure S63. GPC curve of 3-2

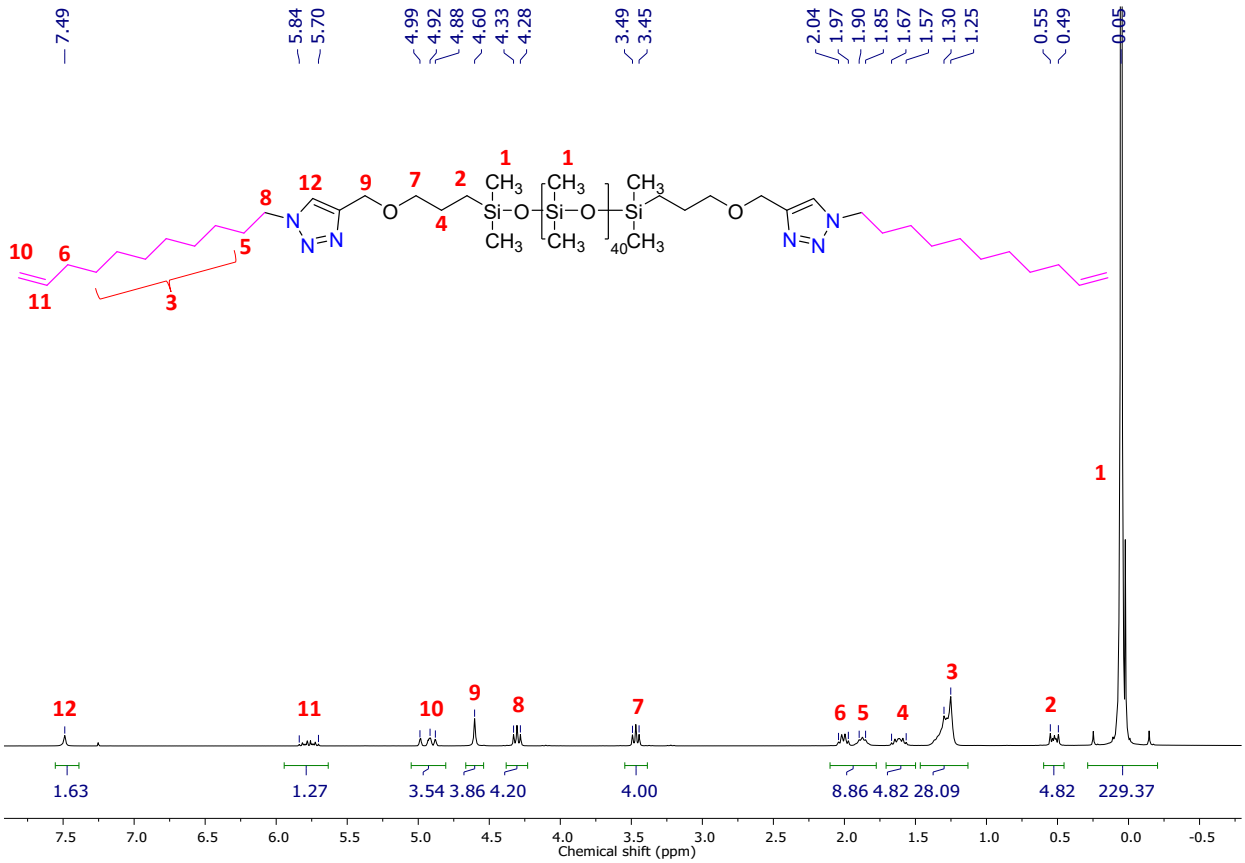

Figure S64. ^{1}H NMR spectrum of 3-3

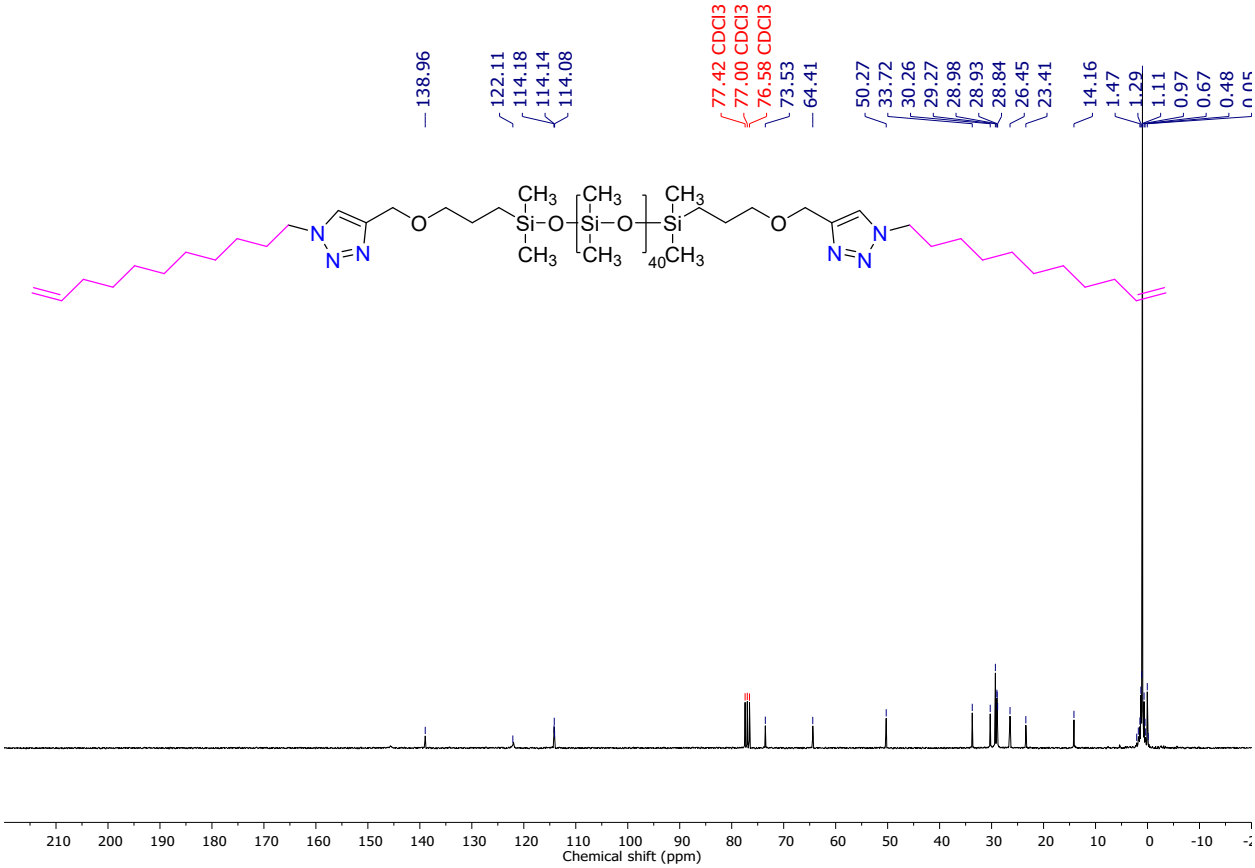

Figure S65. ^{13}C NMR spectrum of 3-3

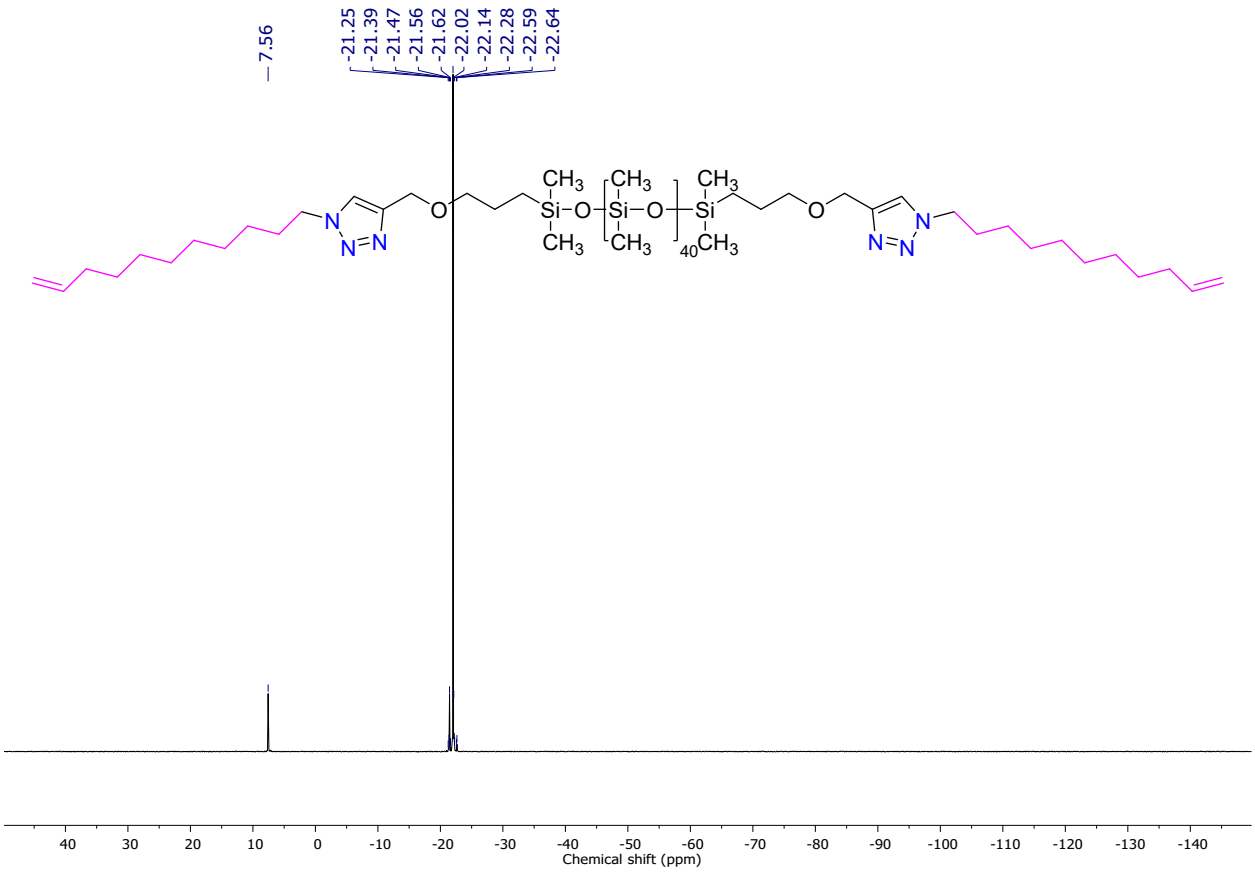

Figure S66. ^{29}Si NMR spectrum of 3-3

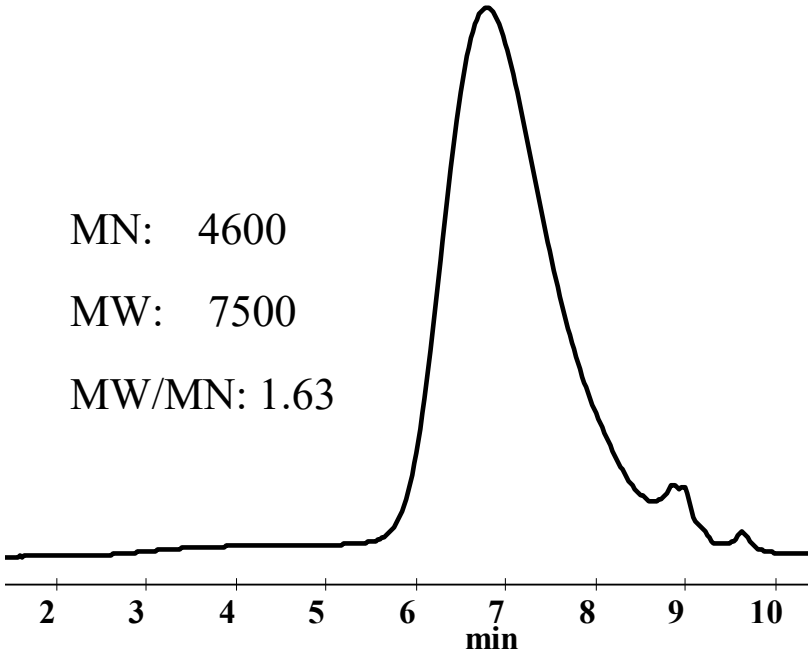

Figure S67. GPC curve of 3-3

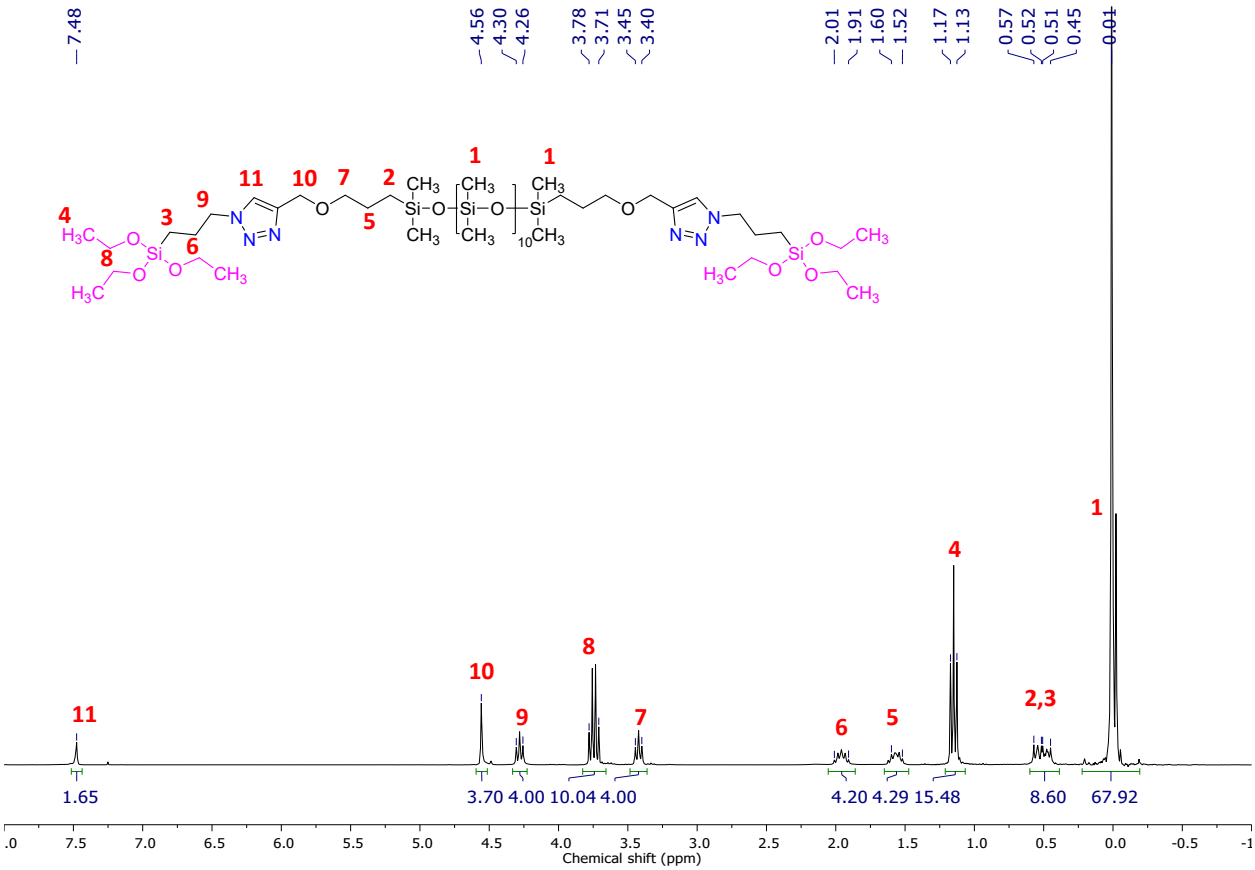

Figure S68. ^{1}H NMR spectrum of 3-4

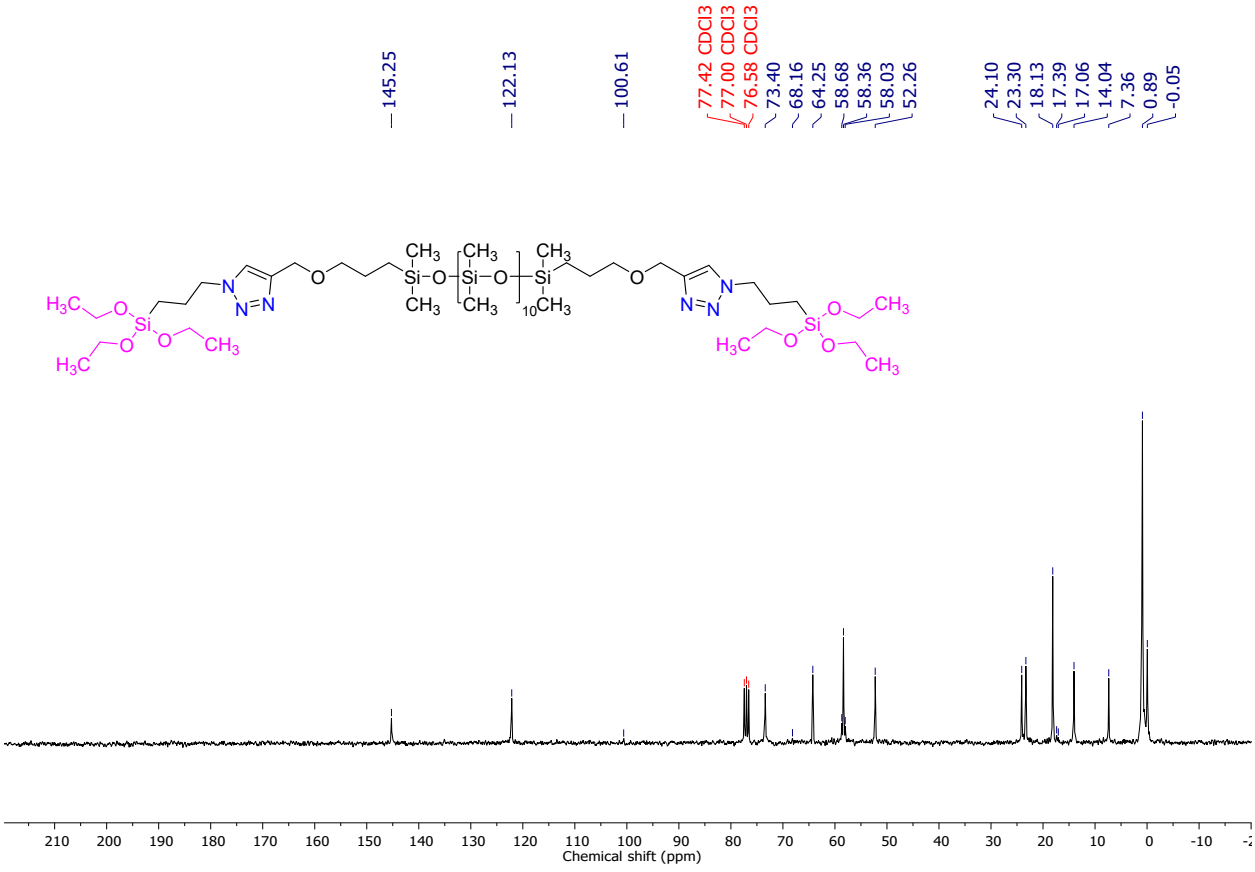

Figure S69. ^{13}C NMR spectrum of 3-4

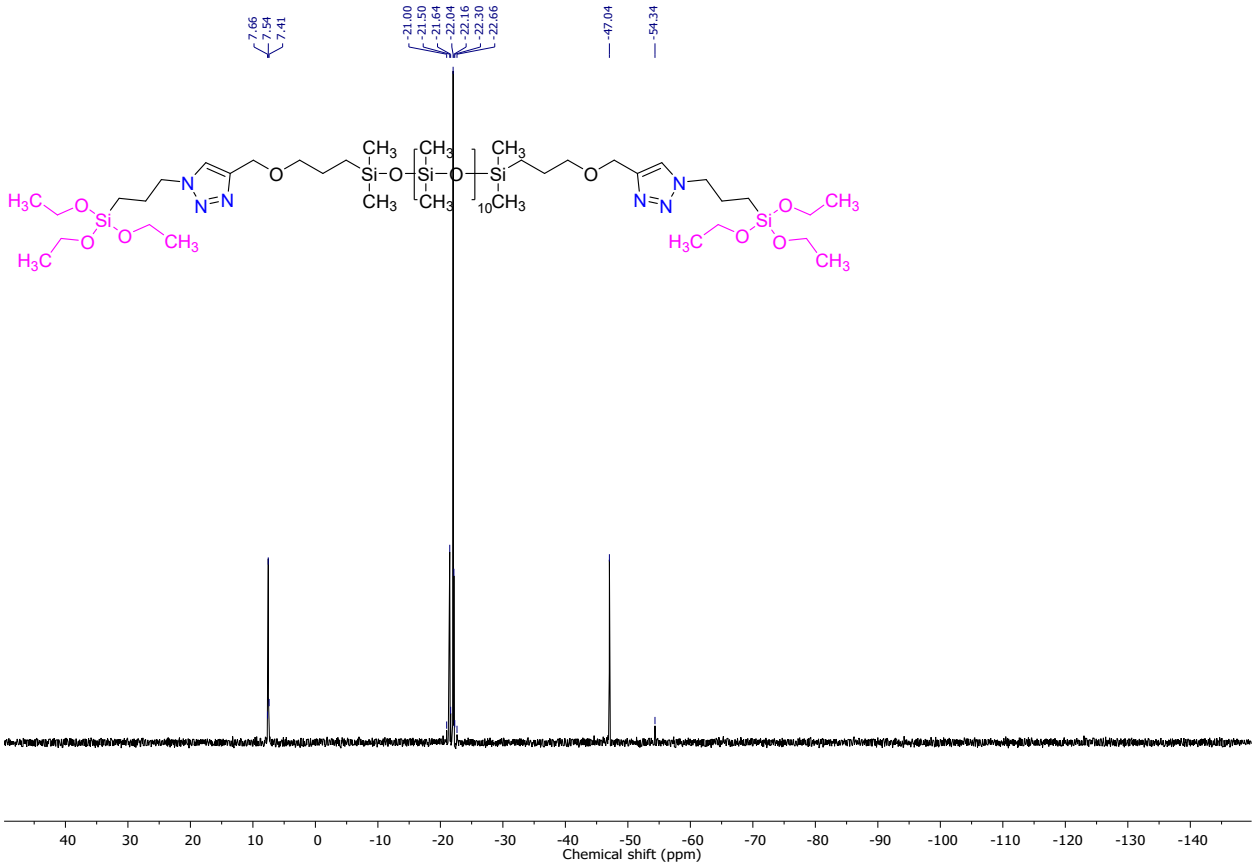

Figure S70. ^{29}Si NMR spectrum of 3-4

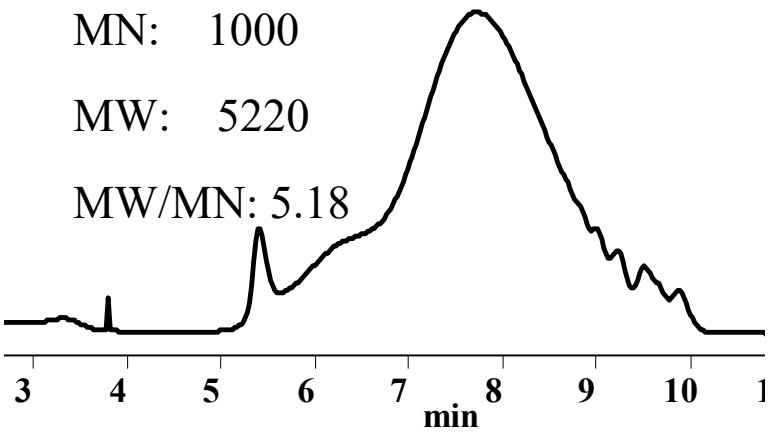

Figure S71. GPC curve of 3-4

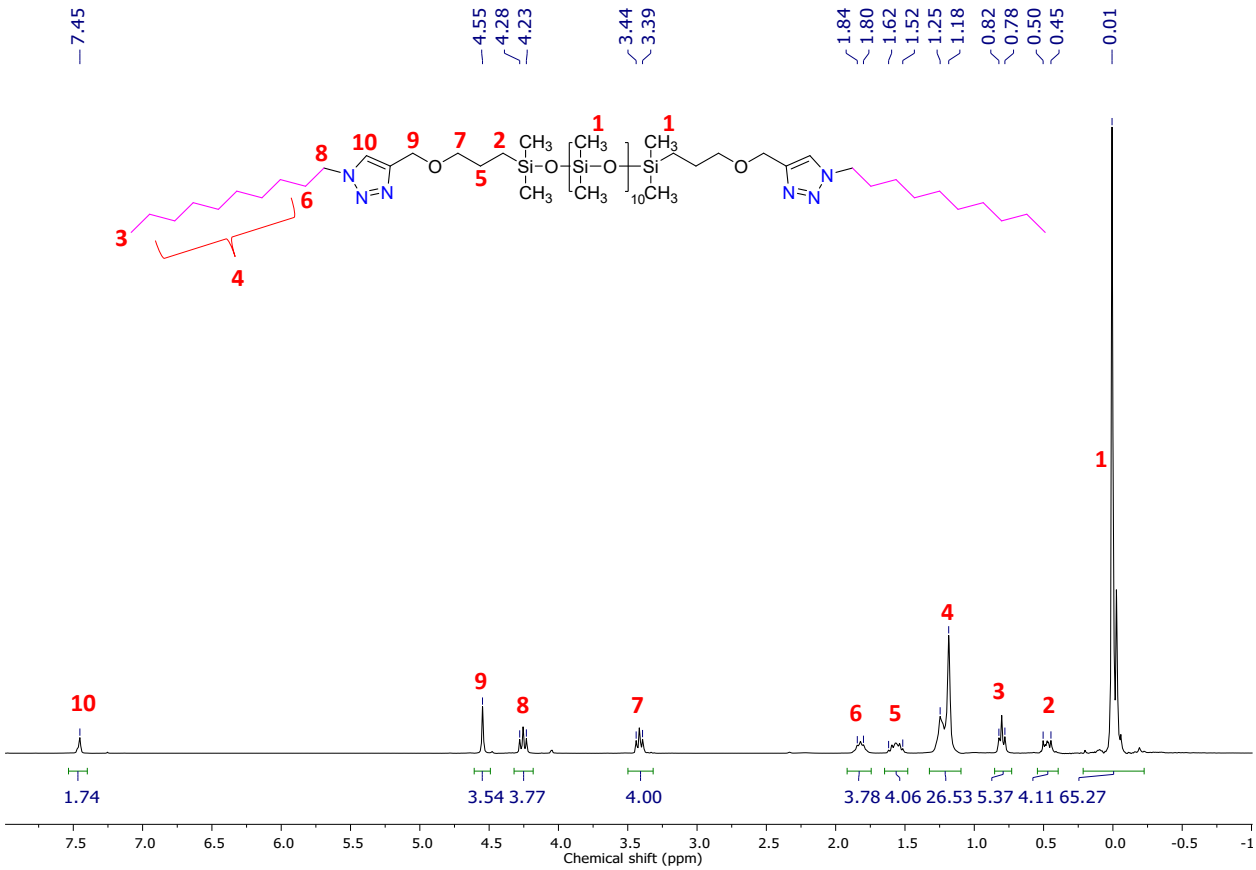

Figure S72. ^{1}H NMR spectrum of 3-5

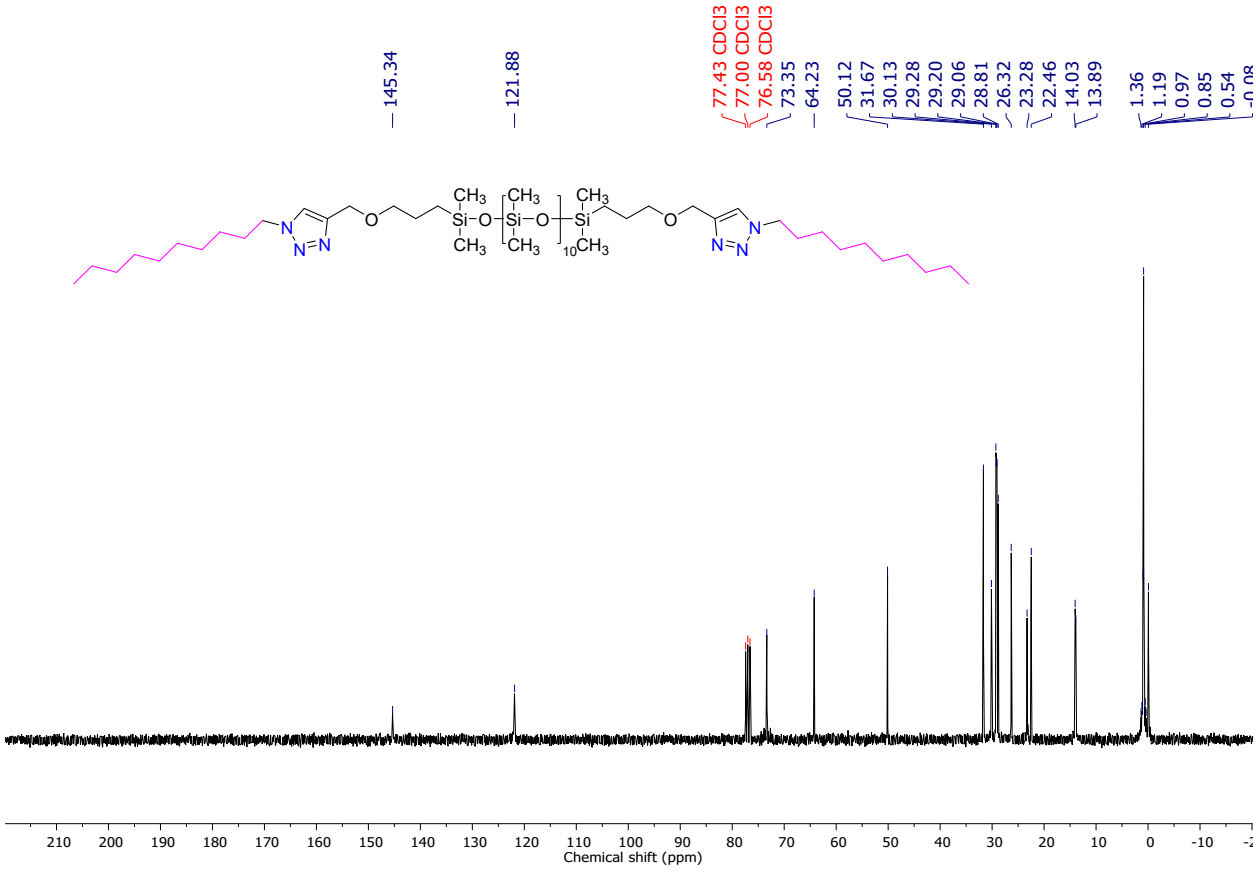

Figure S73. ^{13}C NMR spectrum of 3-5

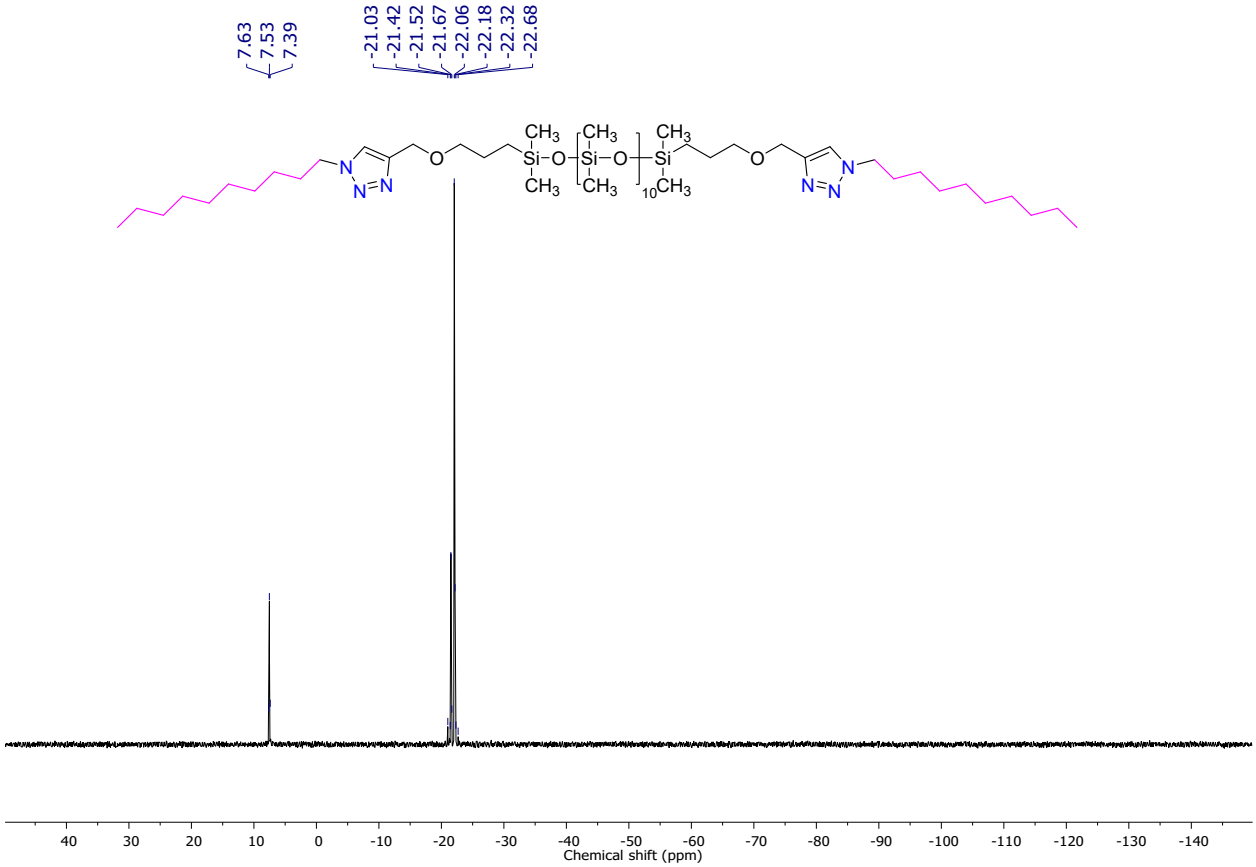

Figure S74. ^{29}Si NMR spectrum of 3-5

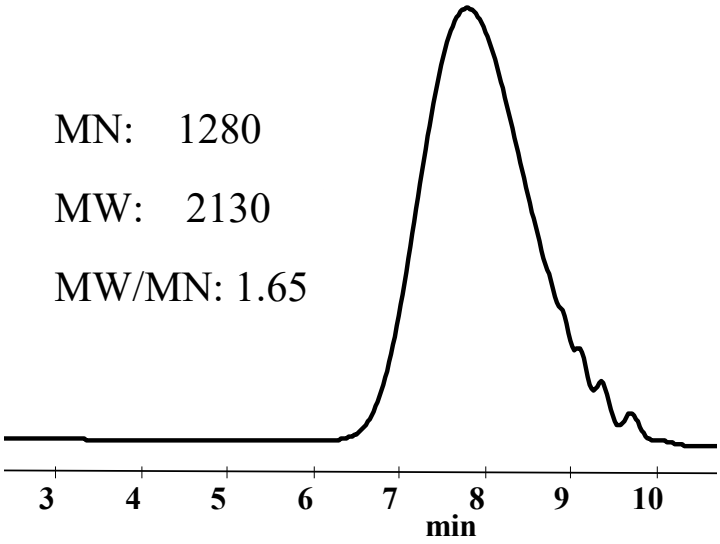

Figure S75. GPC curve of 3-5

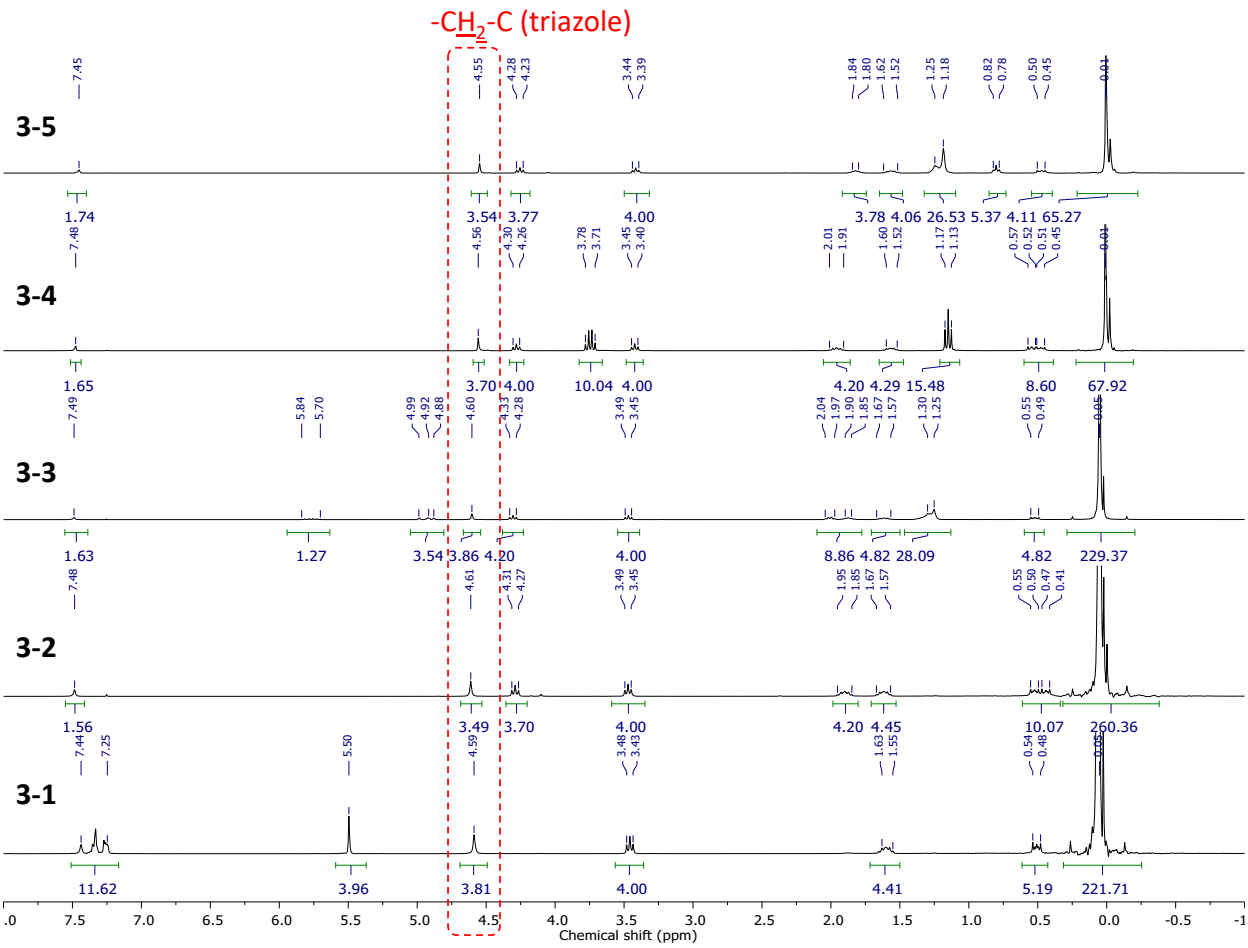

Figure S76. ^{1}H NMR spectra of the obtained functional PDMS

5. NMR spectra and GPC curves of polytriazole polymers

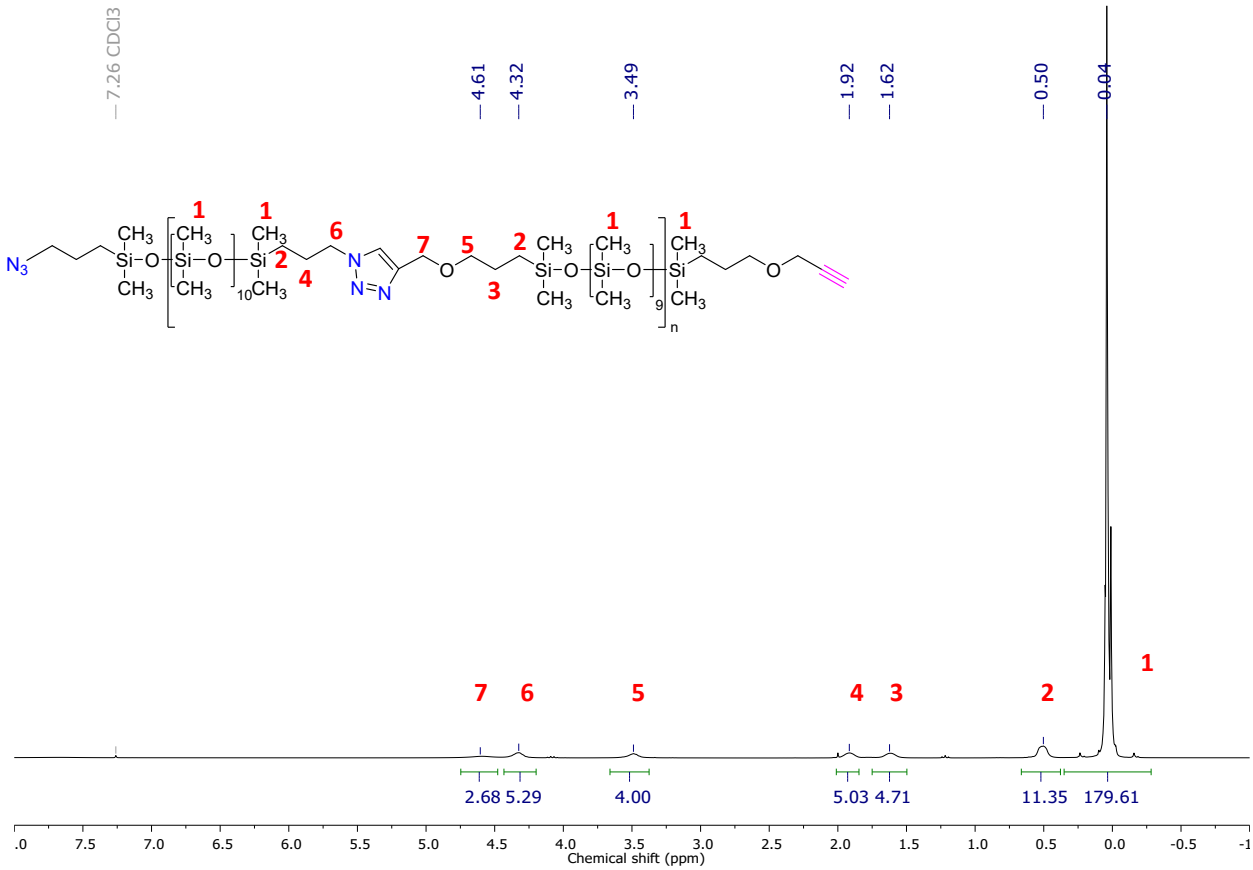

Figure S77. ^{1}H NMR spectrum of 4-1

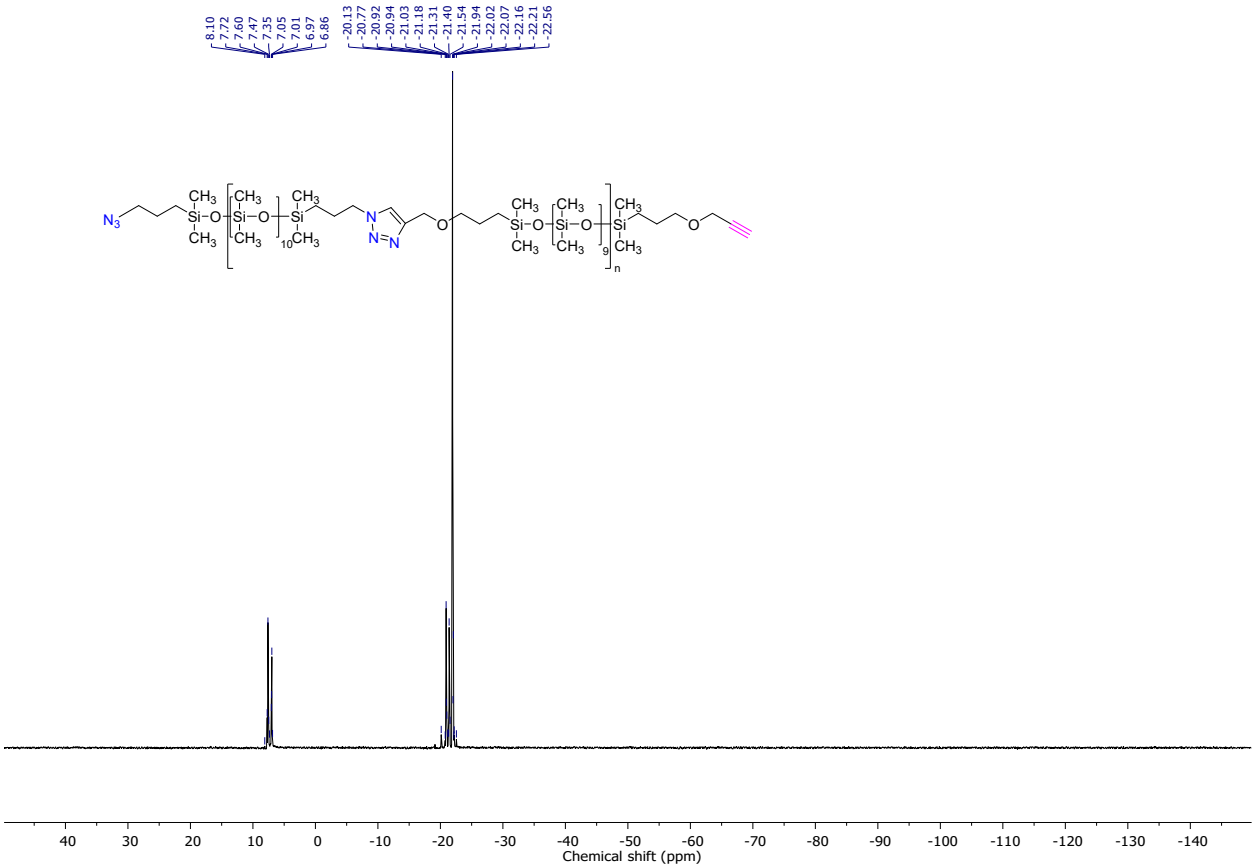

Figure S78. ^{29}Si NMR spectrum of 4-1

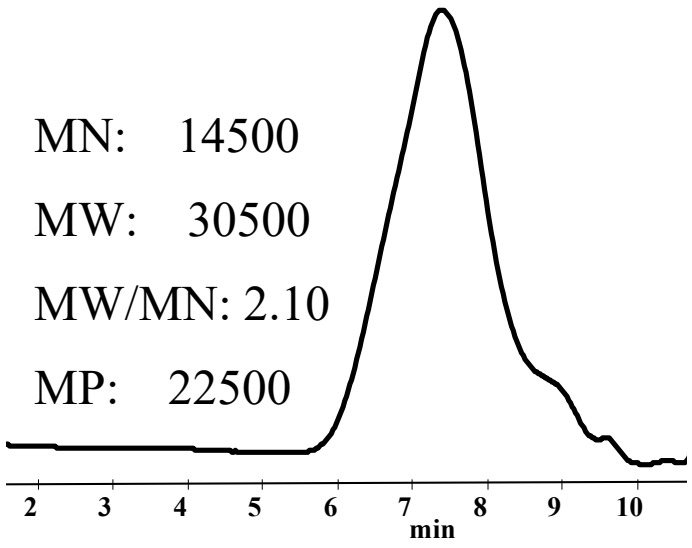

Figure S79. GPC curve of 4-1

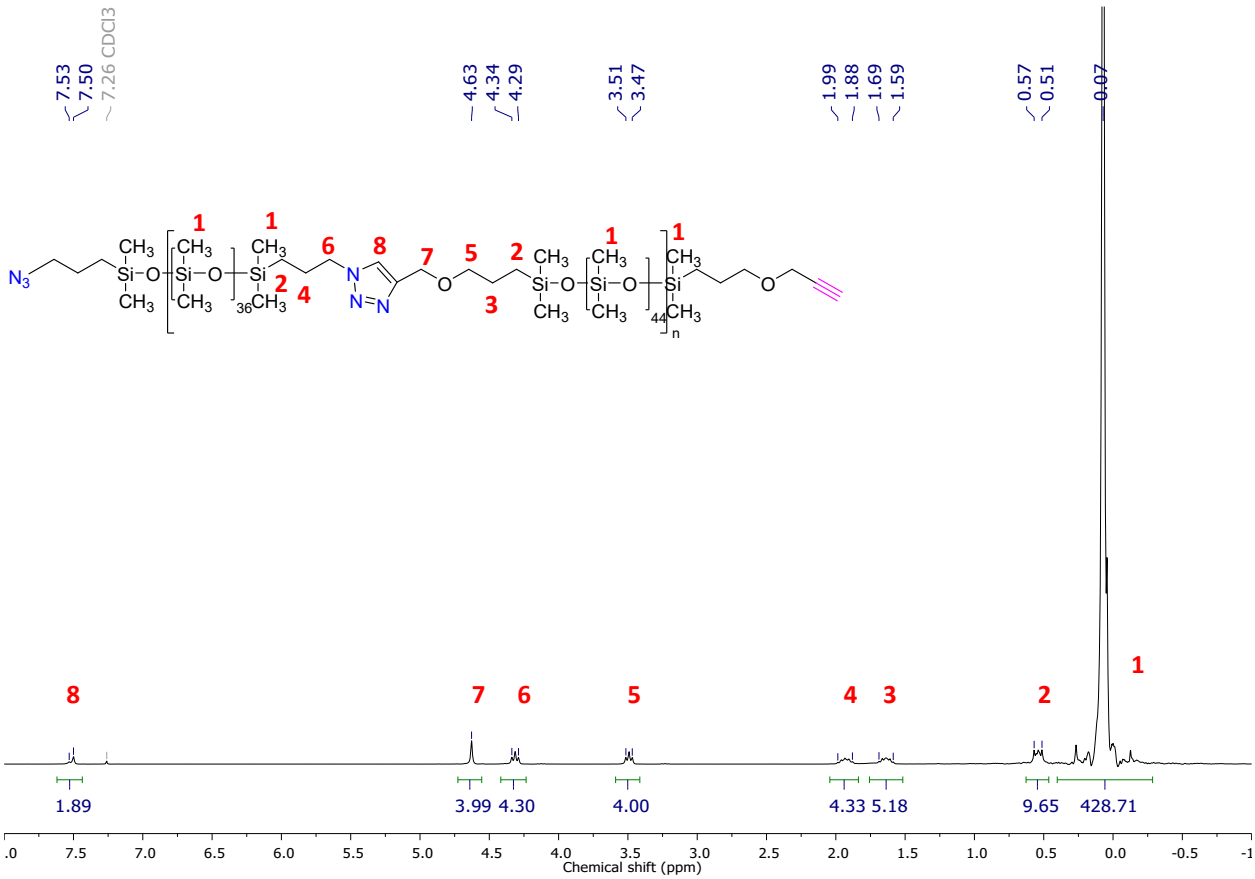

Figure S80. ^{1}H NMR spectrum of 4-2

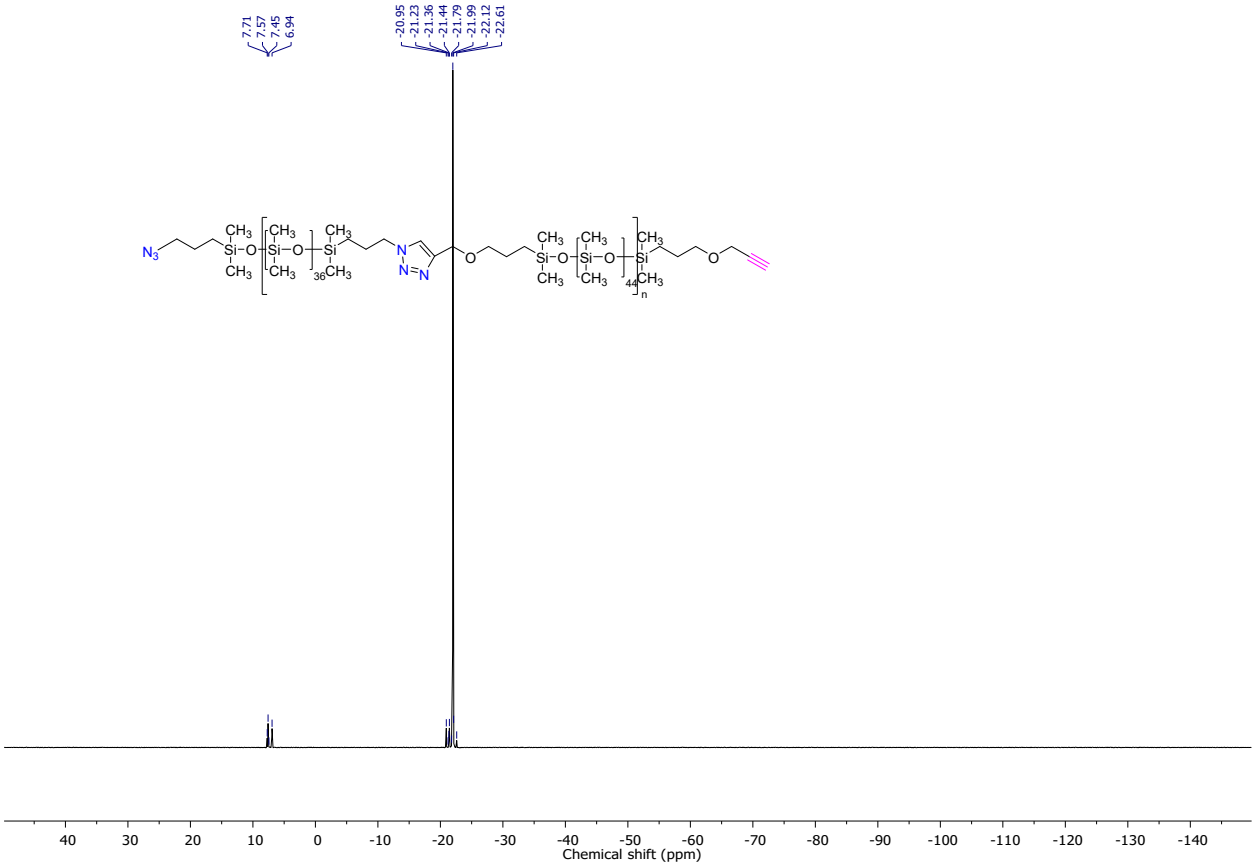

Figure S81. ^{29}Si NMR spectrum of 4-2

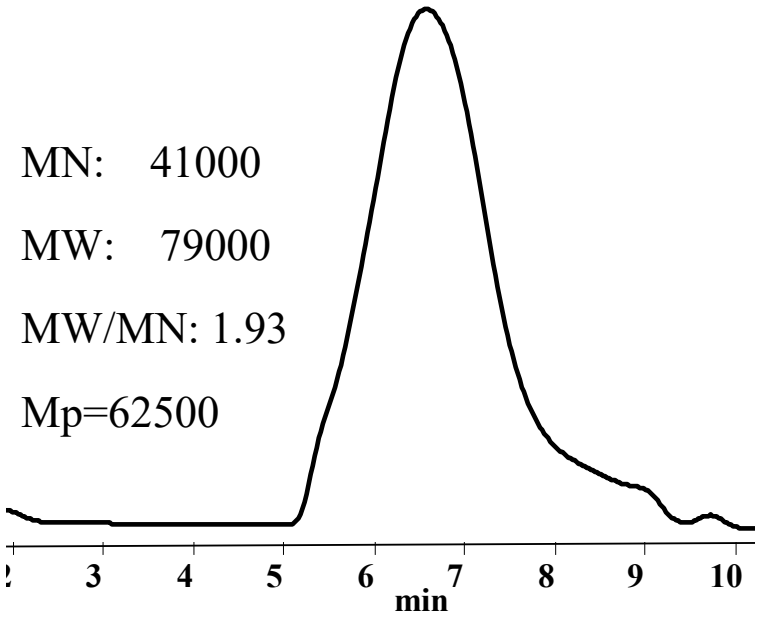

Figure S82. GPC curve of 4-2

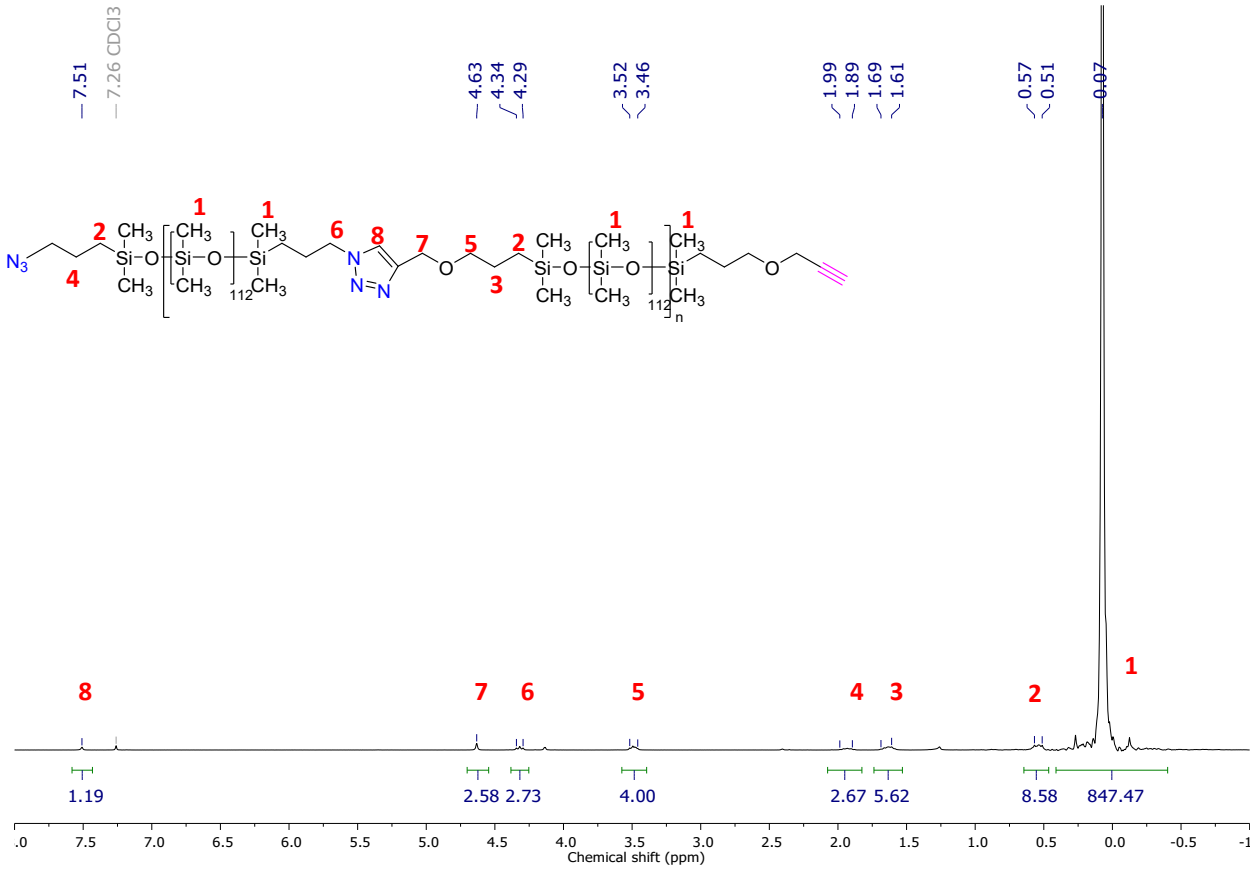

Figure S83. ^{1}H NMR spectrum of 4-3

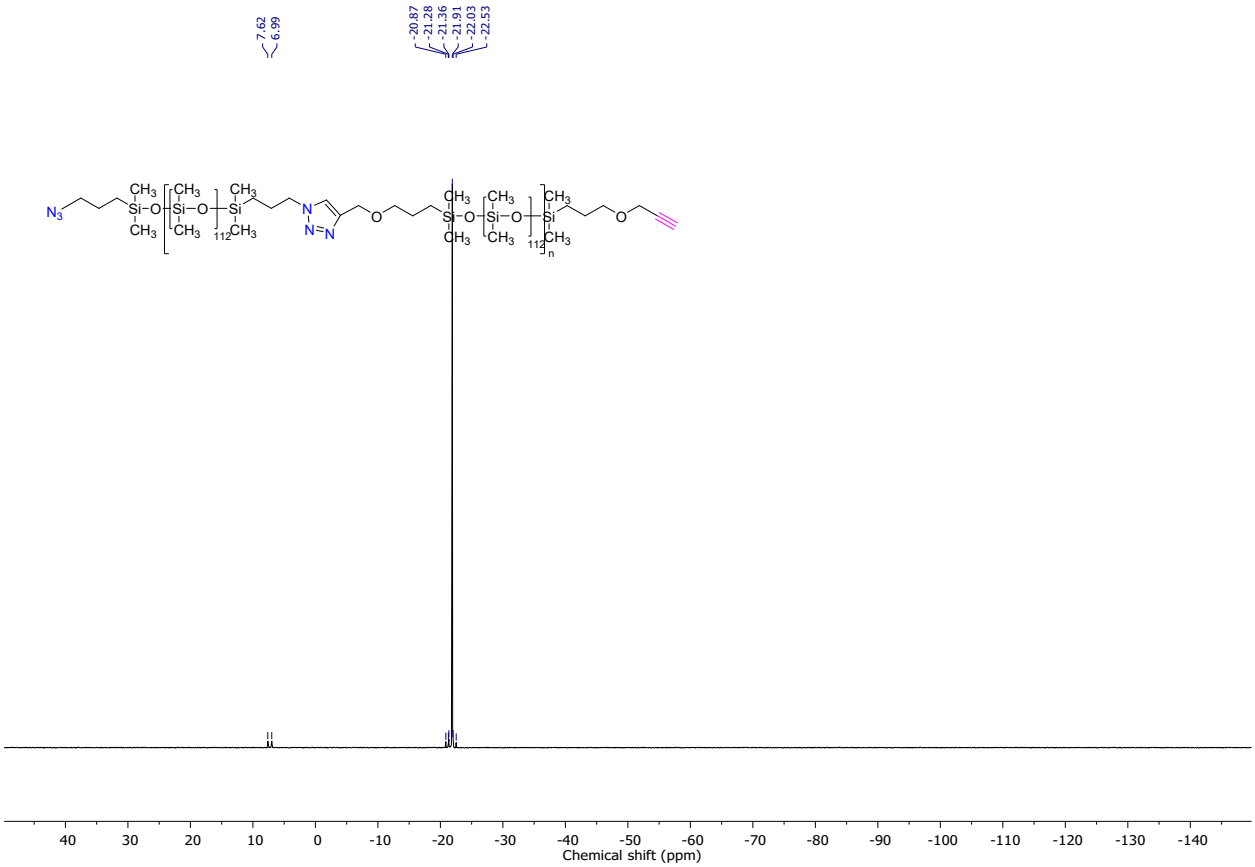

Figure S84. ^{29}Si NMR spectrum of 4-3

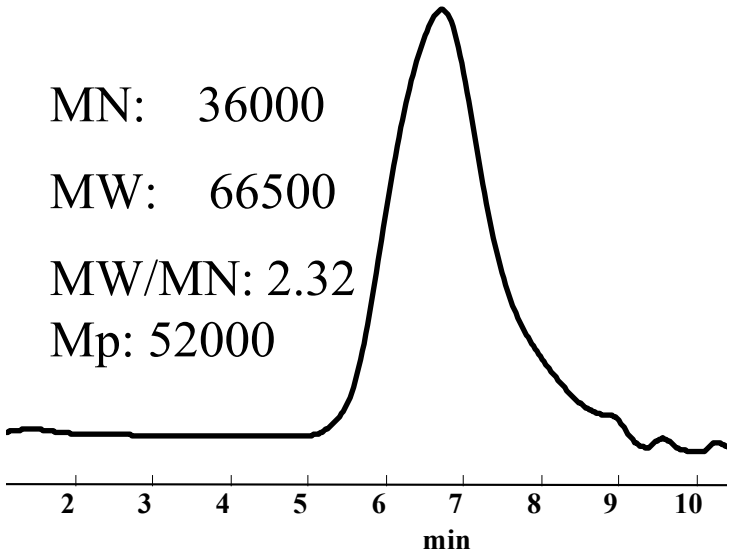

Figure S85. GPC curve of 4-3

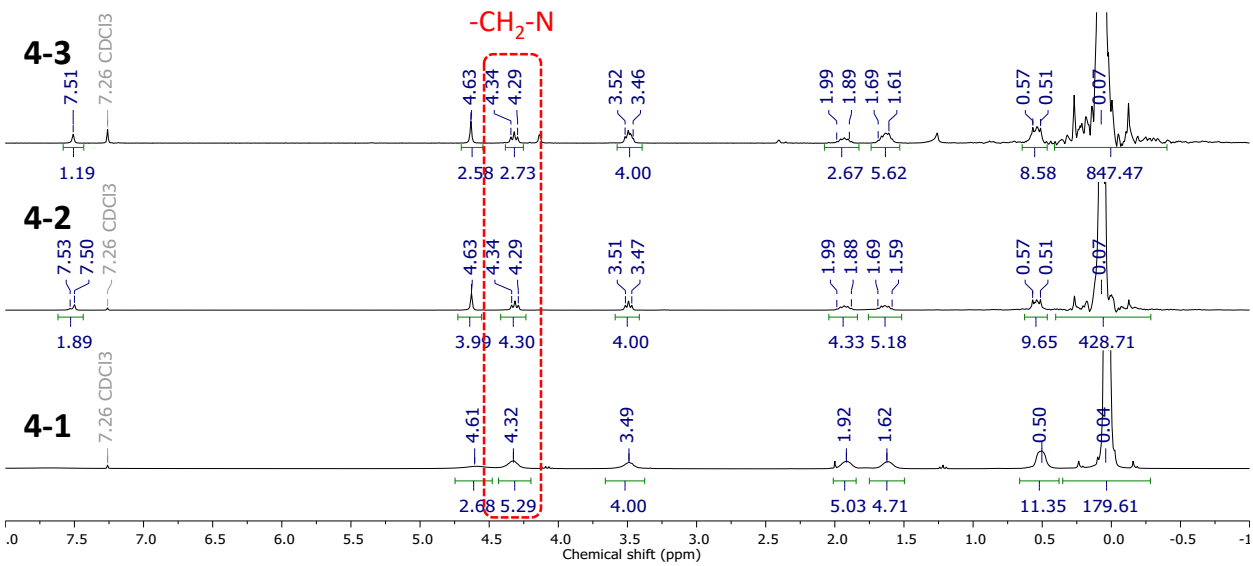

Figure S86. ^{1}H NMR of the obtained polymers

5. NMR spectrum of 4-decyl-1-(3-(triethoxysilyl)propyl)-1H-1,2,3-triazole

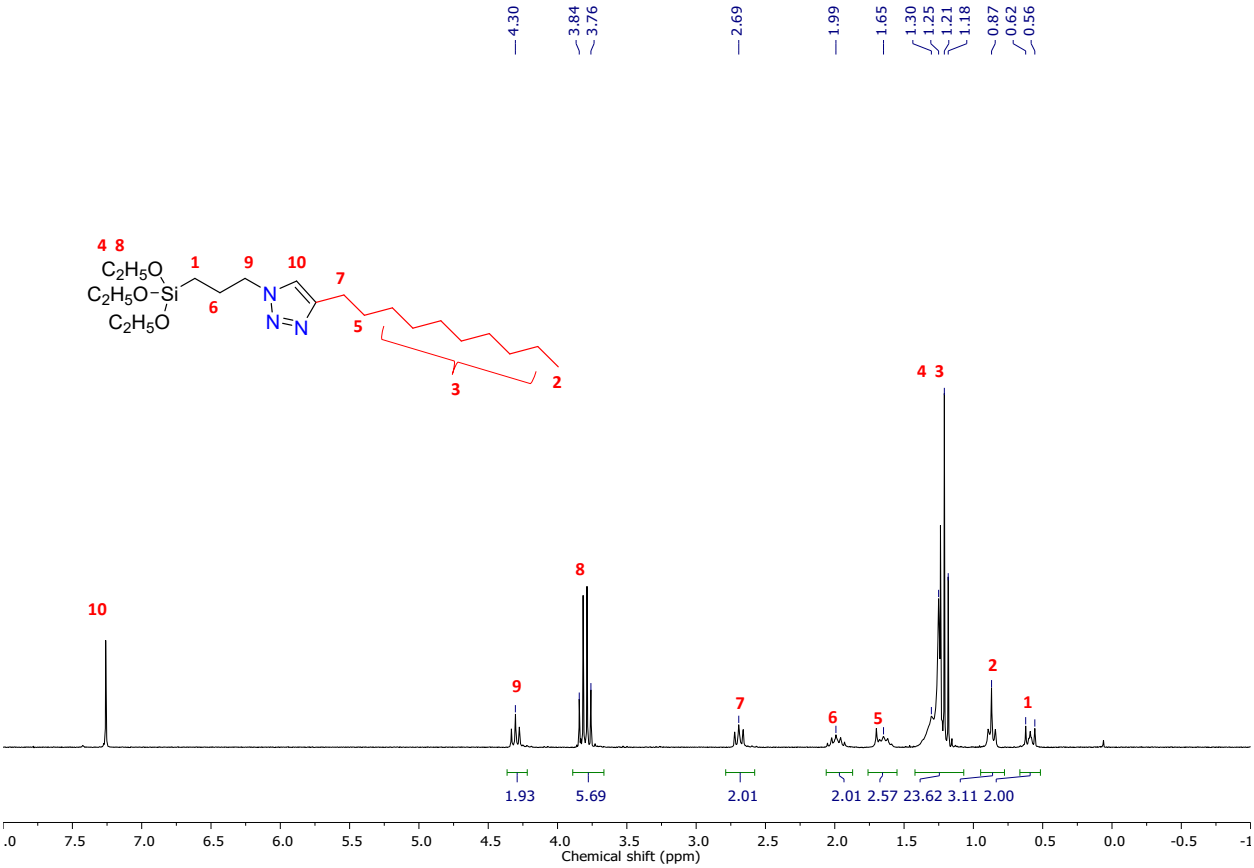

Figure S87. ^{1}H NMR of 5-1

6. SEM images of the copper foam surface

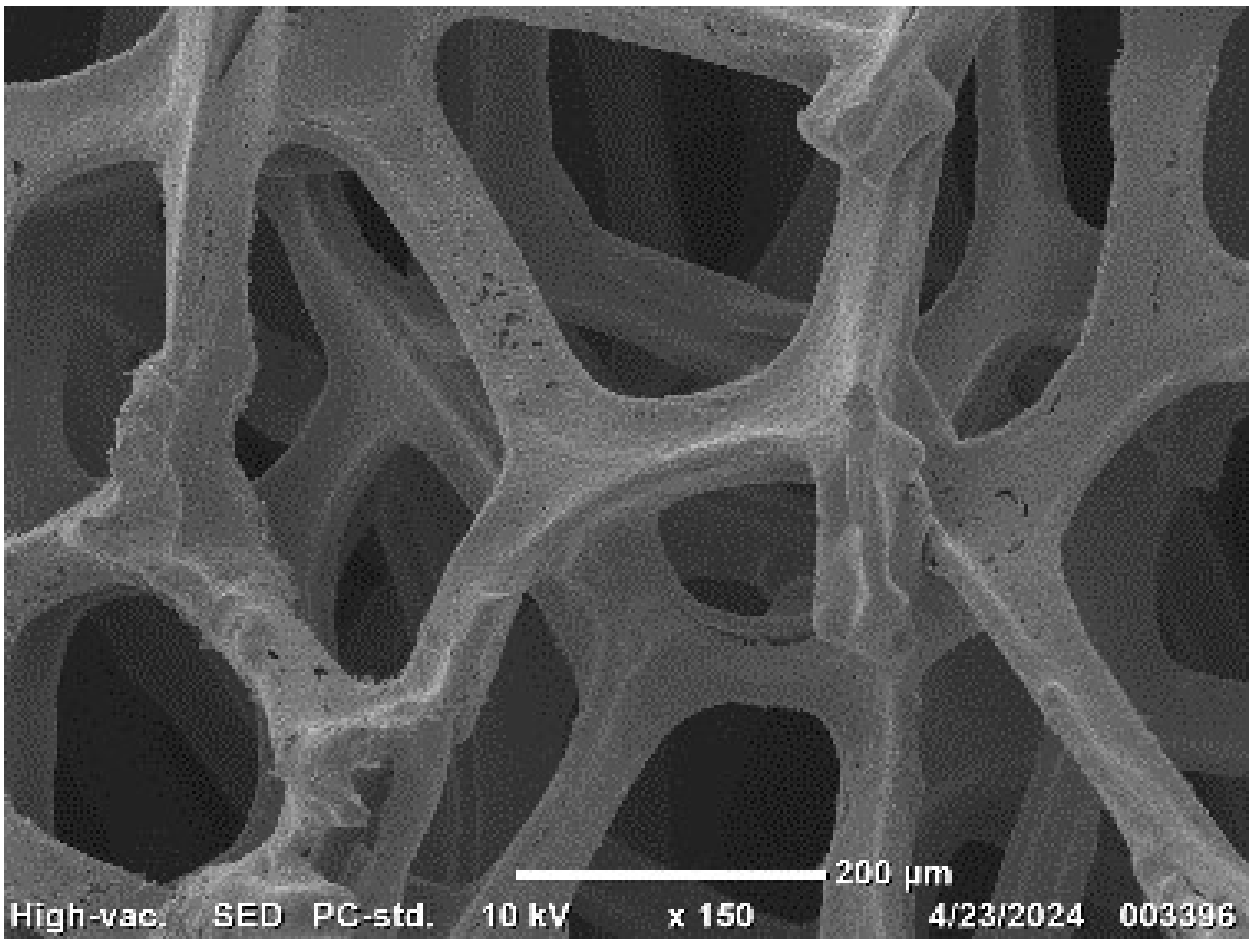

Figure S88. SEM images of the copper foam surface before three reaction

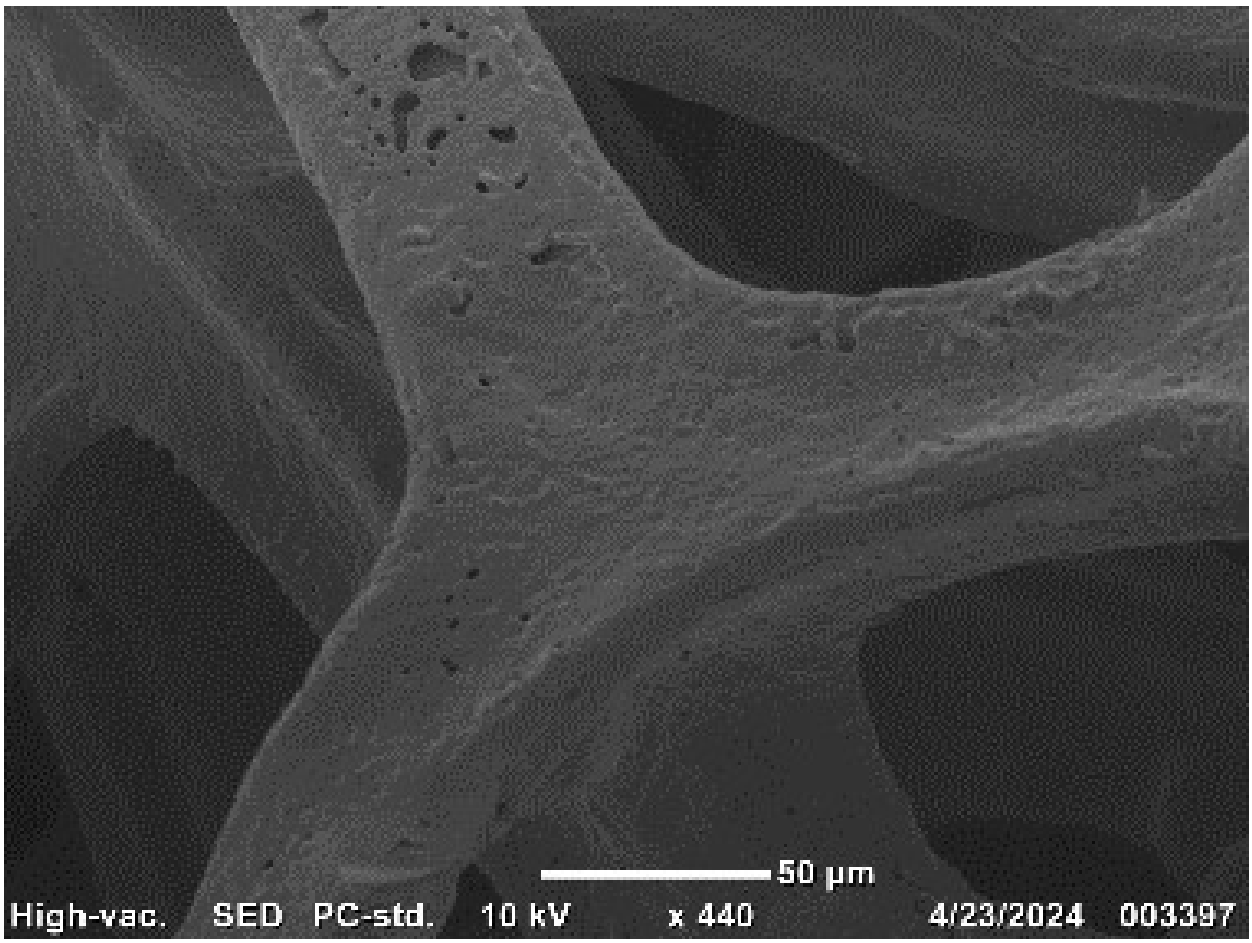

Figure S89. SEM images of the copper foam surface before three reaction

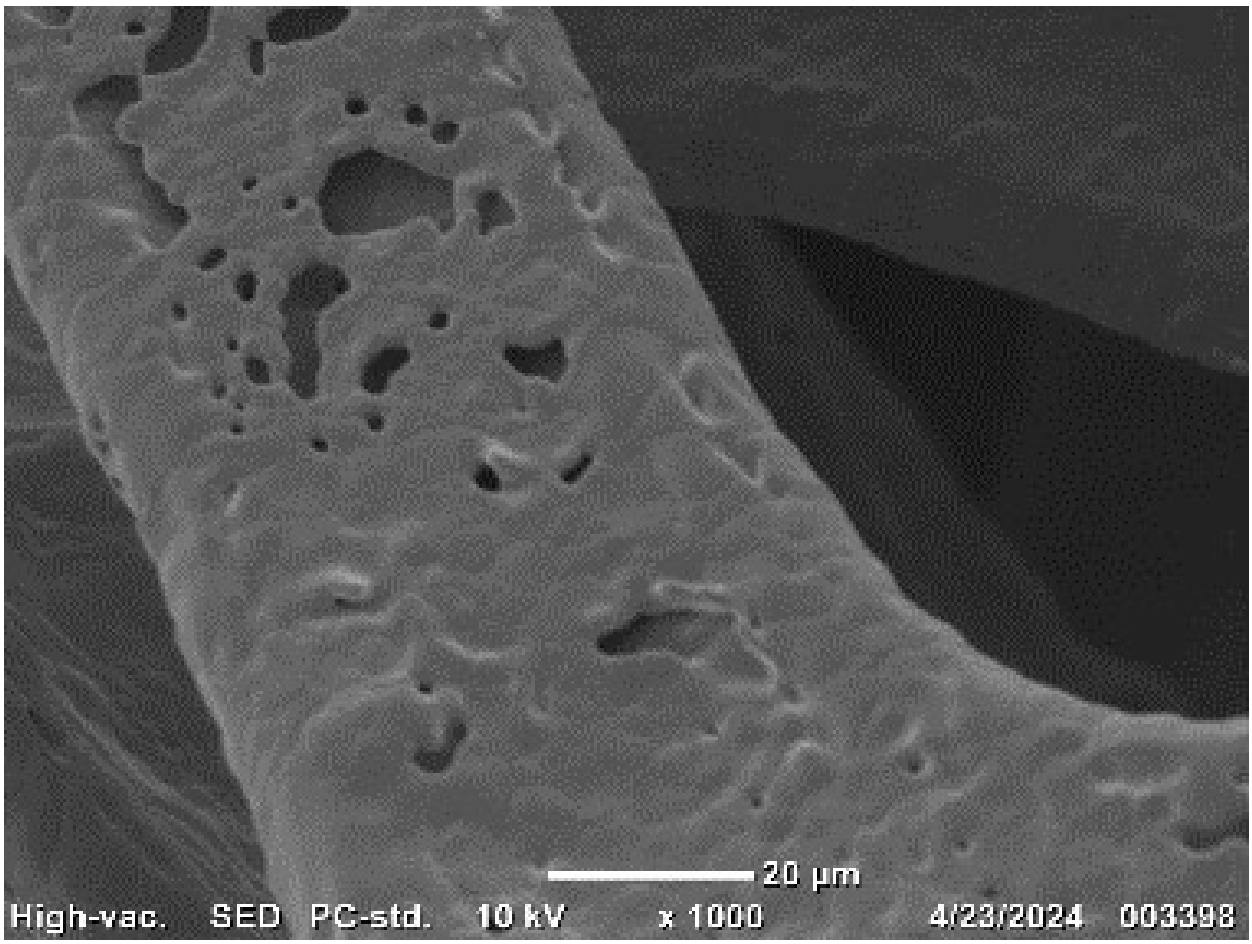

Figure S90. SEM images of the copper foam surface before three reaction

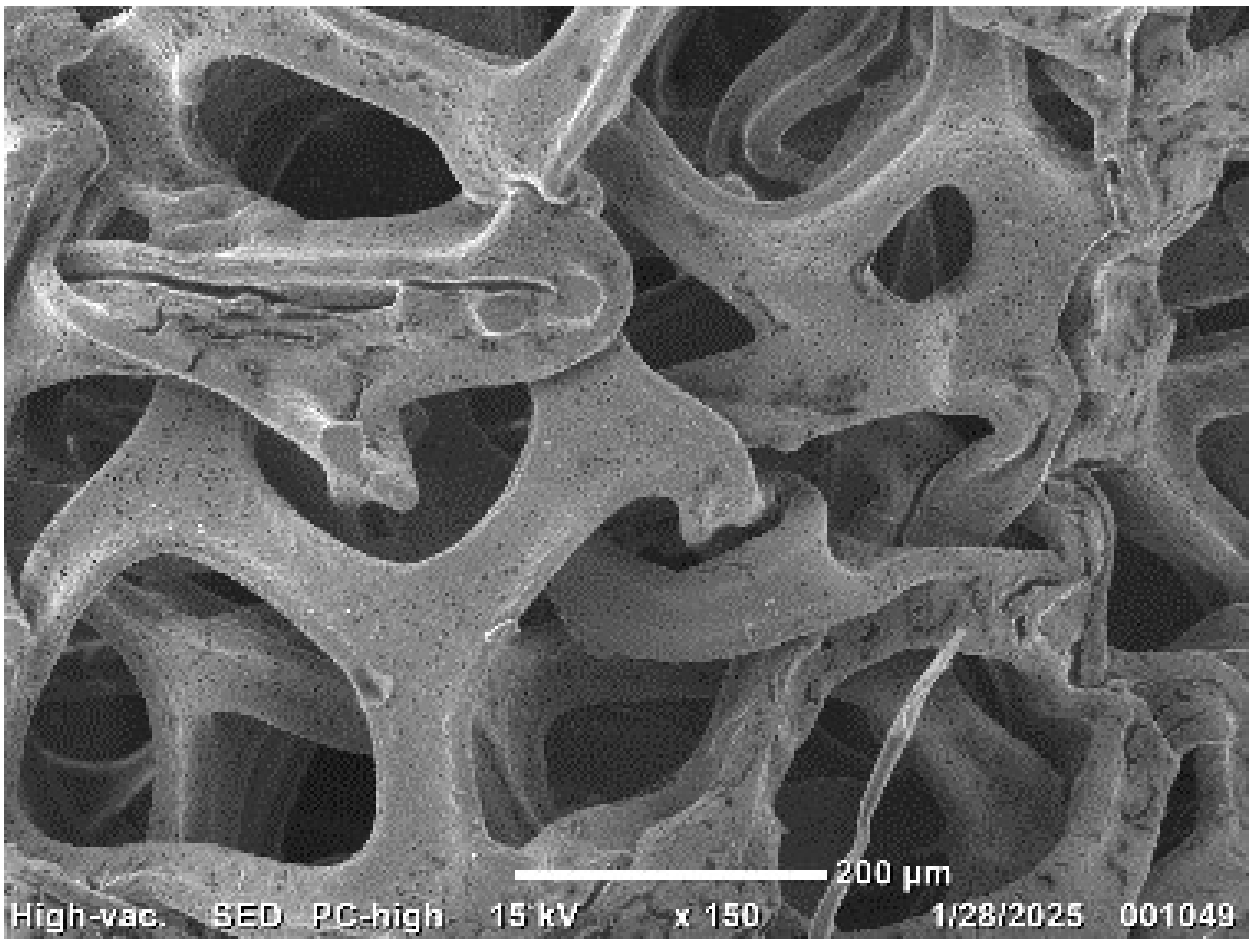

Figure S91. SEM images of the copper foam surface after three reaction

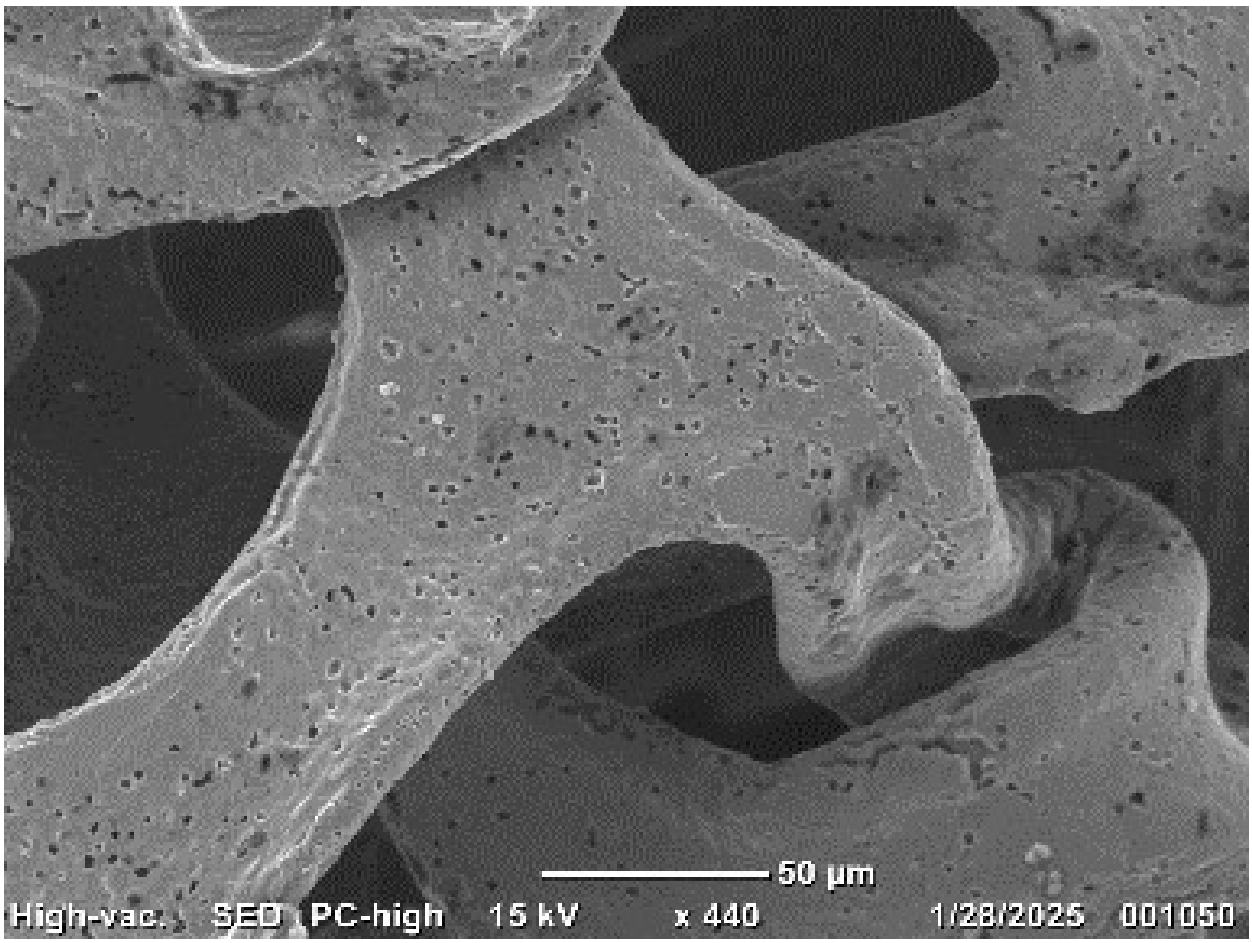

Figure S92. SEM images of the copper foam surface after three reaction

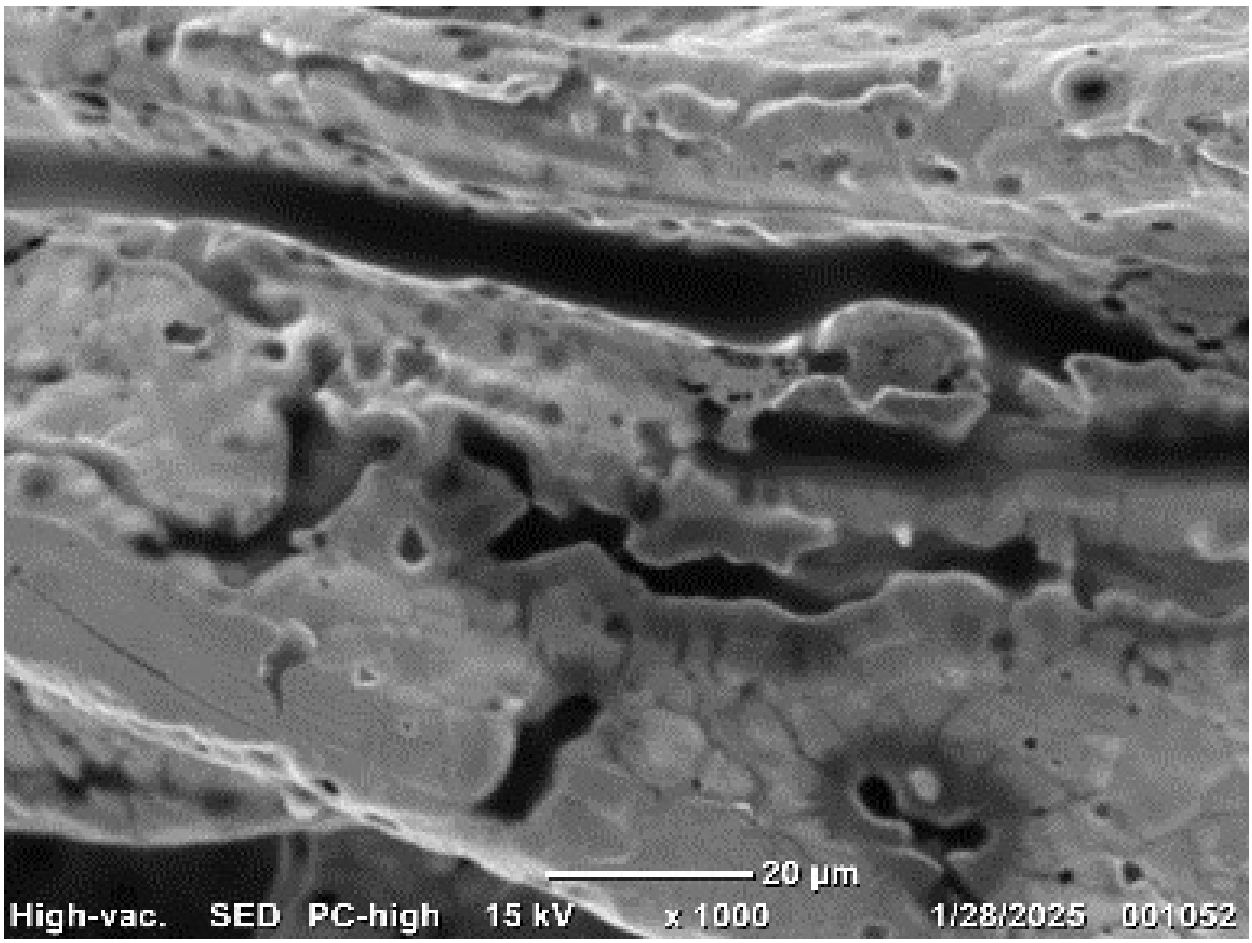

Figure S93. SEM images of the copper foam surface after three reaction