

SUPPORTING INFORMATION

Approaches to the functionalization of carbosilane and carbosilane-siloxane dendrons based on limonene

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CONTENT

SI1. NMR spectra

SI2. GPC curves

SI3. GC curves

SI1. NMR spectra

PDA118.001.1.1.1r
1H_

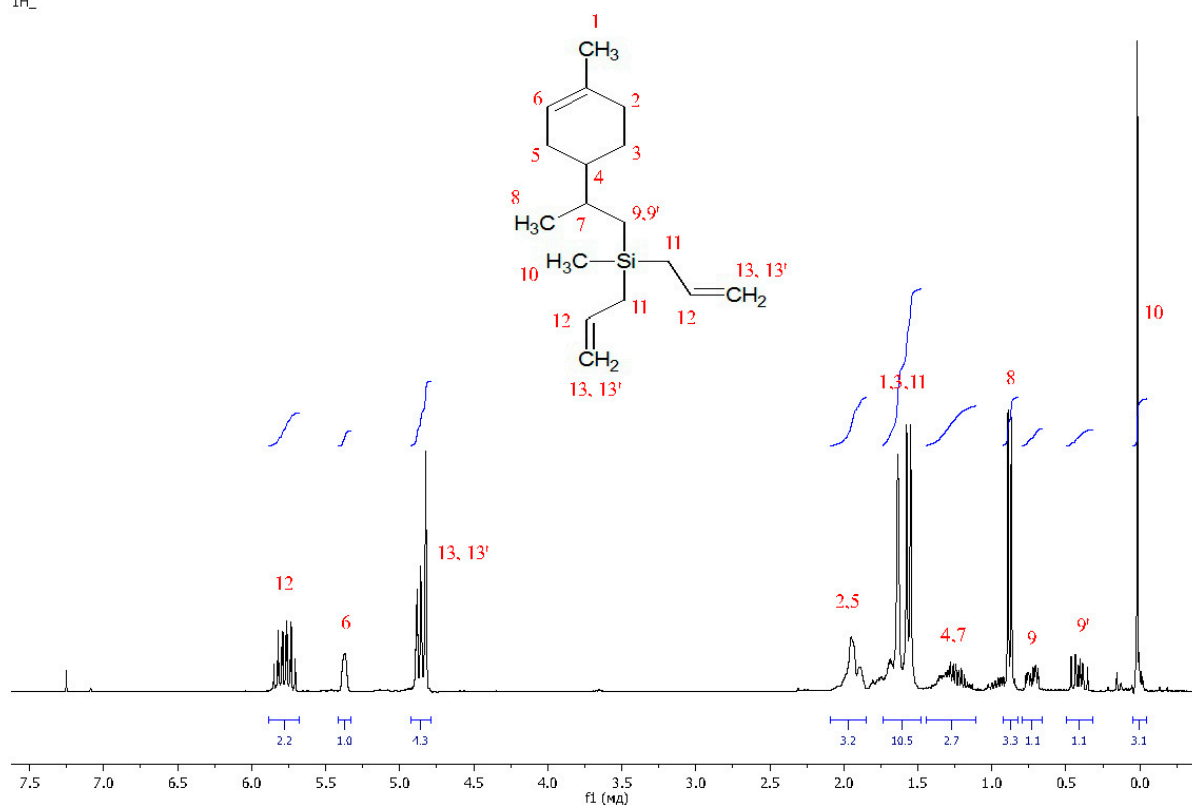


Figure S1. ^1H NMR spectrum of *Lim-GoAll*².

pda127.001.fid

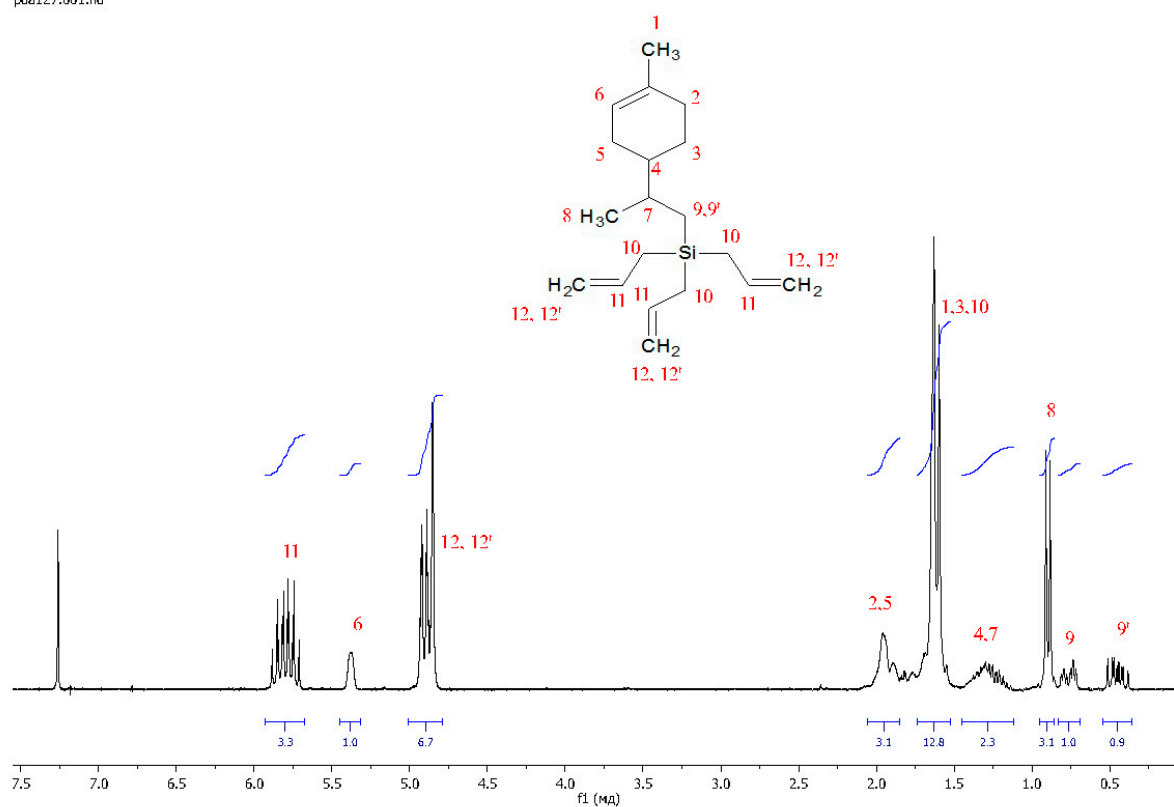


Figure S2. ^1H NMR spectrum of *Lim-GoAll*³.

ar88.005~1.1.1r
1H_

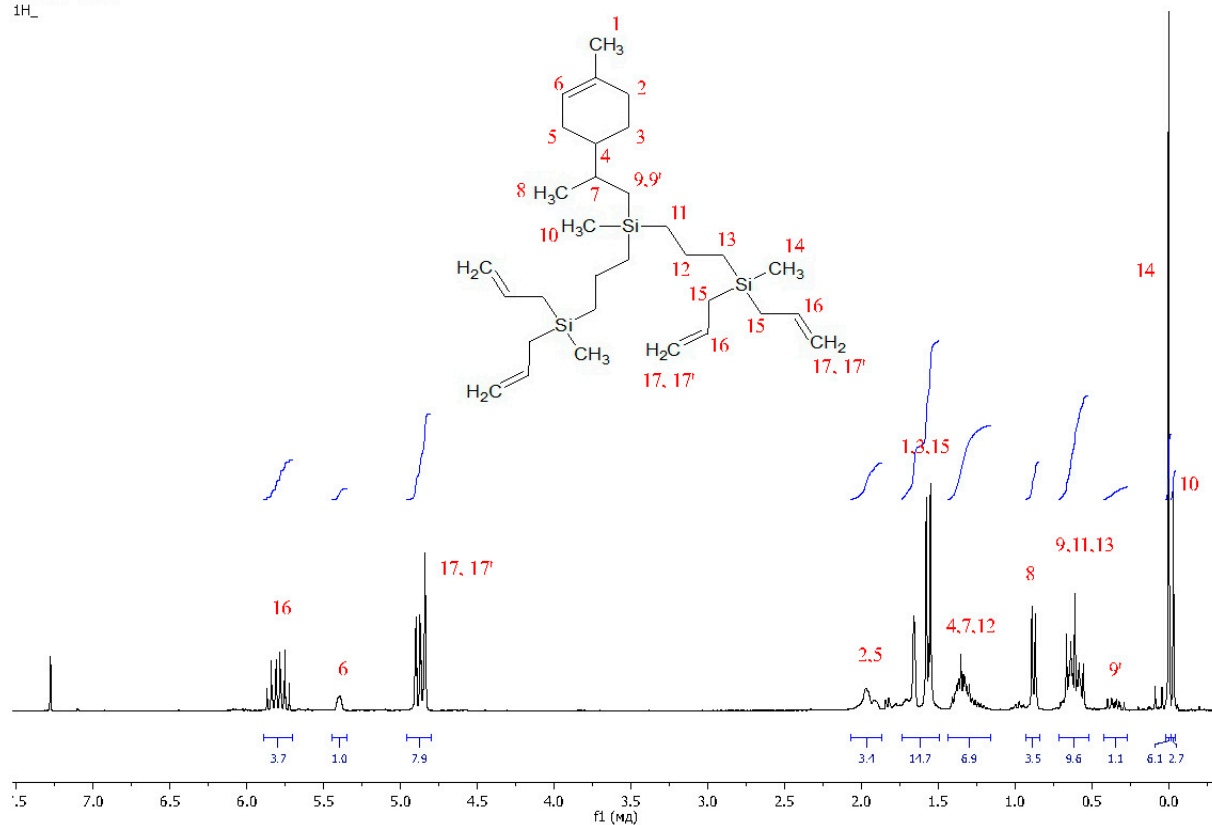


Figure S3. ¹H NMR spectrum of *Lim-G1All⁴*.

fd800.001

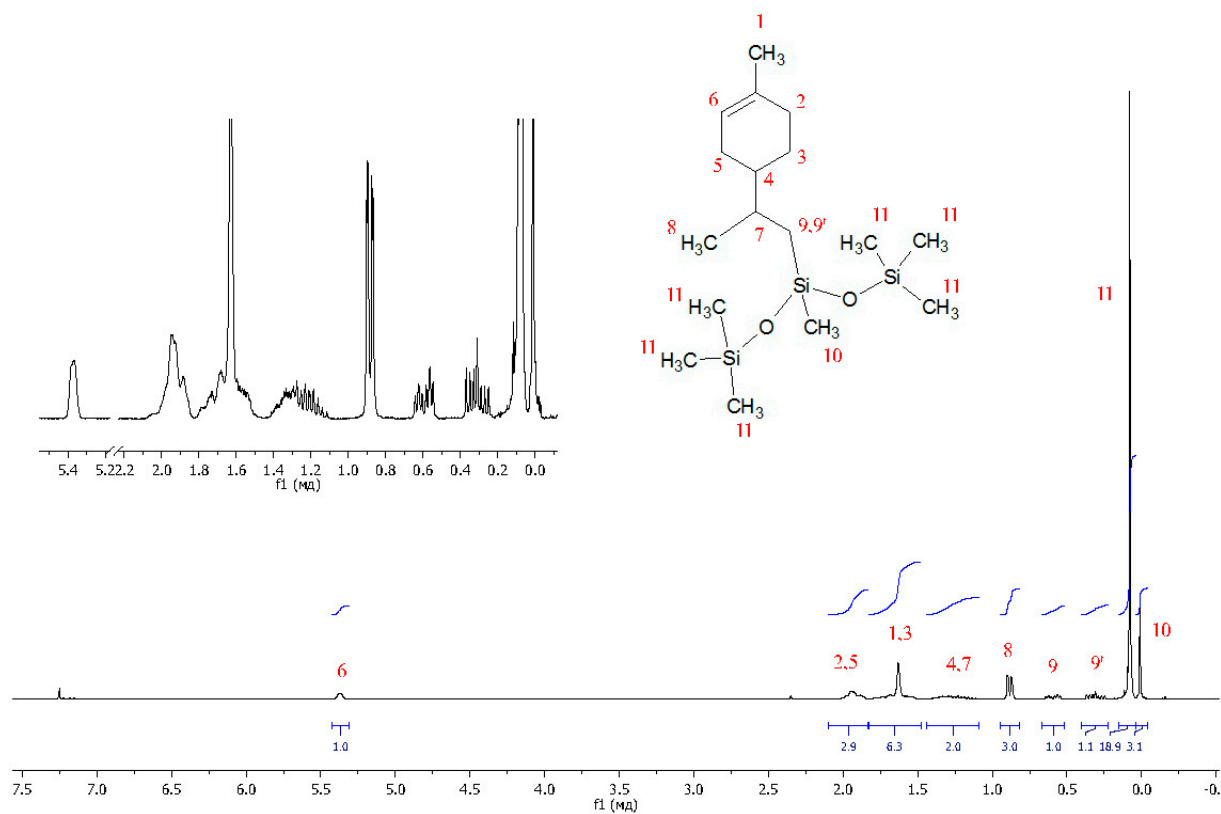


Figure S4. ¹H NMR spectrum of *Lim-G0.5TMS₂*.

ar90.2.1.1.1r
1H_

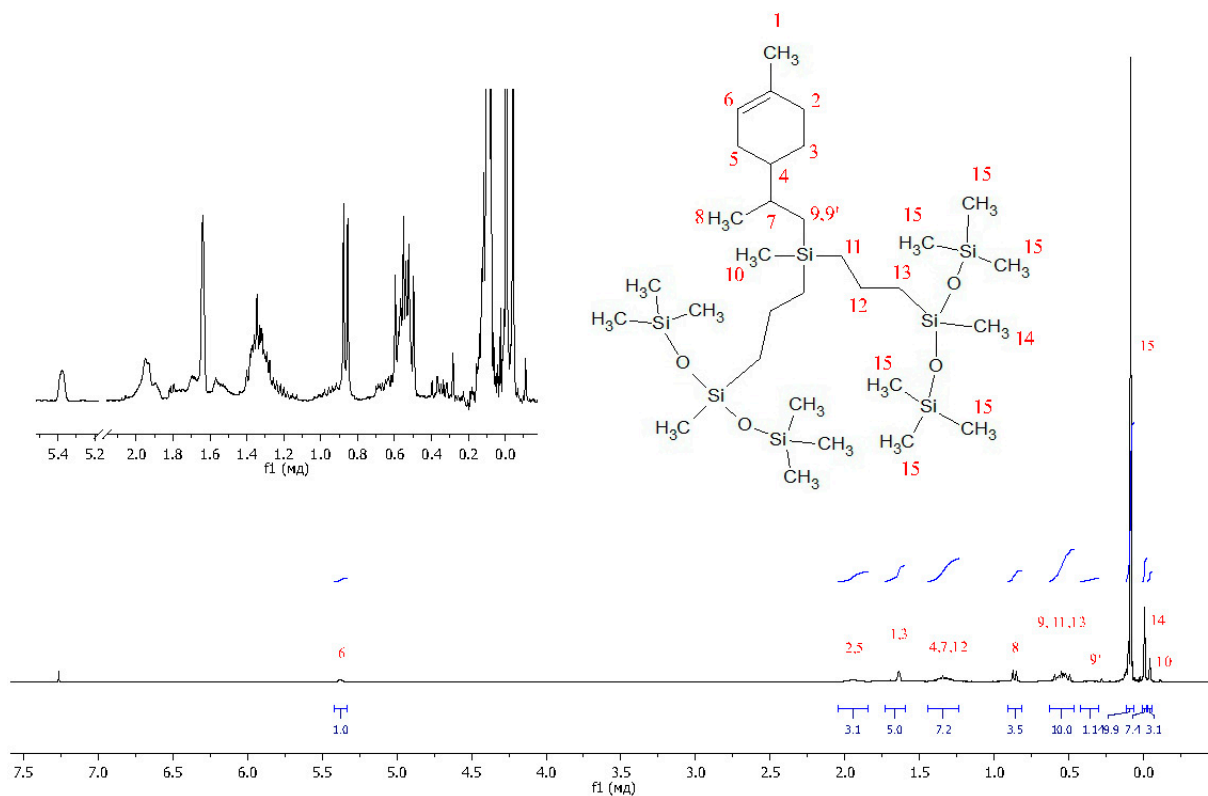


Figure S5. ^1H NMR spectrum of *Lim-G_{1,5}TMS⁴*.

ar91.2.1.1.1r
1H_

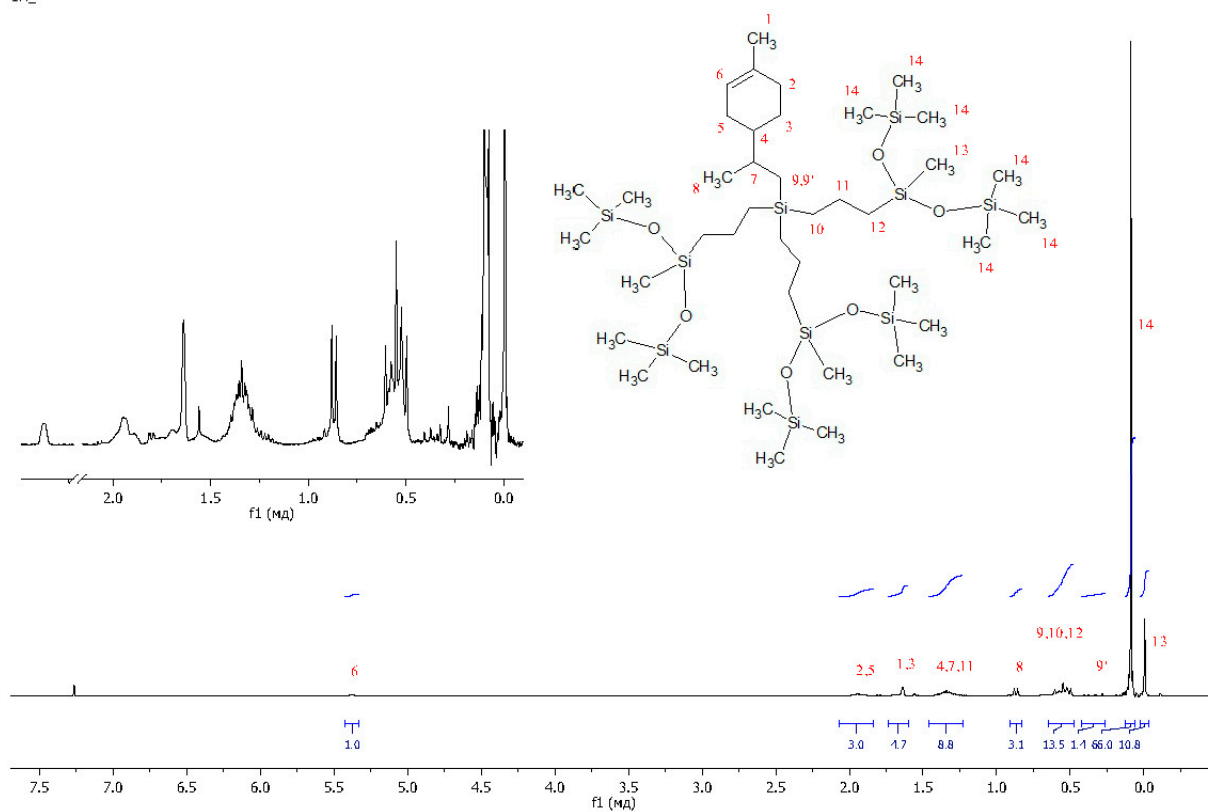


Figure S6. ^1H NMR spectrum of *Lim-G_{1,5}TMS⁶*.

ar92.2.1.1.1r
1H_

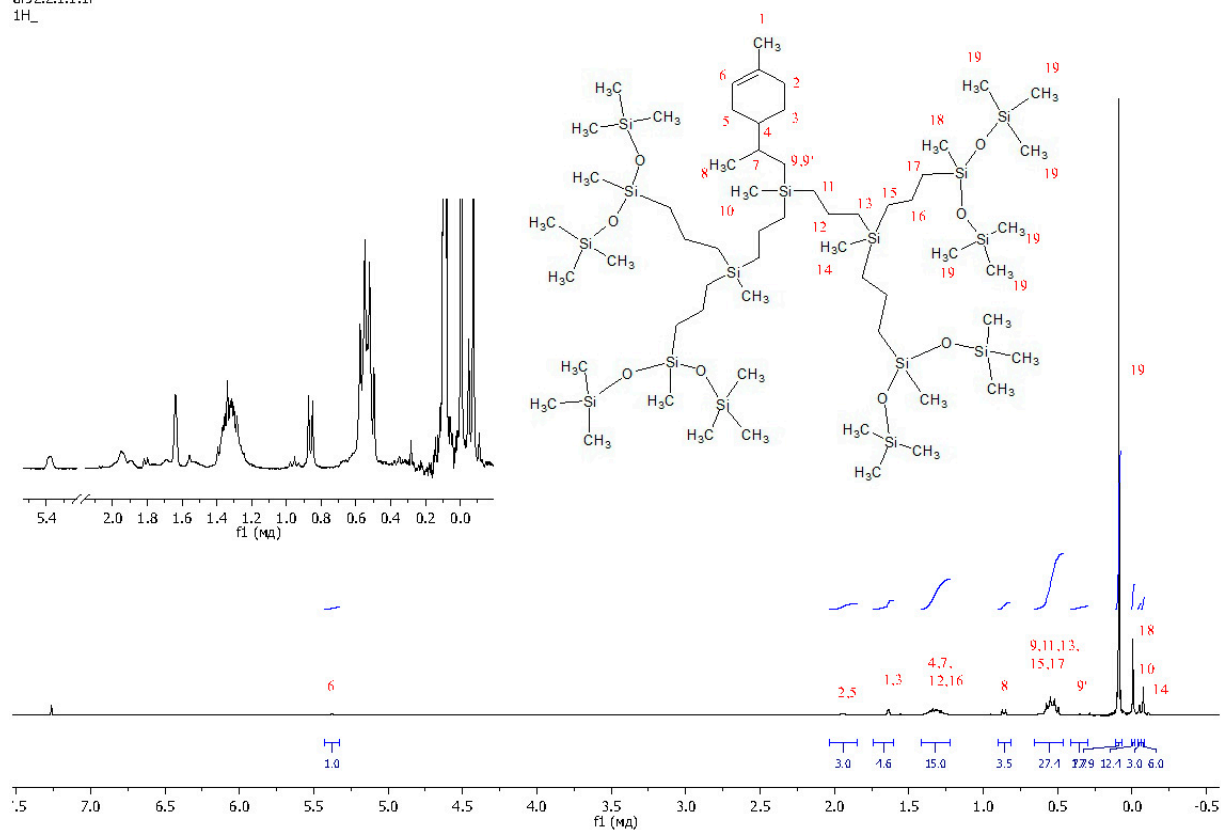


Figure S7. ¹H NMR spectrum of *Lim-G_{2.5}TMS₈*⁸.

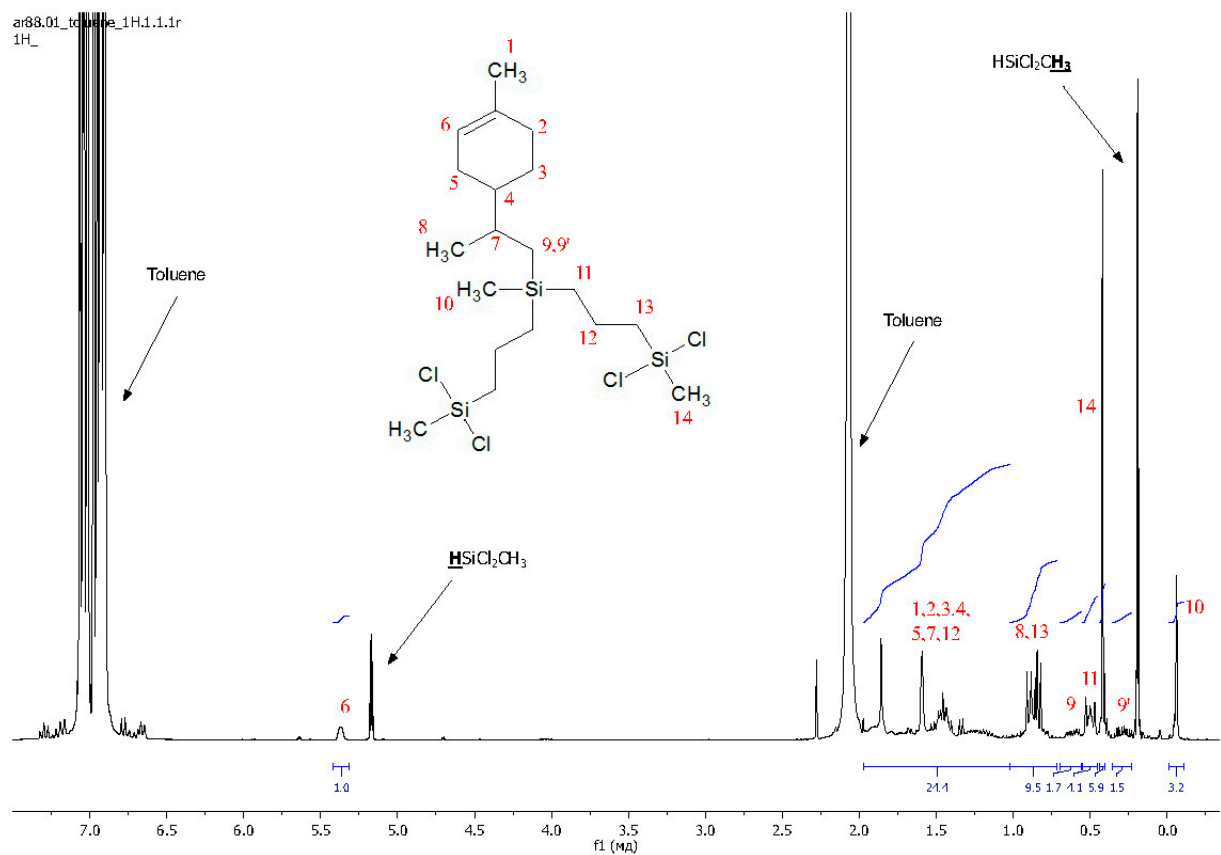


Figure S8. ¹H NMR spectrum of *Lim-G₁Cl₄*.

ar195.1.1.1.1r

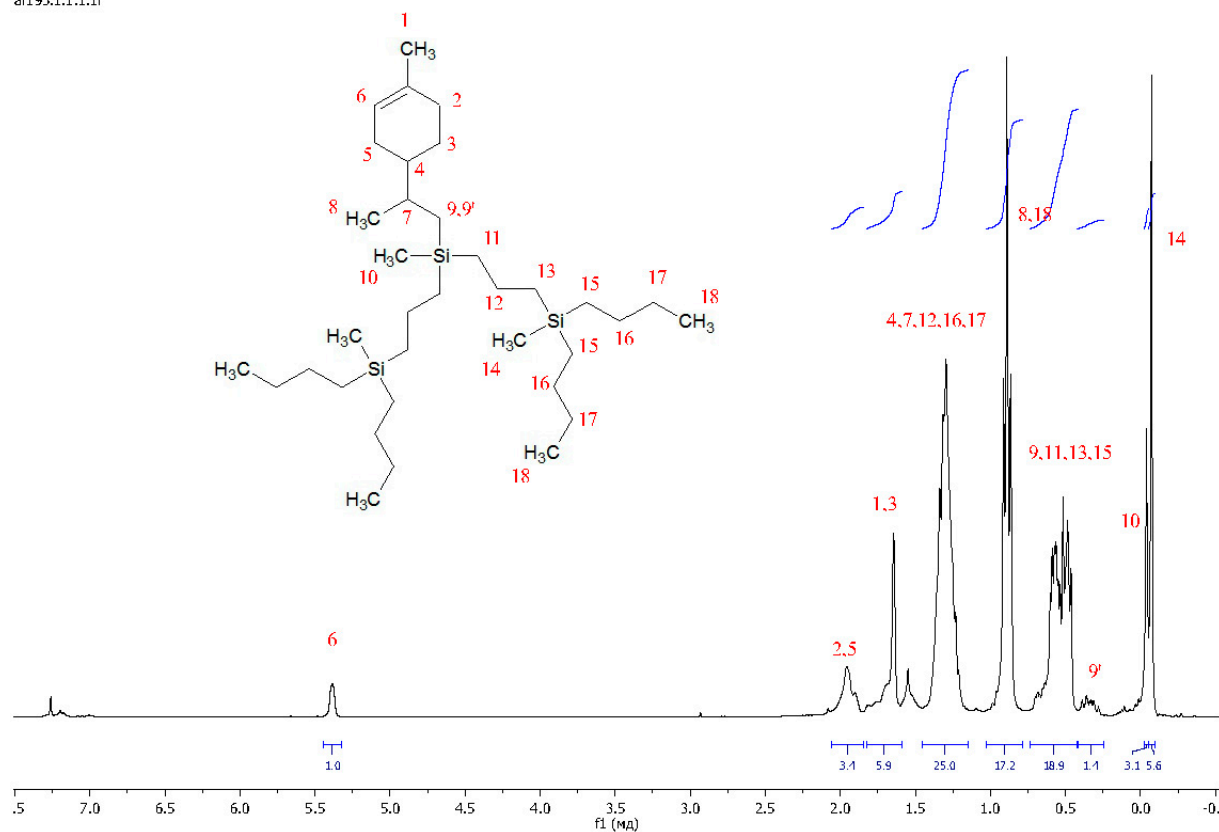


Figure S9. ¹H NMR spectrum of *Lim-G₁Bu⁴*.

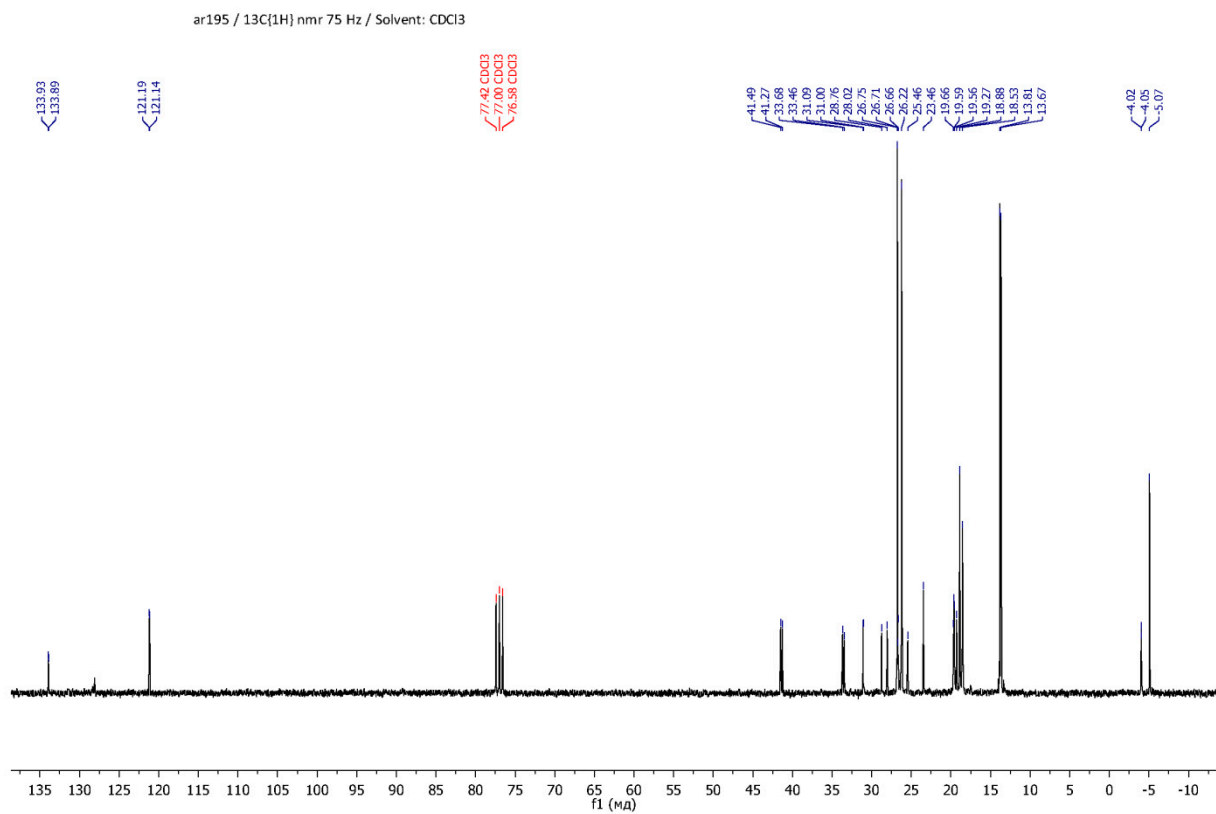


Figure S10. ¹³C NMR spectrum of *Lim-G₁Bu⁴*.

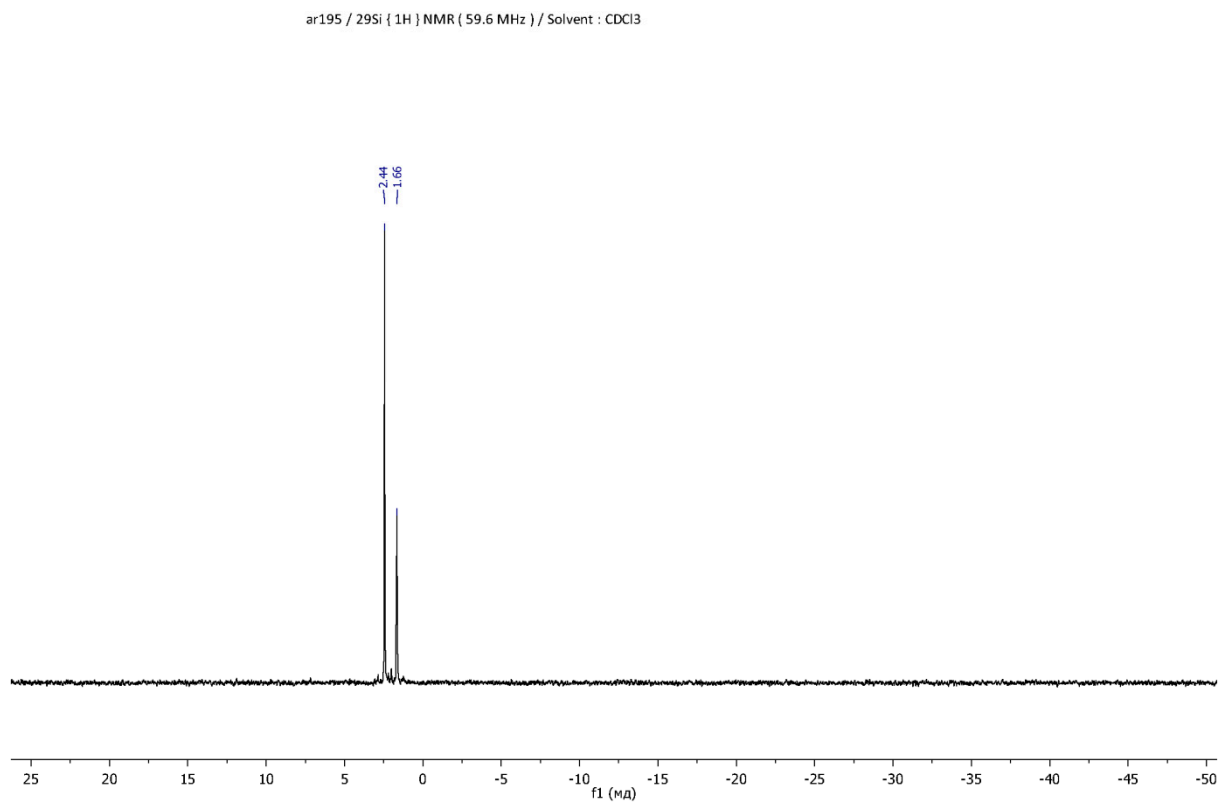


Figure S11. ^{29}Si NMR spectrum of *Lim-G₁Bu⁴*.

bkk20.001.fid

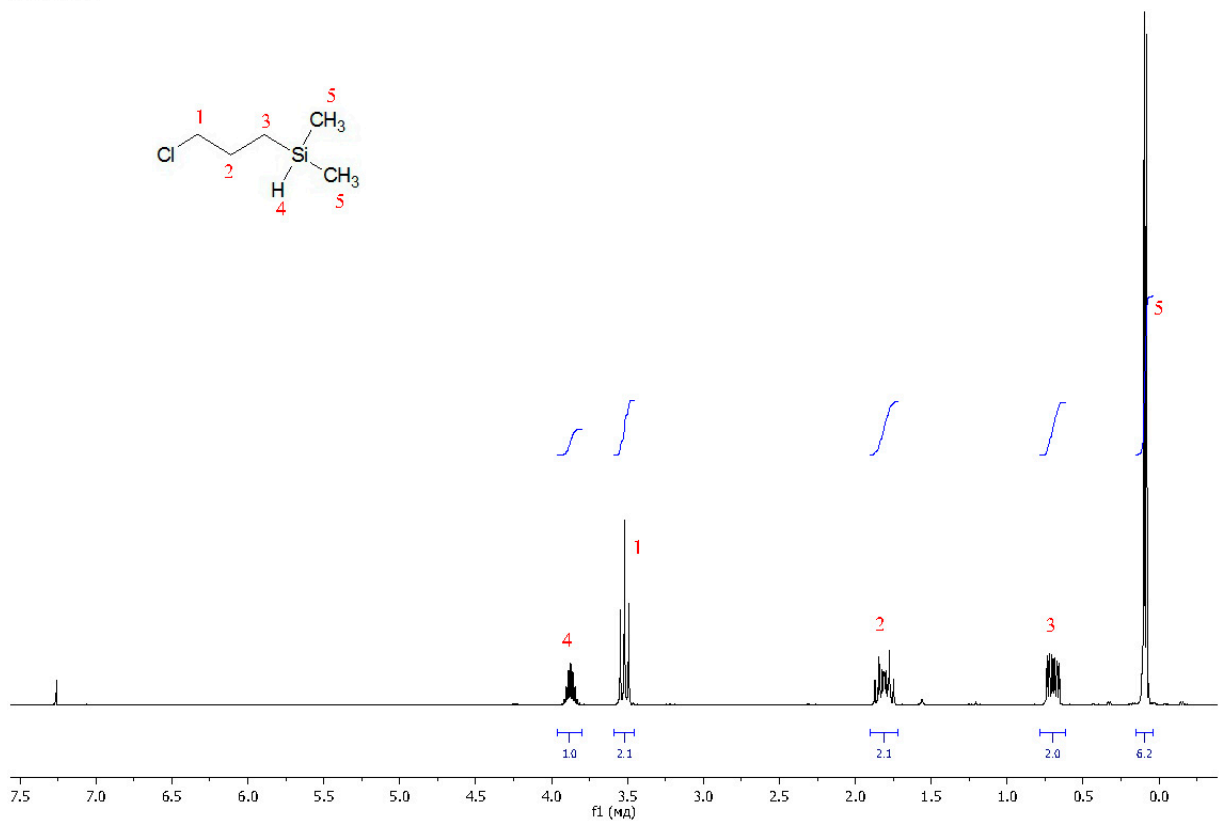


Figure S12. ^1H NMR spectrum of 3-chloropropyldimethylsilane.

ar117.003.1.fid
1H

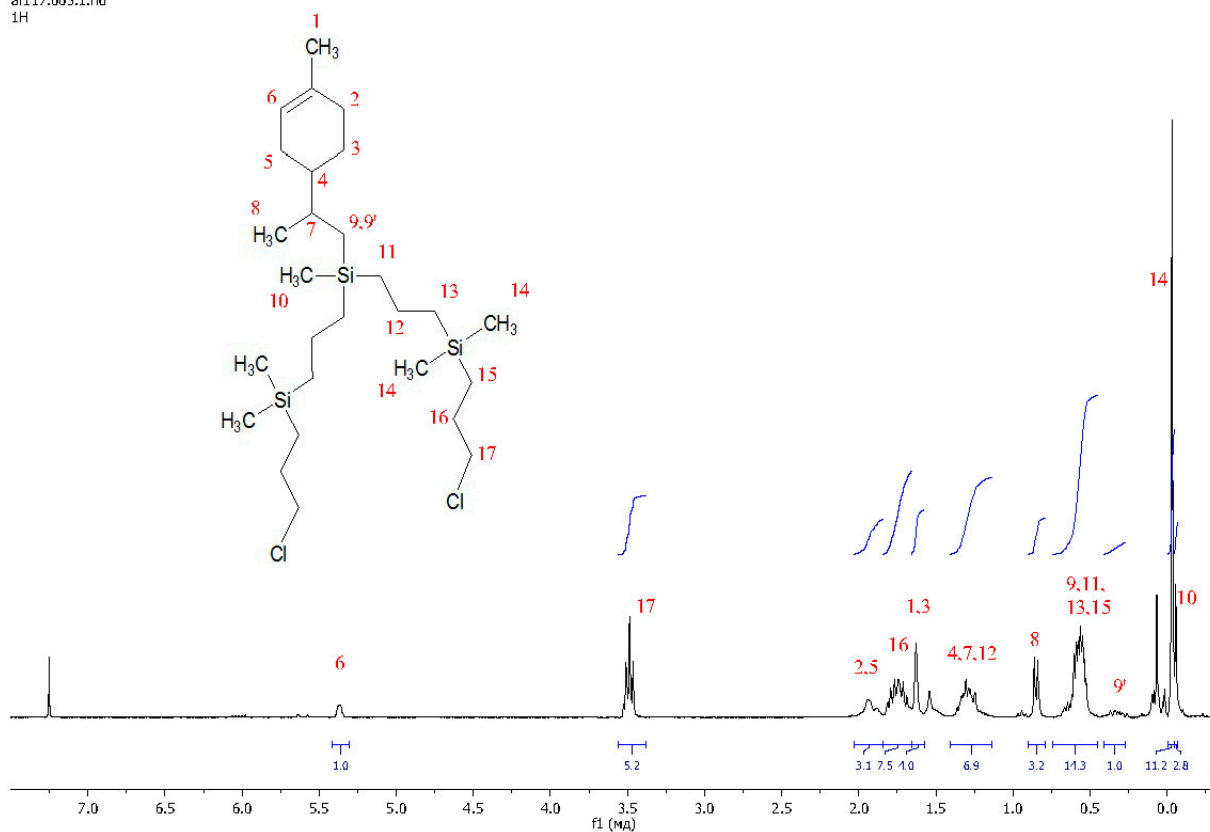


Figure S13. ^1H NMR spectrum of $\text{Lim-G}_0(\text{PrCl})^2$.

ar208.002

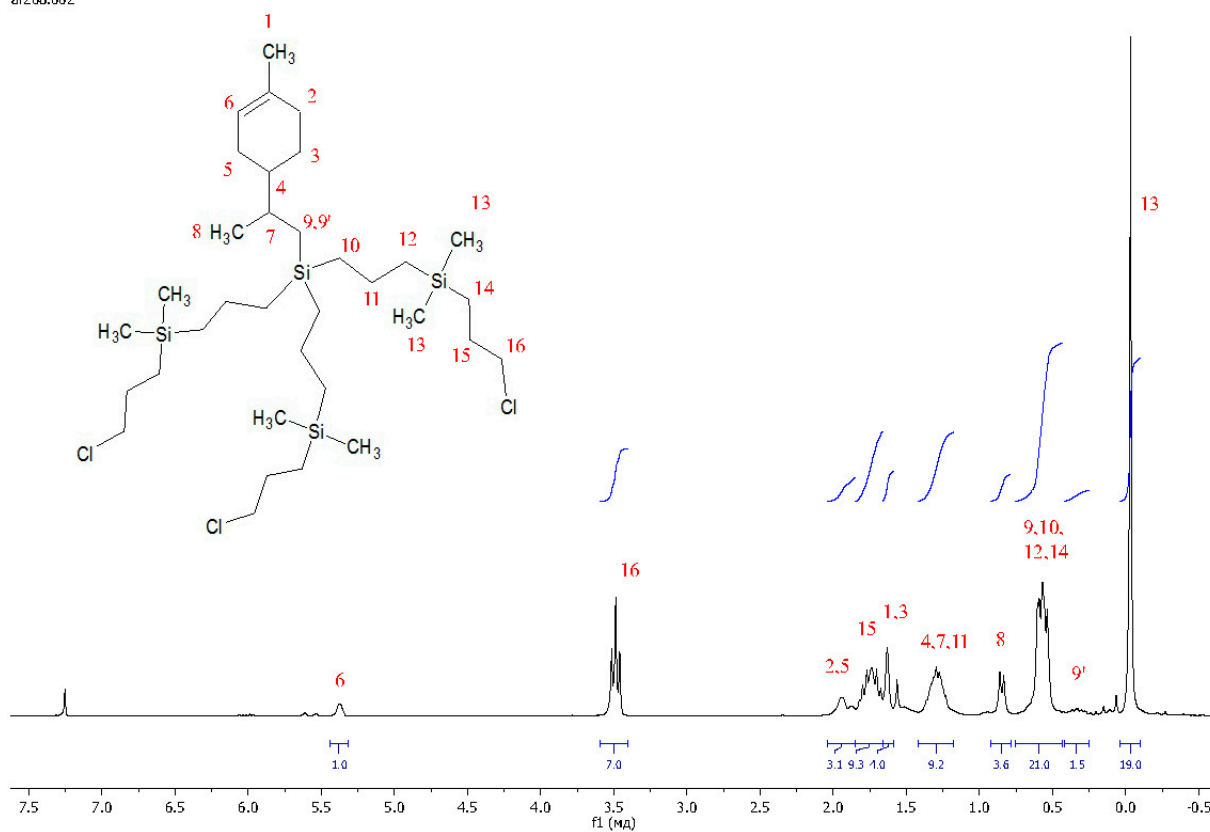


Figure S14. ^1H NMR spectrum of $\text{Lim-G}_1(\text{PrCl})^3$.

ar2724 005 1 f1d
1f

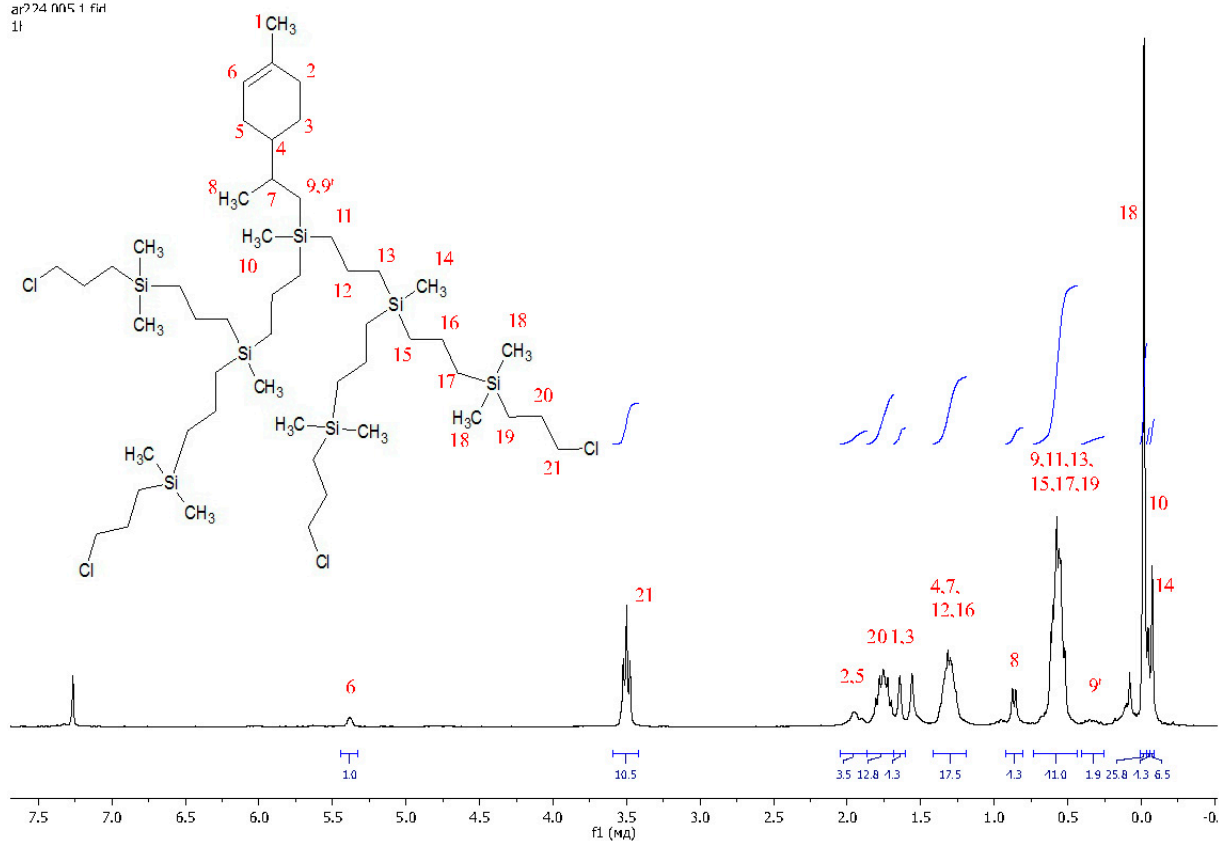


Figure S15. ^1H NMR spectrum of $\text{Lim-G}_2(\text{PrCl})^4$.

ar143.003

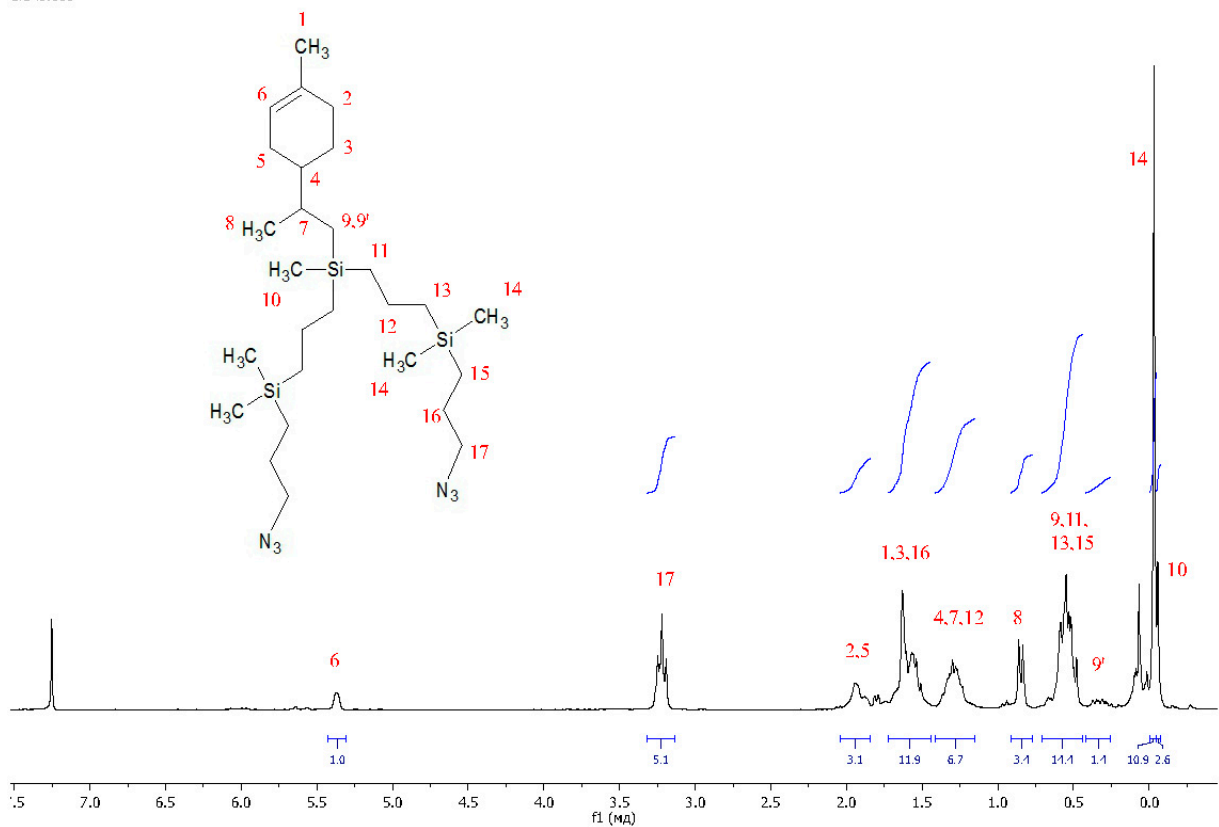


Figure S16. ^1H NMR spectrum of $\text{Lim-G}_0(\text{PrN}_3)^2$.

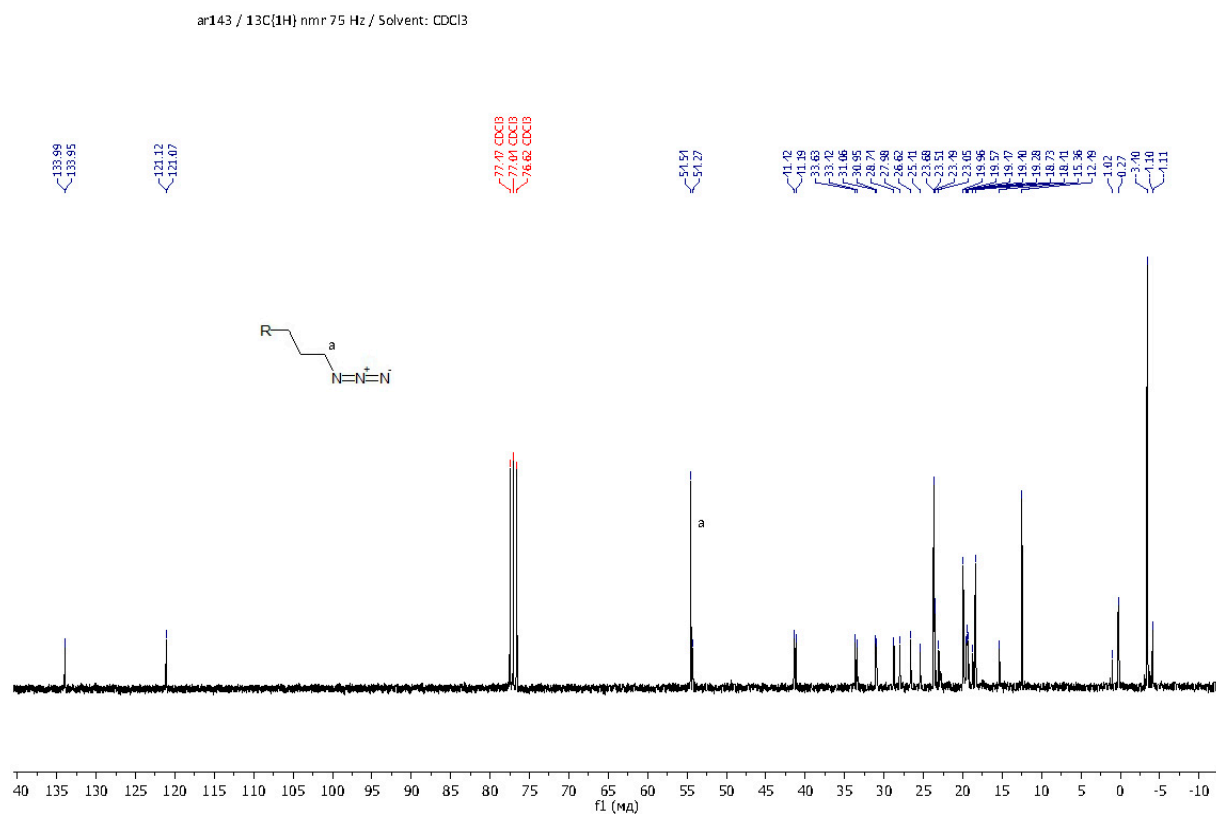


Figure S17. ^{13}C NMR spectrum of $\text{Lim-G}_0(\text{PrN}_3)^2$.

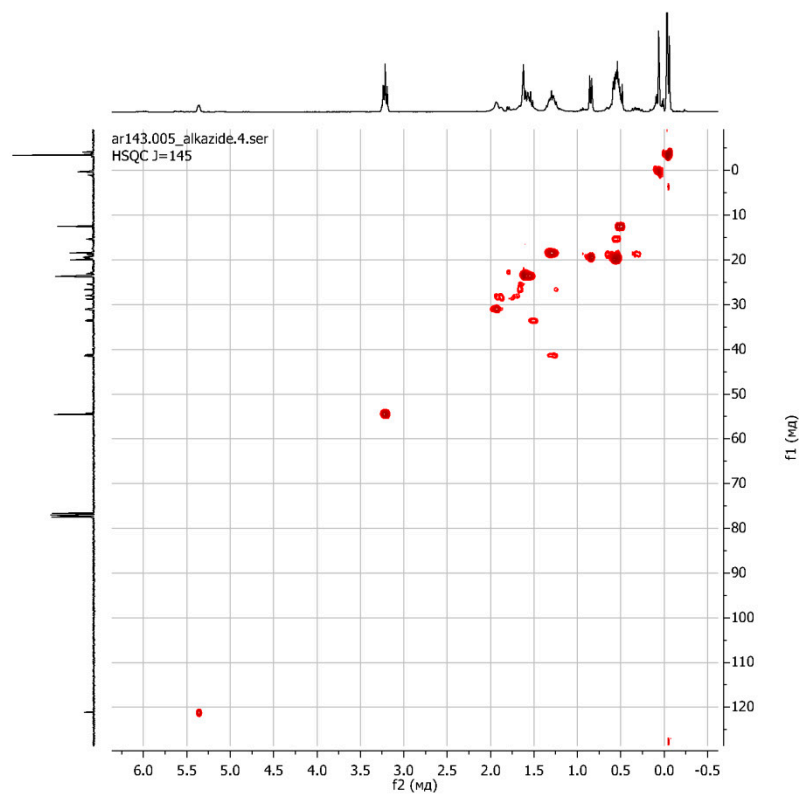


Figure S18. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of $\text{Lim-G}_0(\text{PrN}_3)^2$.

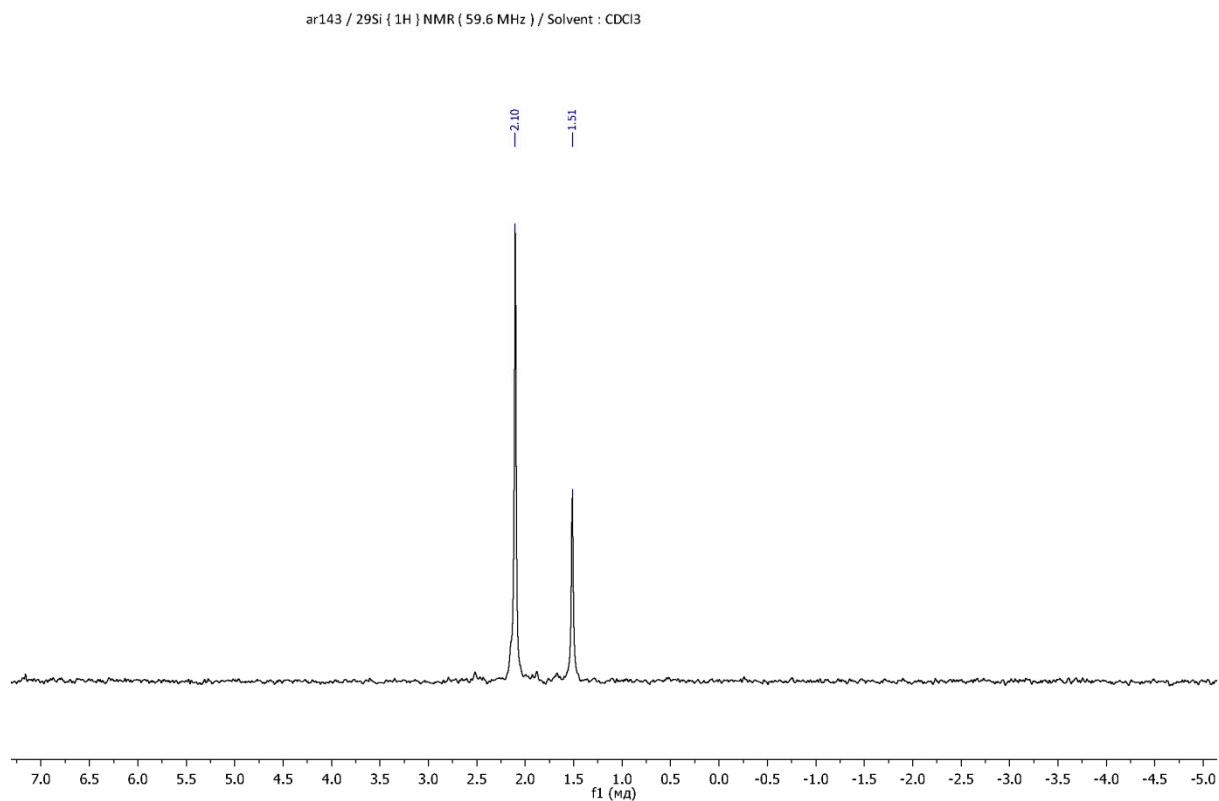


Figure S19. ^{29}Si NMR spectrum of $\text{Lim-G}_0(\text{PrN}_3)^2$.

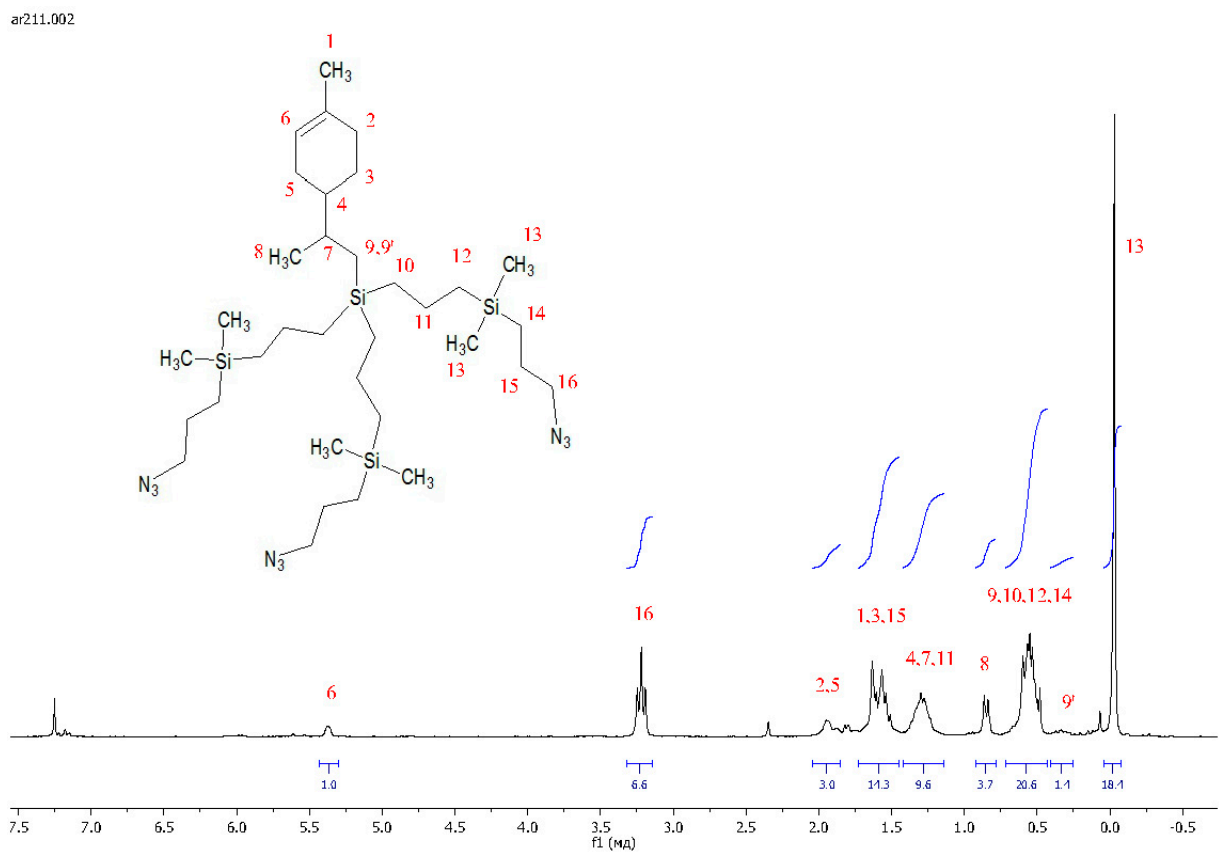


Figure S20. ^1H NMR spectrum of $\text{Lim-G}_1(\text{PrN}_3)^3$.

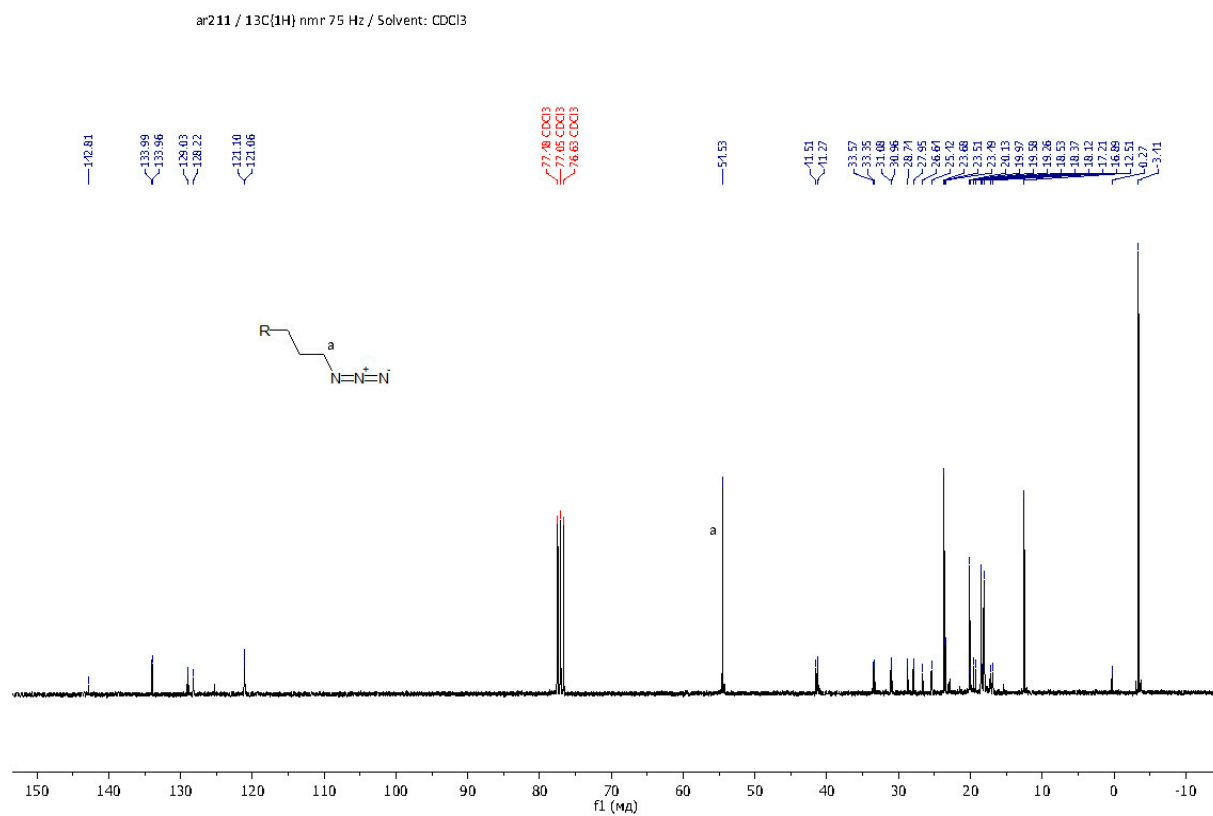


Figure S21. ^{13}C NMR spectrum of $\text{Lim-G}_1(\text{PrN}_3)^3$.

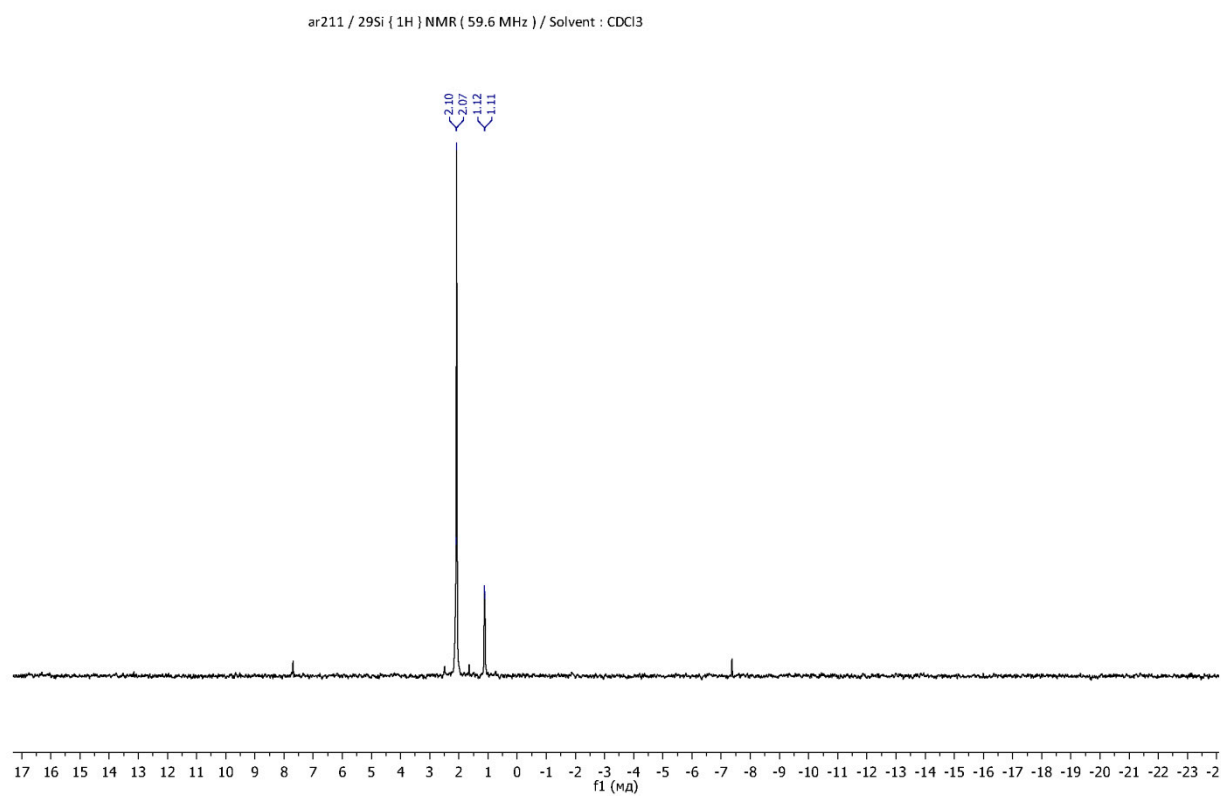
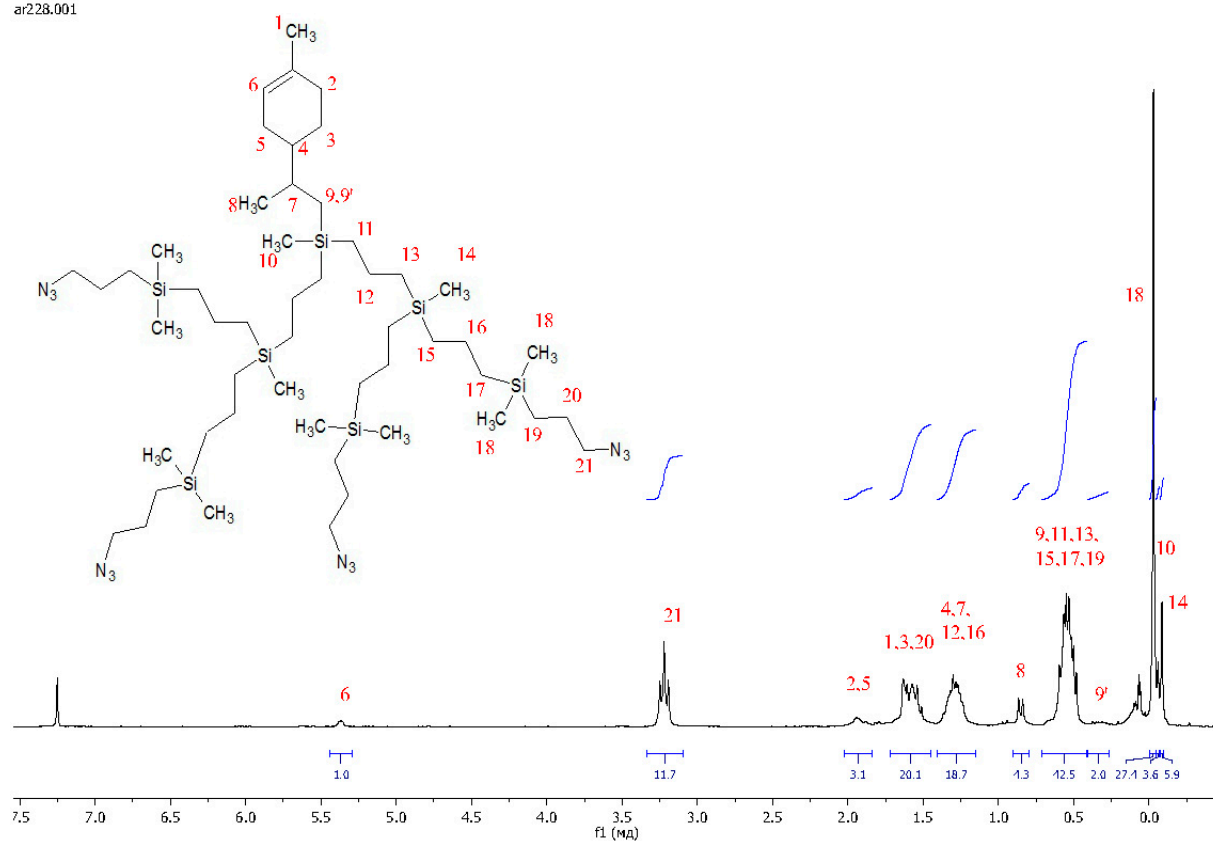
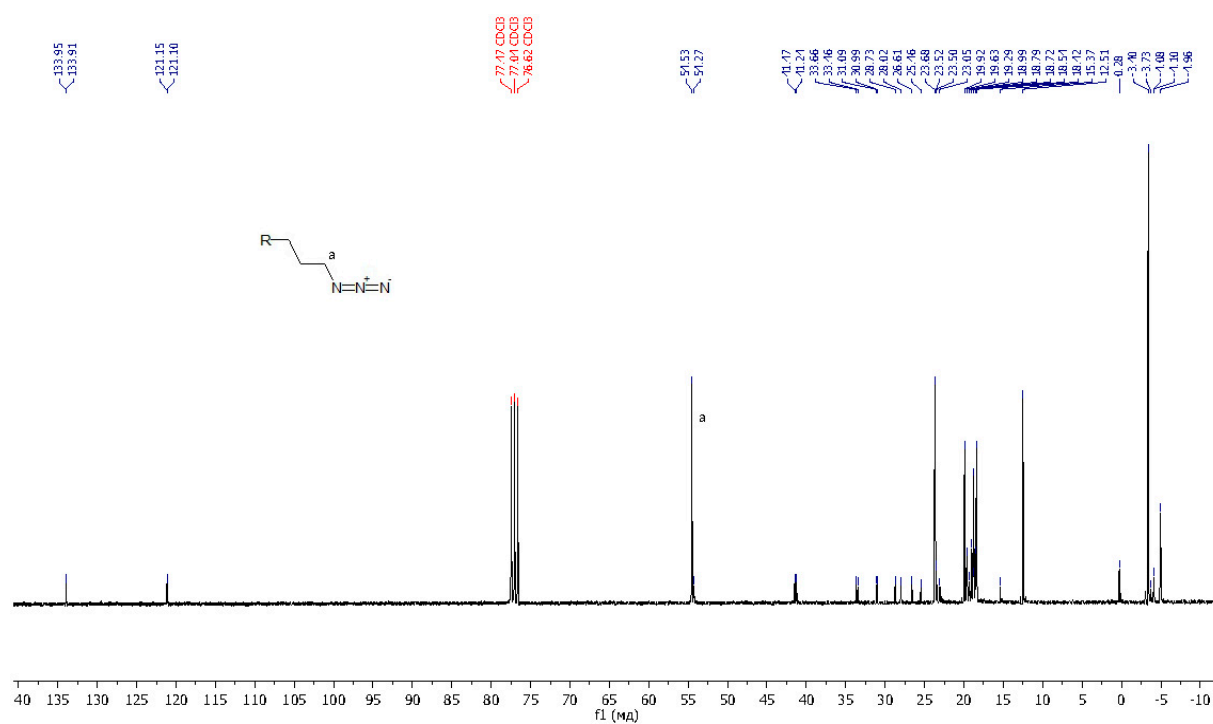


Figure S22. ^{29}Si NMR spectrum of $\text{Lim-G}_1(\text{PrN}_3)^3$.

ar228.001

Figure S23. ^1H NMR spectrum of $\text{Lim-G}_2(\text{PrN}_3)_4$.ar228 / $^{13}\text{C}\{^1\text{H}\}$ nmr 75 Hz / Solvent: CDCl_3 Figure S24. ^{13}C NMR spectrum of $\text{Lim-G}_2(\text{PrN}_3)_4$.

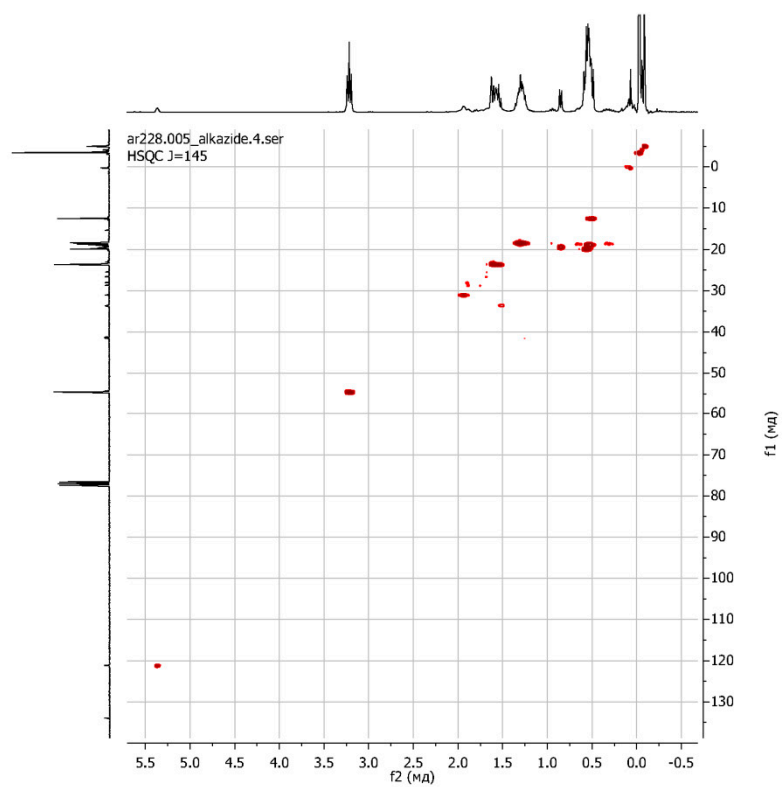


Figure S25. $\{^1\text{H } ^{13}\text{C}\}$ HSQC NMR spectrum of $\text{Lim-G}_2(\text{PrN}_3)^4$.

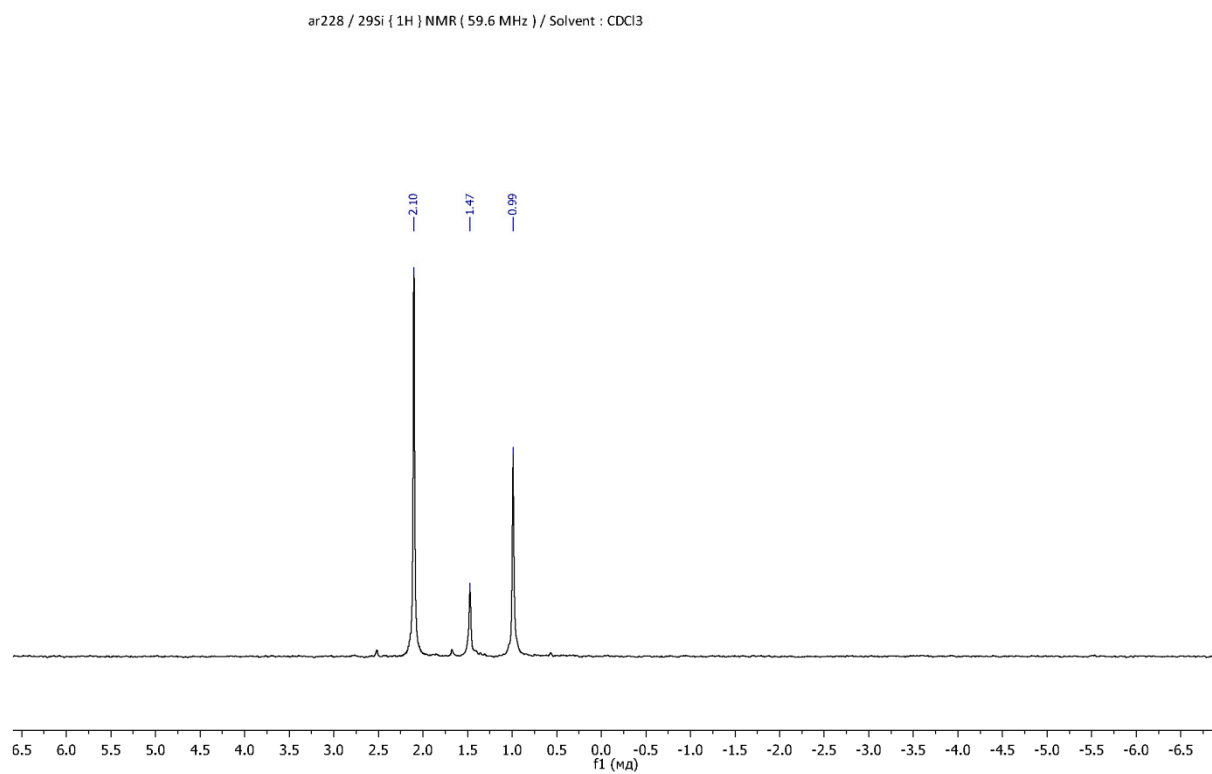


Figure S26. ^{29}Si NMR spectrum of $\text{Lim-G}_2(\text{PrN}_3)^4$.

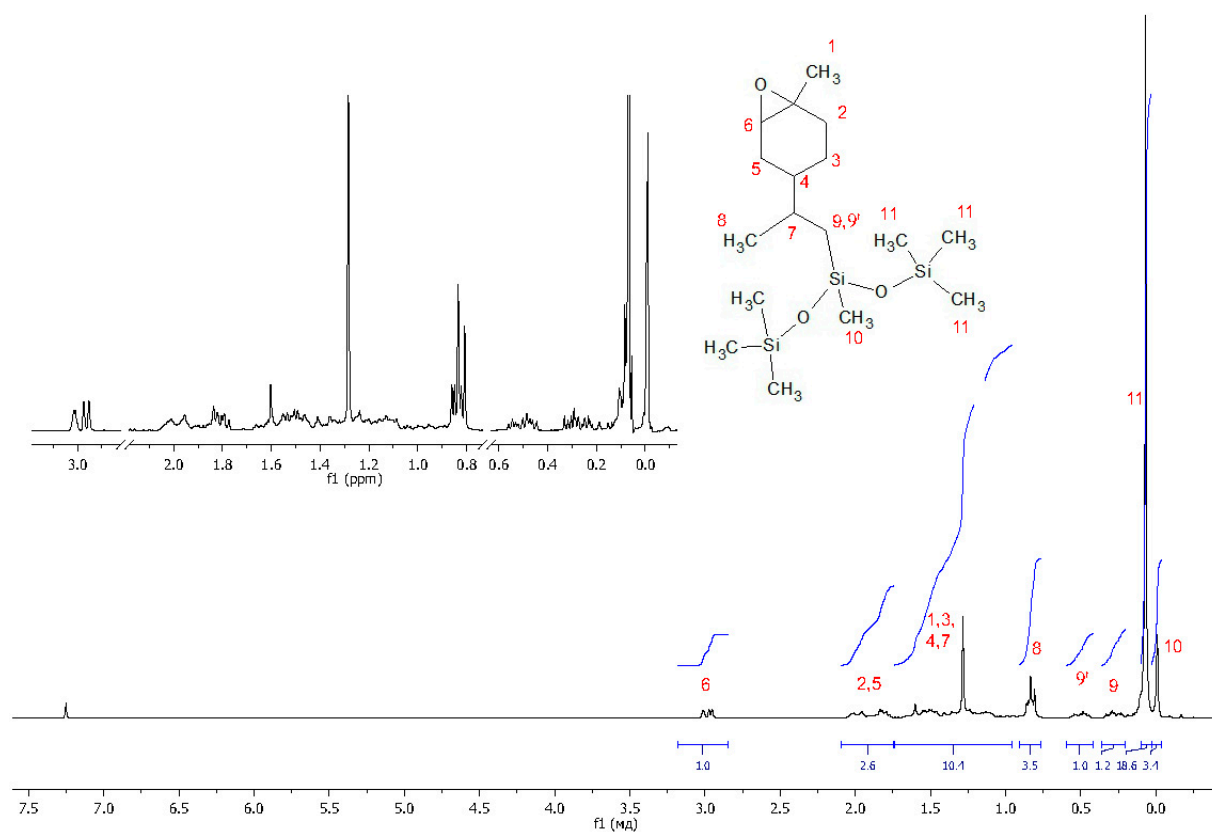


Figure S27. ^1H NMR spectrum of *LimOx-G_{0.5}TMS²*.

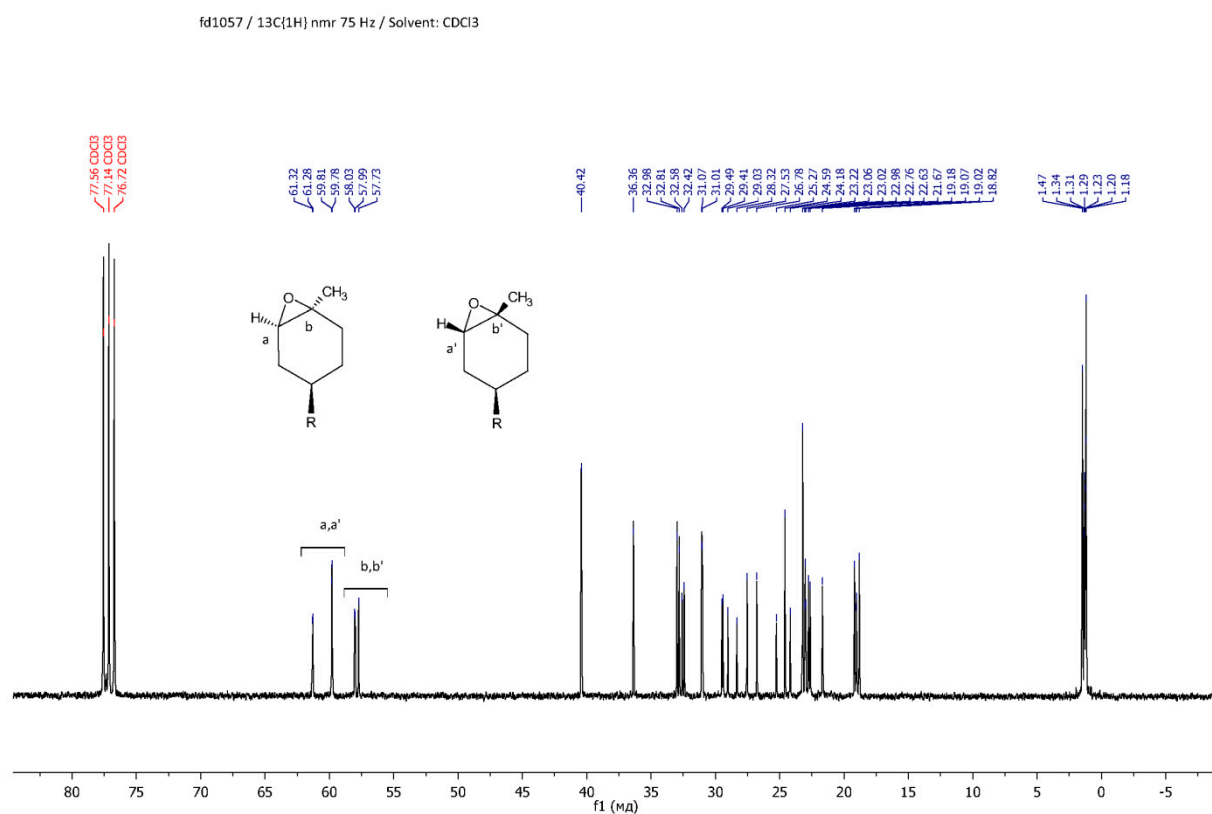


Figure S28. ^{13}C NMR spectrum of *LimOx-G_{0.5}TMS²*.

fd1057 / APT 75 Hz / Solvent: CDCl₃

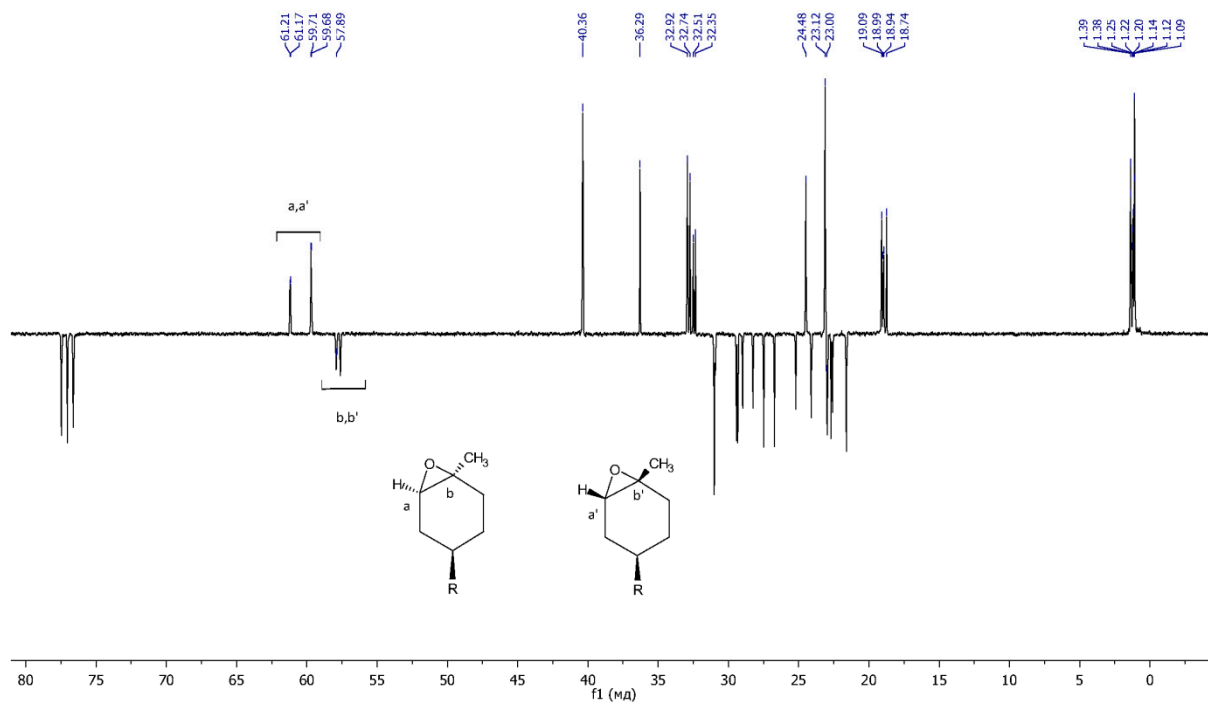


Figure S29. APT NMR spectrum of *LimOx-G_{0,5}TMS²*.

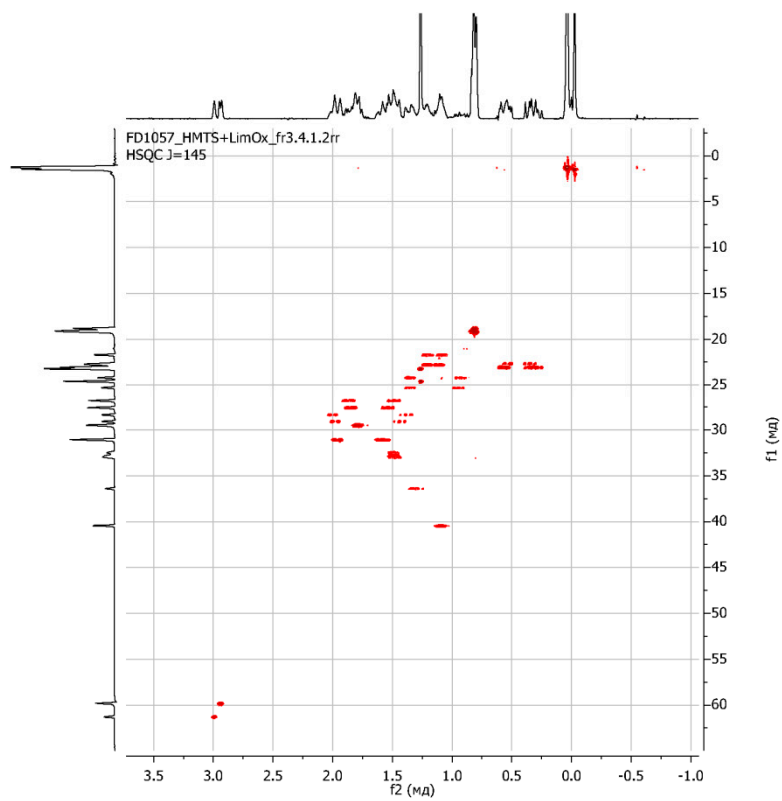


Figure S30. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of *LimOx-G_{0,5}TMS²*.

fd1057 / ^{29}Si { 1H } NMR (59.6 MHz) / Solvent : CDCl_3

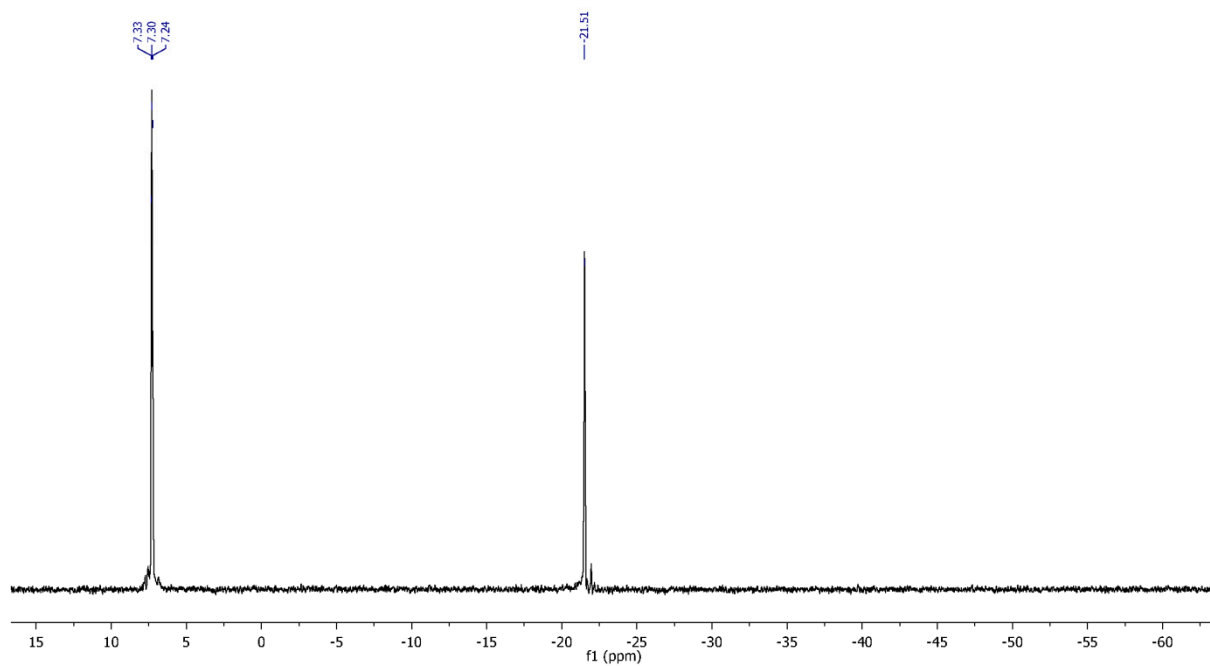


Figure S31. ^{29}Si NMR spectrum of *LimOx-G_{0.5}TMS²*.

ar102.5.1.1.1r

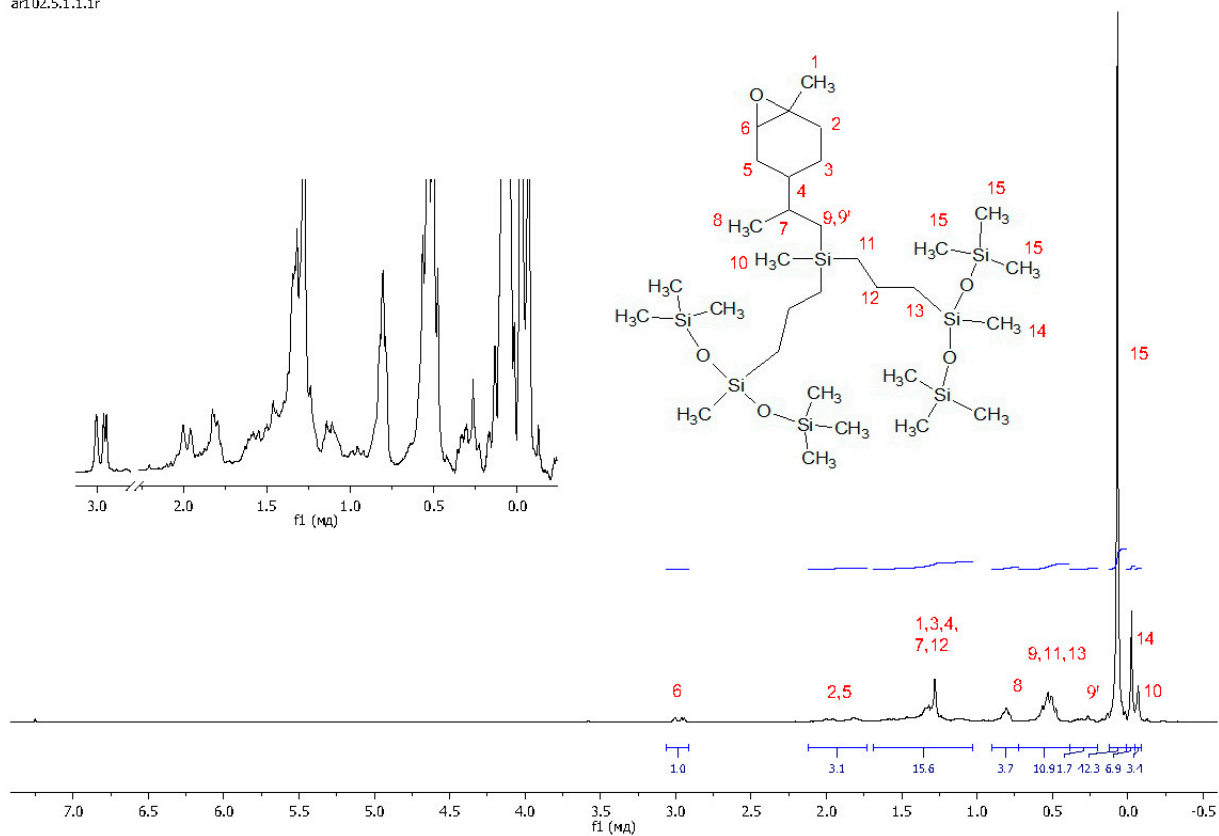


Figure S32. ^1H NMR spectrum of *LimOx-G_{1.5}TMS⁴*.

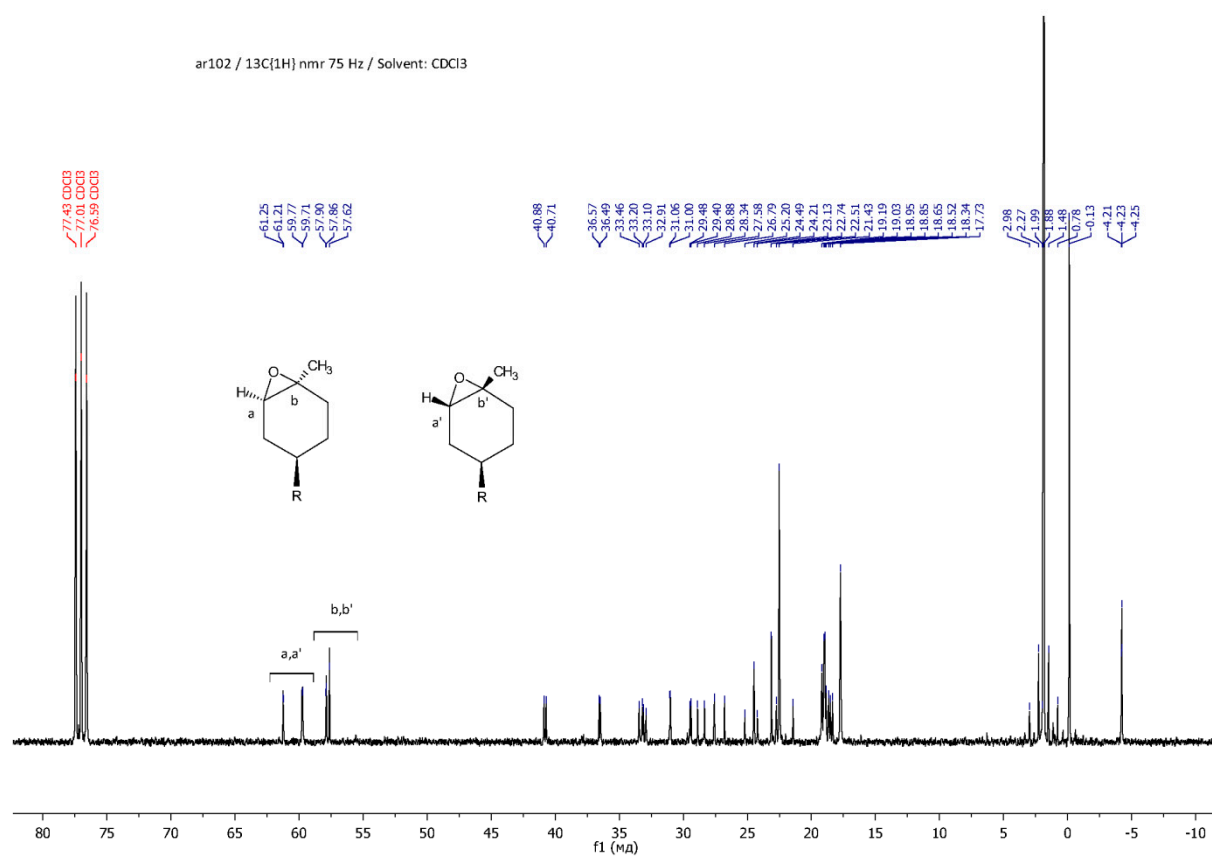


Figure S33. ^{13}C NMR spectrum of *LimOx-G_{1,5}TMS⁴*.

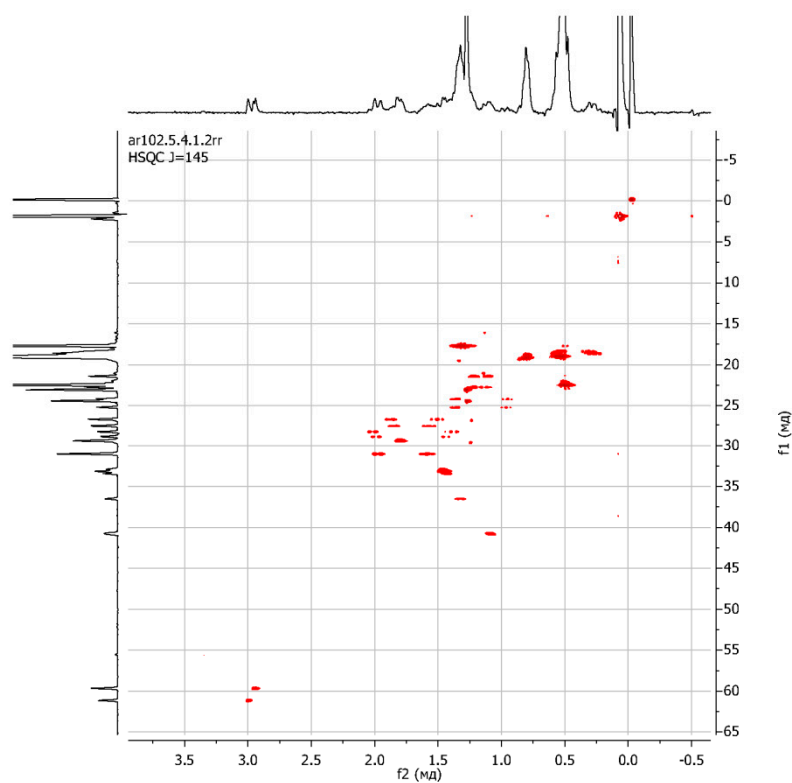


Figure S34. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of *LimOx-G_{1,5}TMS⁴*.

ar102 / ^{29}Si { ^1H } NMR (59.6 MHz) / Solvent : CDCl_3

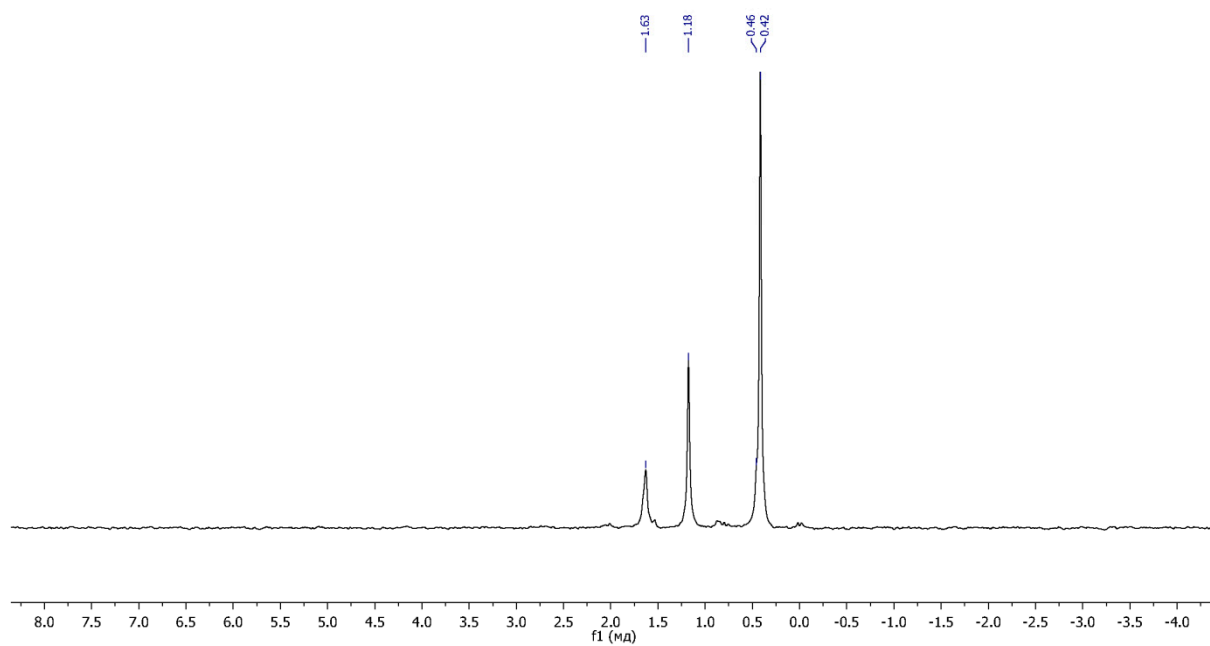


Figure S35. ^{29}Si NMR spectrum of *LimOx-G_{1,5}TMS⁴*.

ar109.002

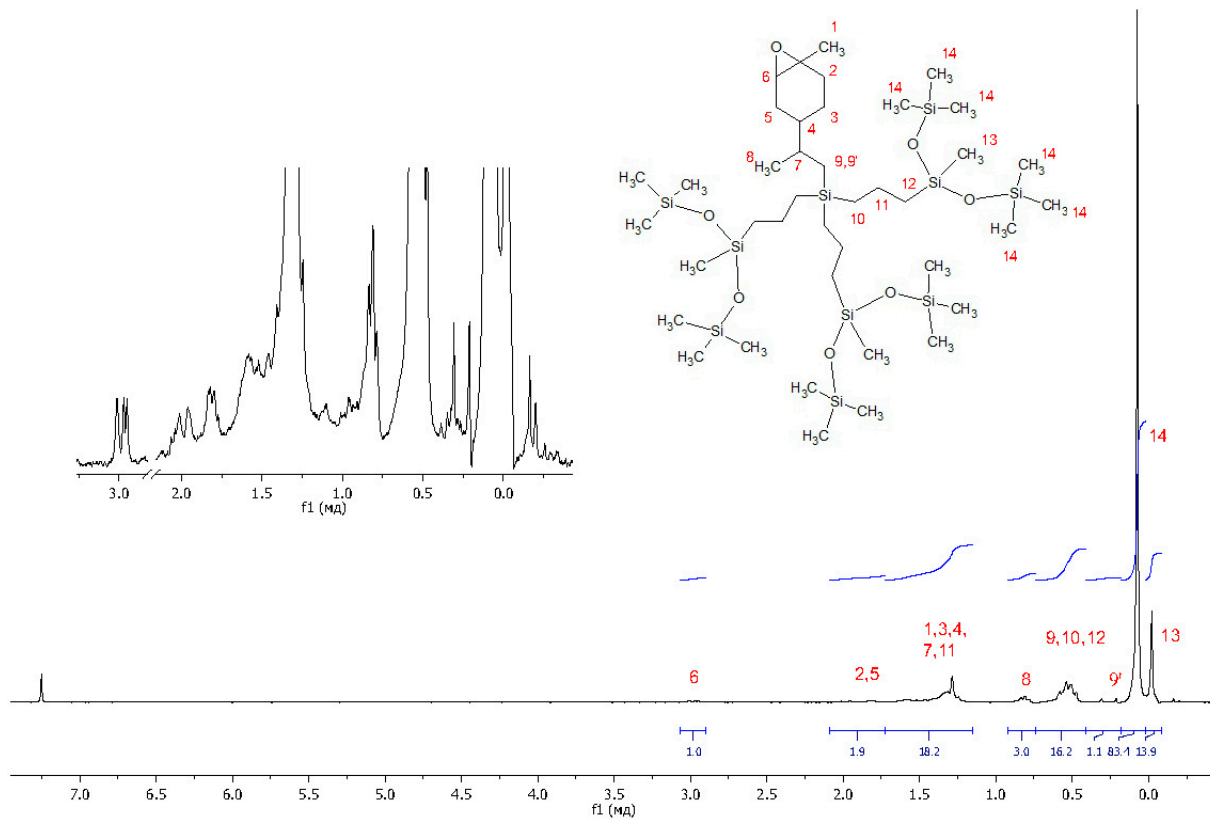


Figure S36. ^1H NMR spectrum of *LimOx-G_{1,5}TMS⁶*.

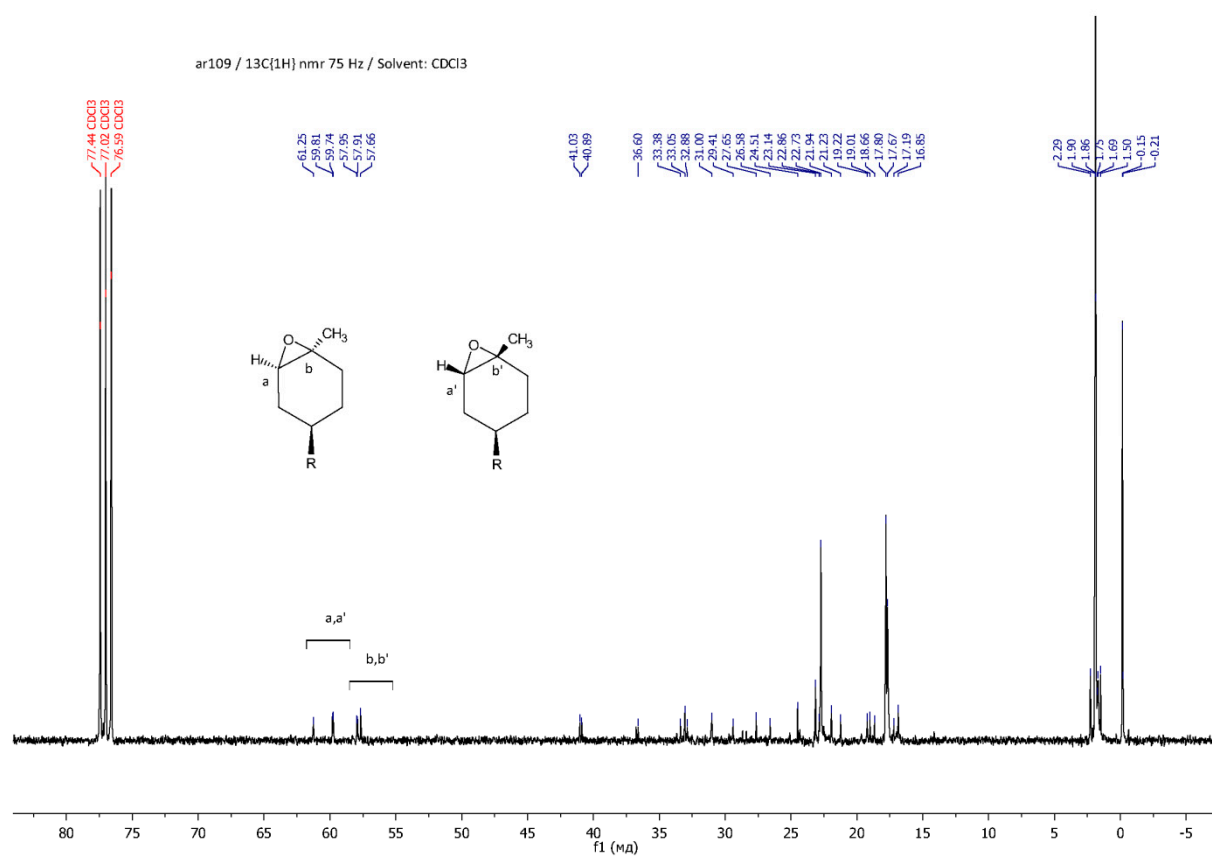


Figure S37. ^{13}C NMR spectrum of *LimOx-G_{1,5}TMS⁶*.

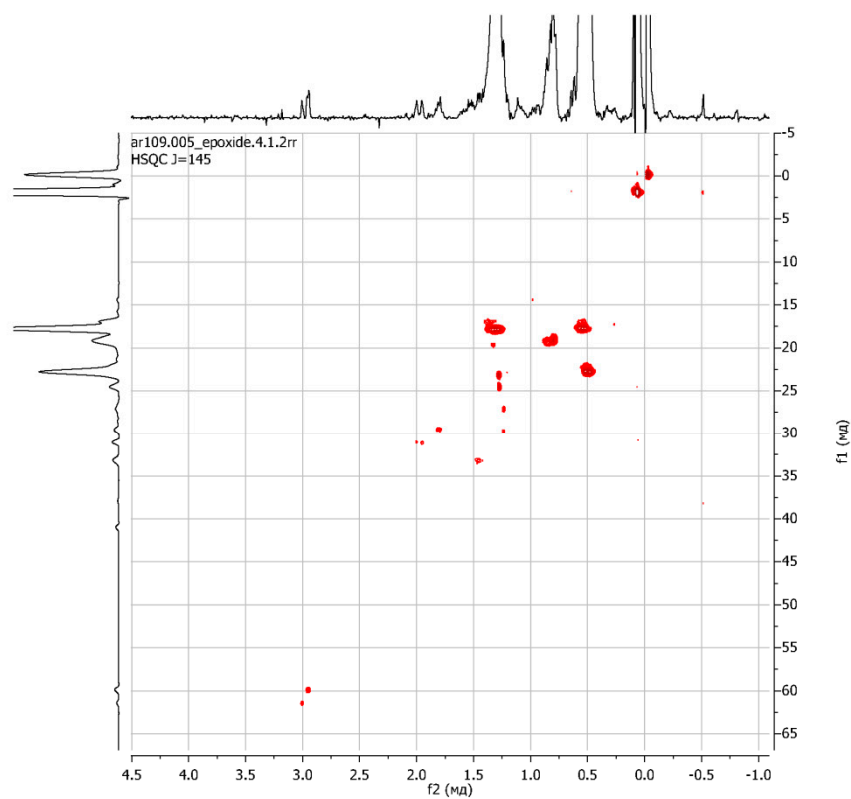


Figure S38. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of *LimOx-G_{1,5}TMS⁶*.

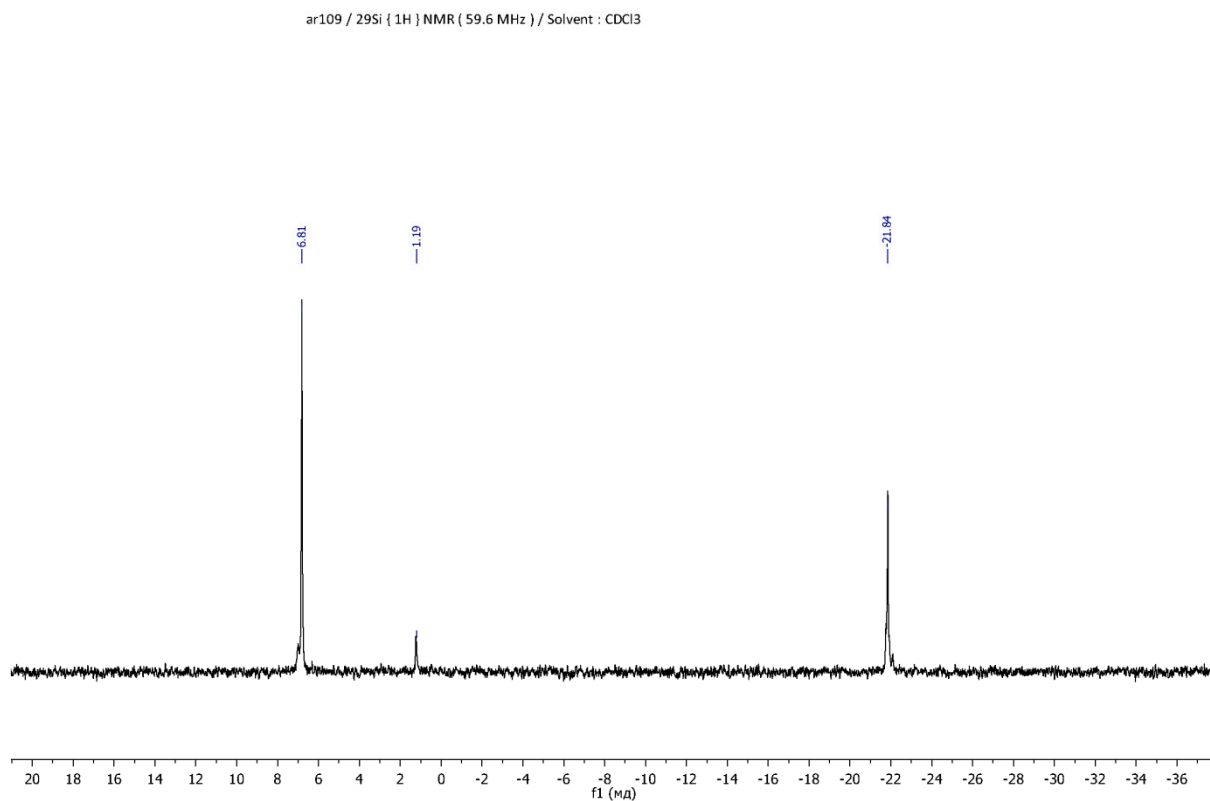


Figure S39. ^{29}Si NMR spectrum of $\text{LimOx-G}_{1.5}\text{TMS}^6$.

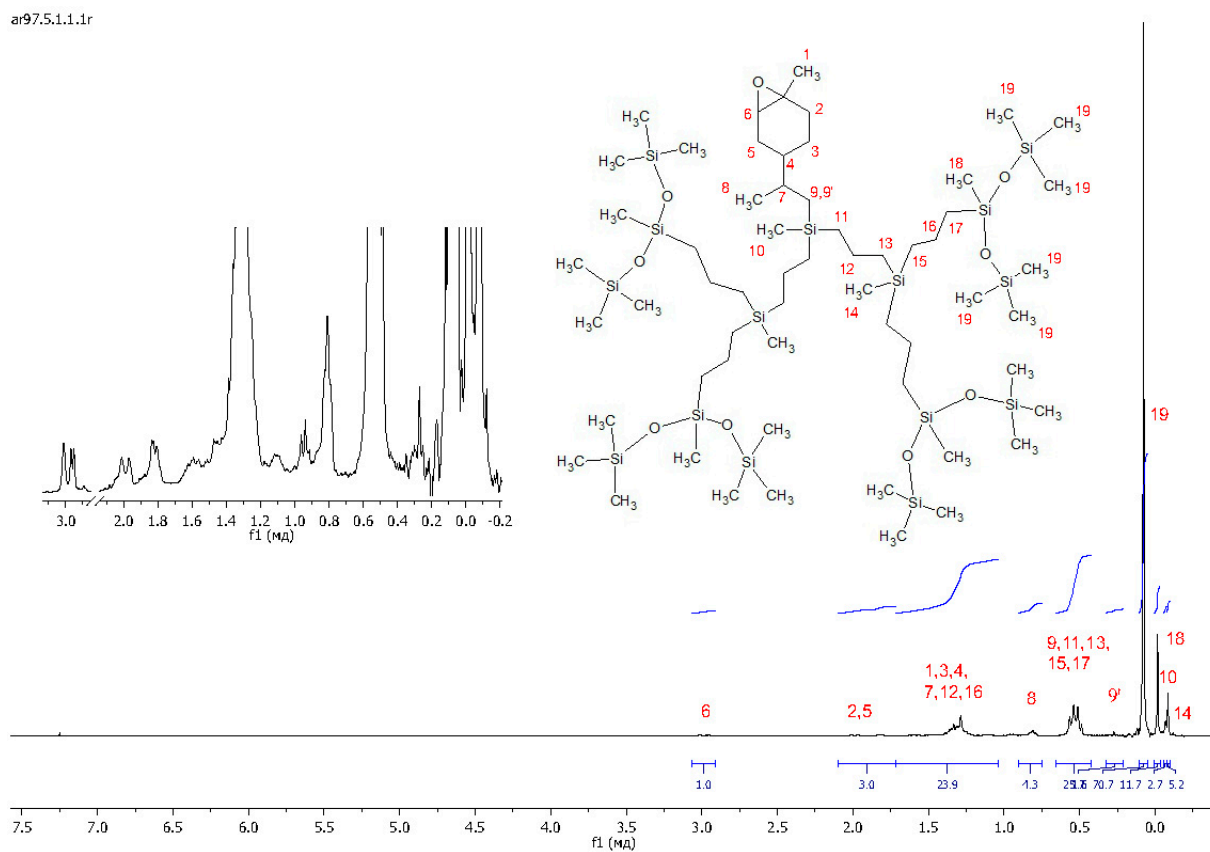


Figure S40. ^1H NMR spectrum of $\text{LimOx-G}_{2.5}\text{TMS}^8$.

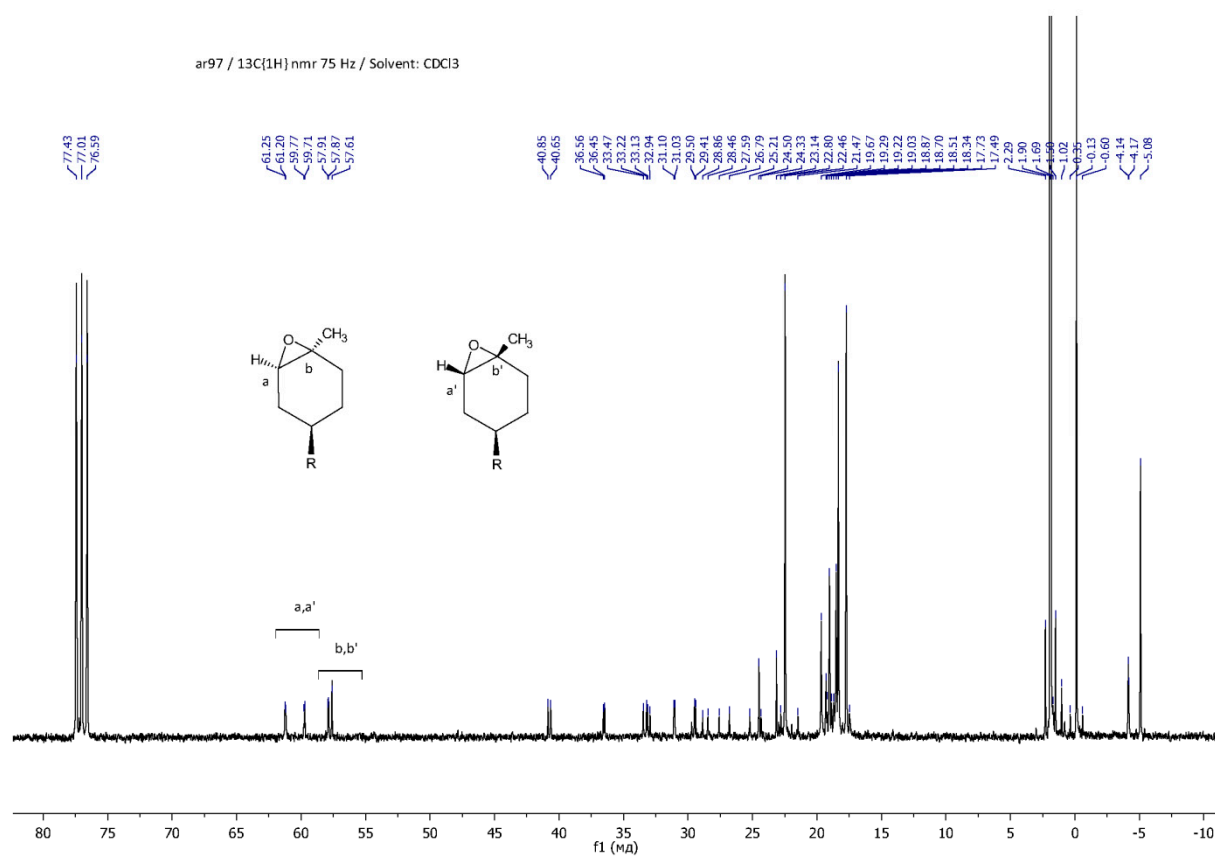


Figure S41. ^{13}C NMR spectrum of *LimOx-G_{2,5}TMS*⁸.

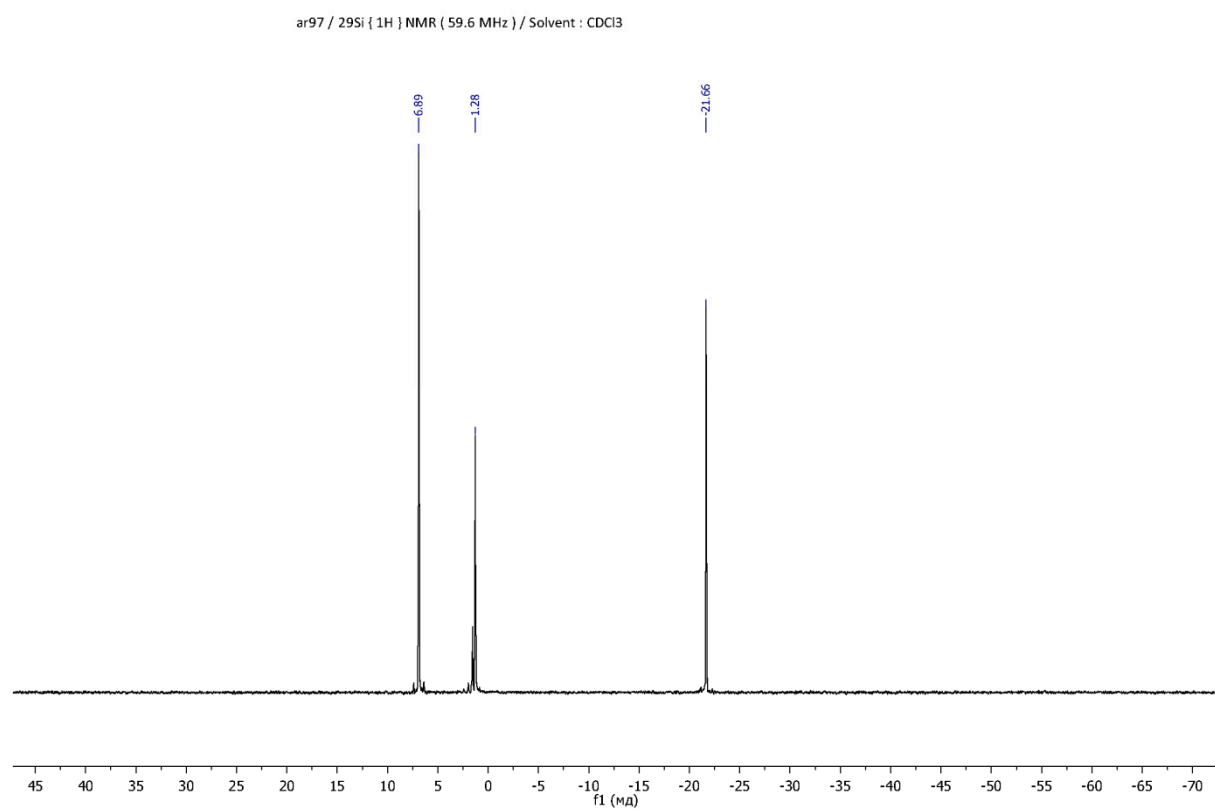
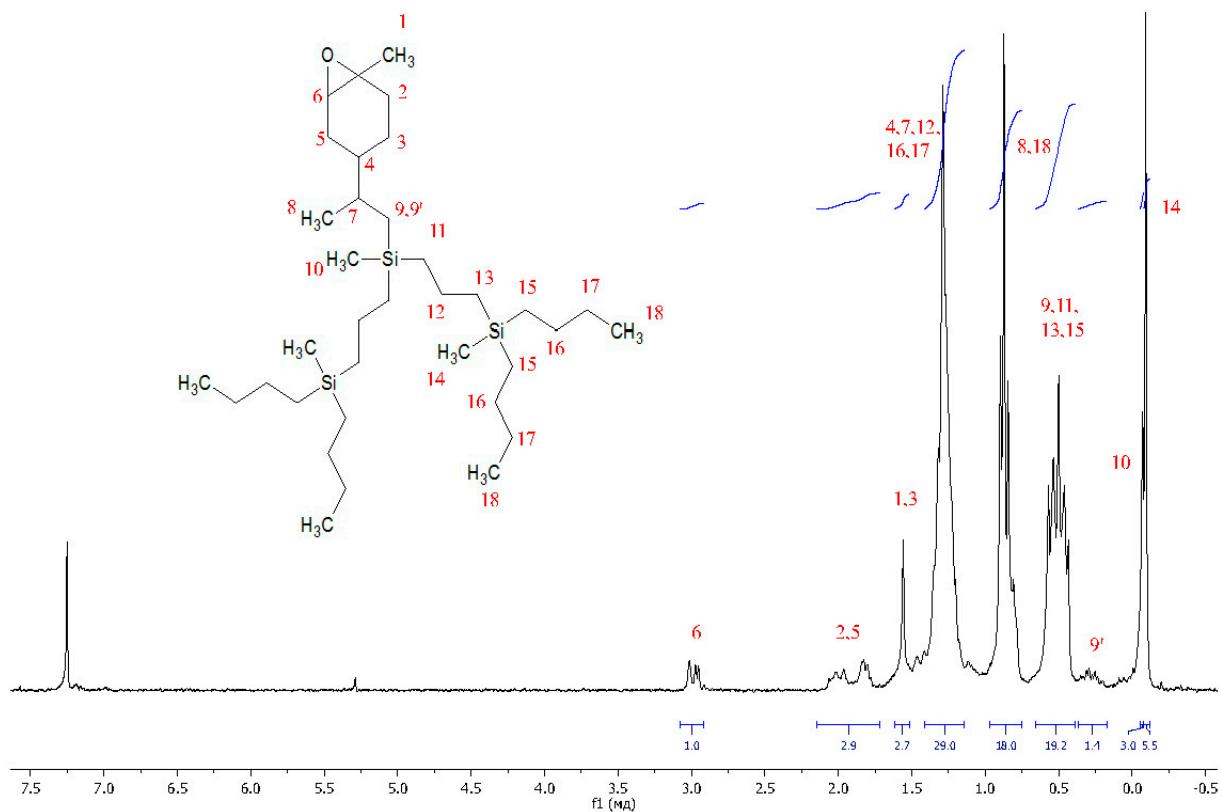
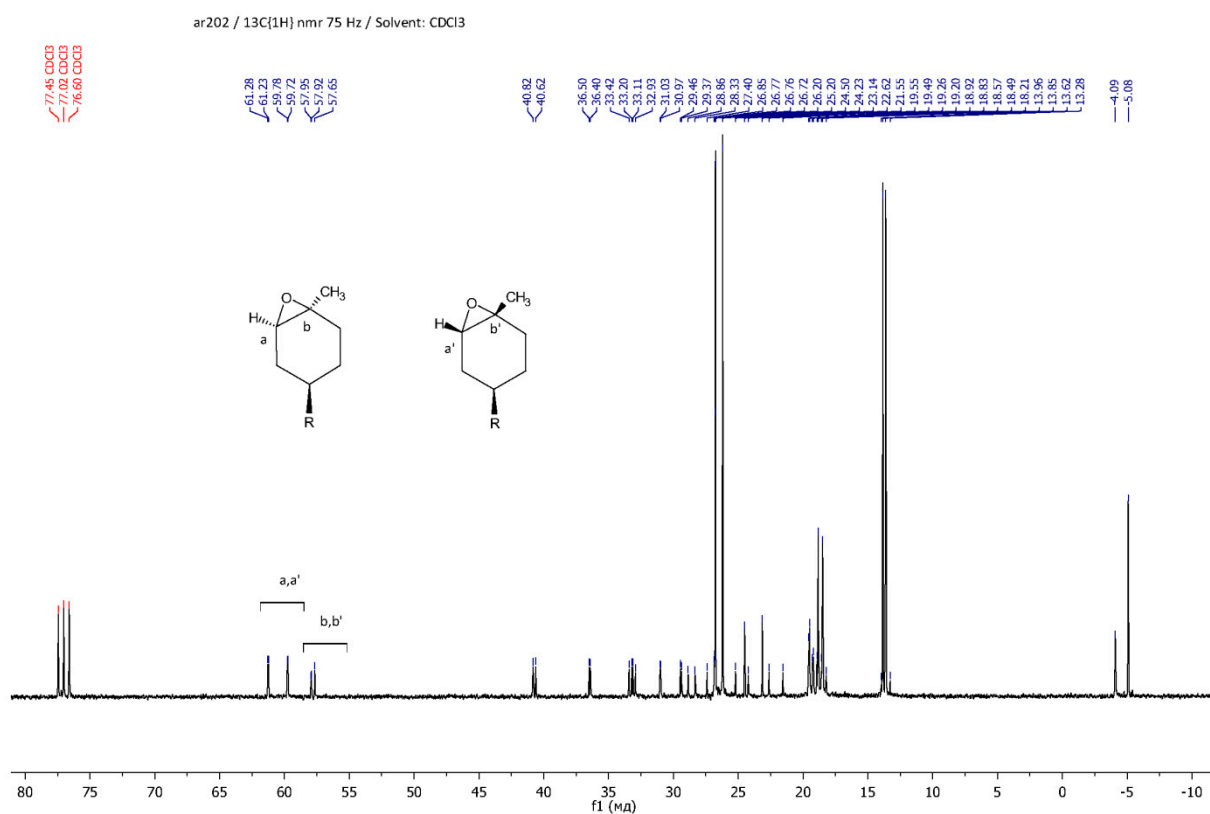


Figure S42. ^{29}Si NMR spectrum of *LimOx-G_{2,5}TMS*⁸.

Figure S43. ¹H NMR spectrum of *LimOx-G₁Bu⁴*.Figure S44. ¹³C NMR spectrum of *LimOx-G₁Bu⁴*.

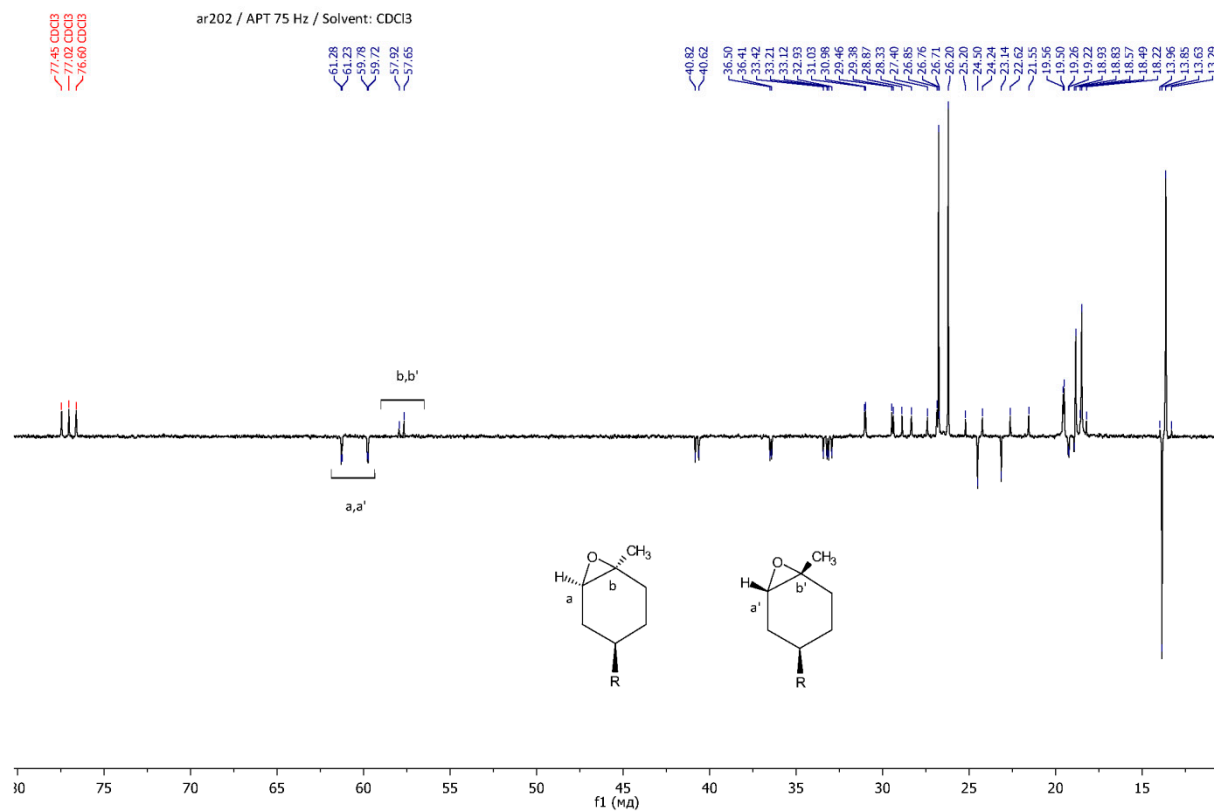


Figure S45. APT NMR spectrum of *LimOx-G₁Bu⁴*.

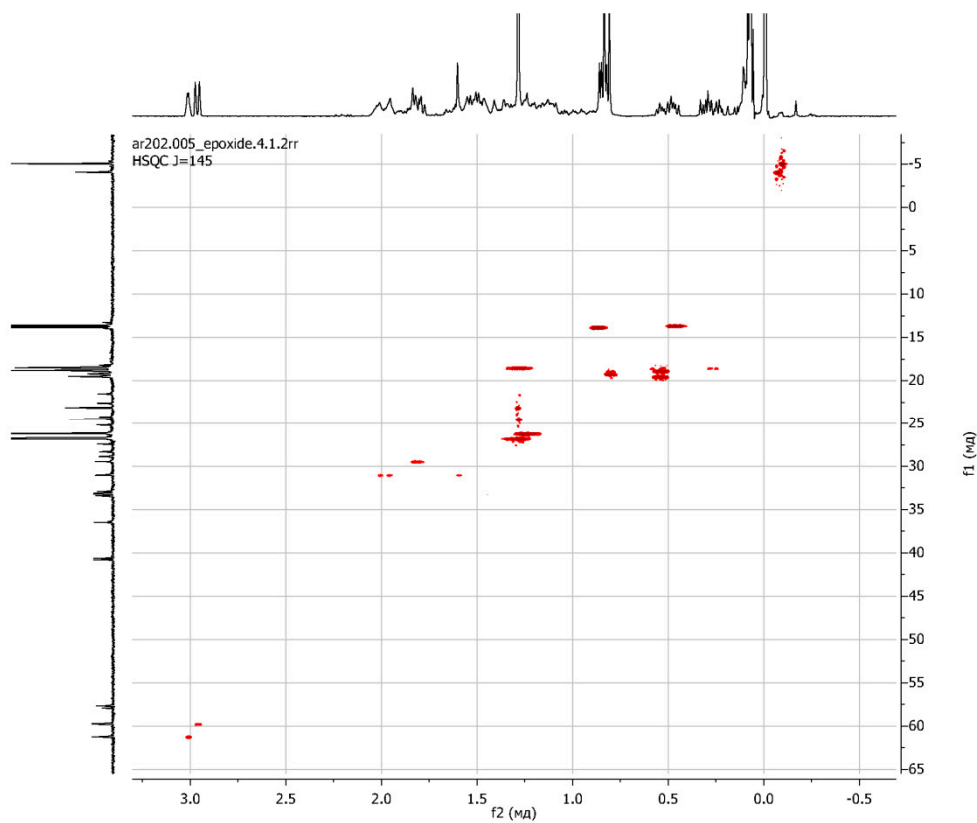


Figure S46. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of *LimOx-G₁Bu⁴*.

ar202 / 29Si { 1H } NMR (59.6 MHz) / Solvent : CDCl3

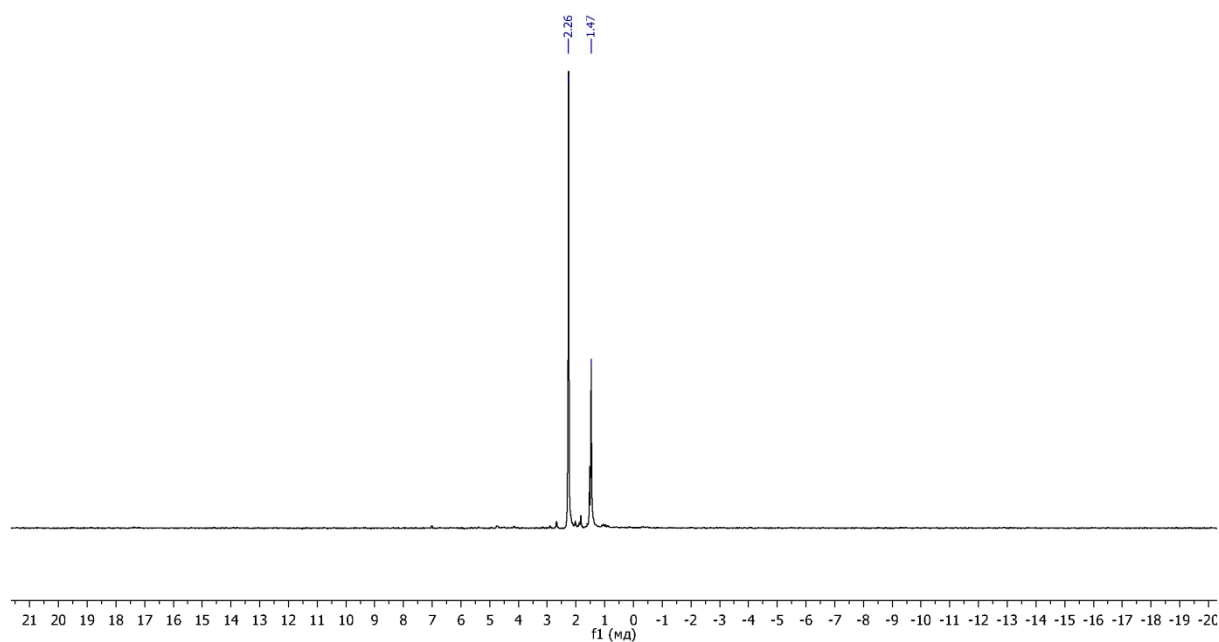


Figure S47. ^{29}Si NMR spectrum of *LimOx-G1Bu*⁴.

ar203_epox-azide_research.1.1.1r
1H_

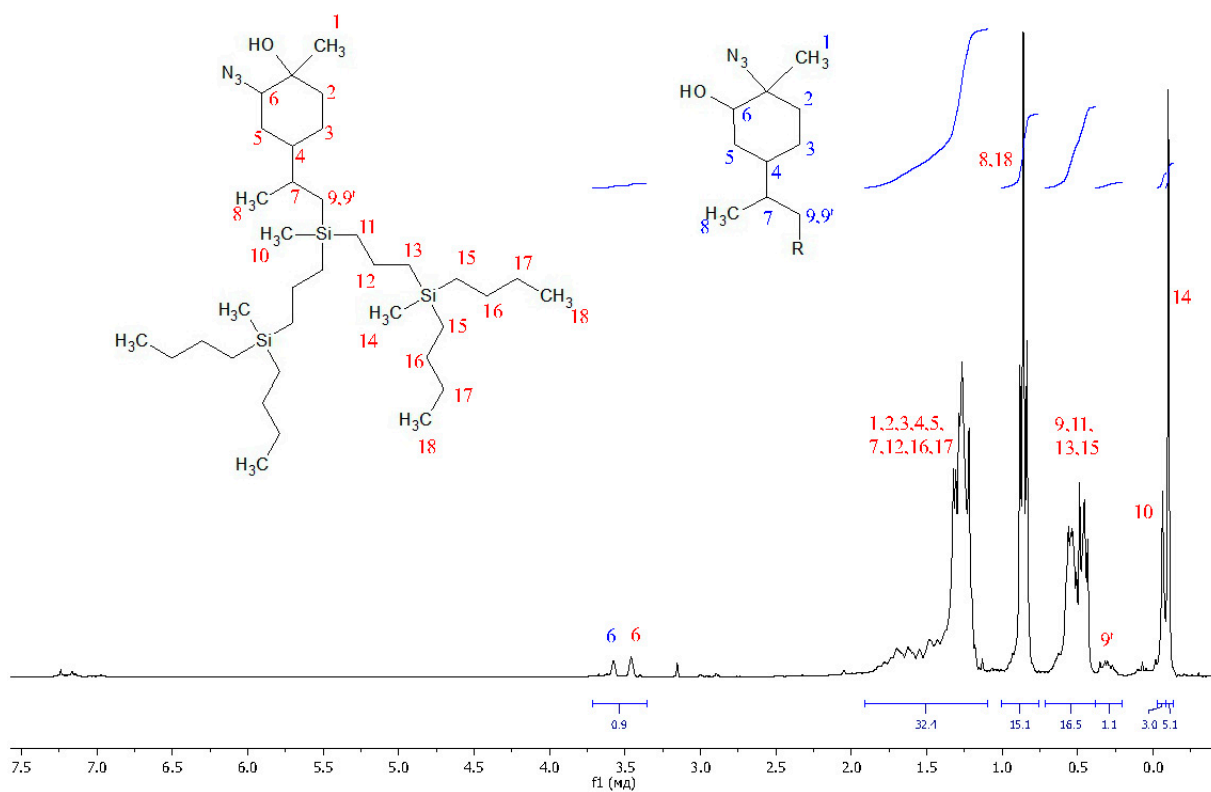


Figure S48. ^1H NMR spectrum of *LimN3-G1Bu*⁴.

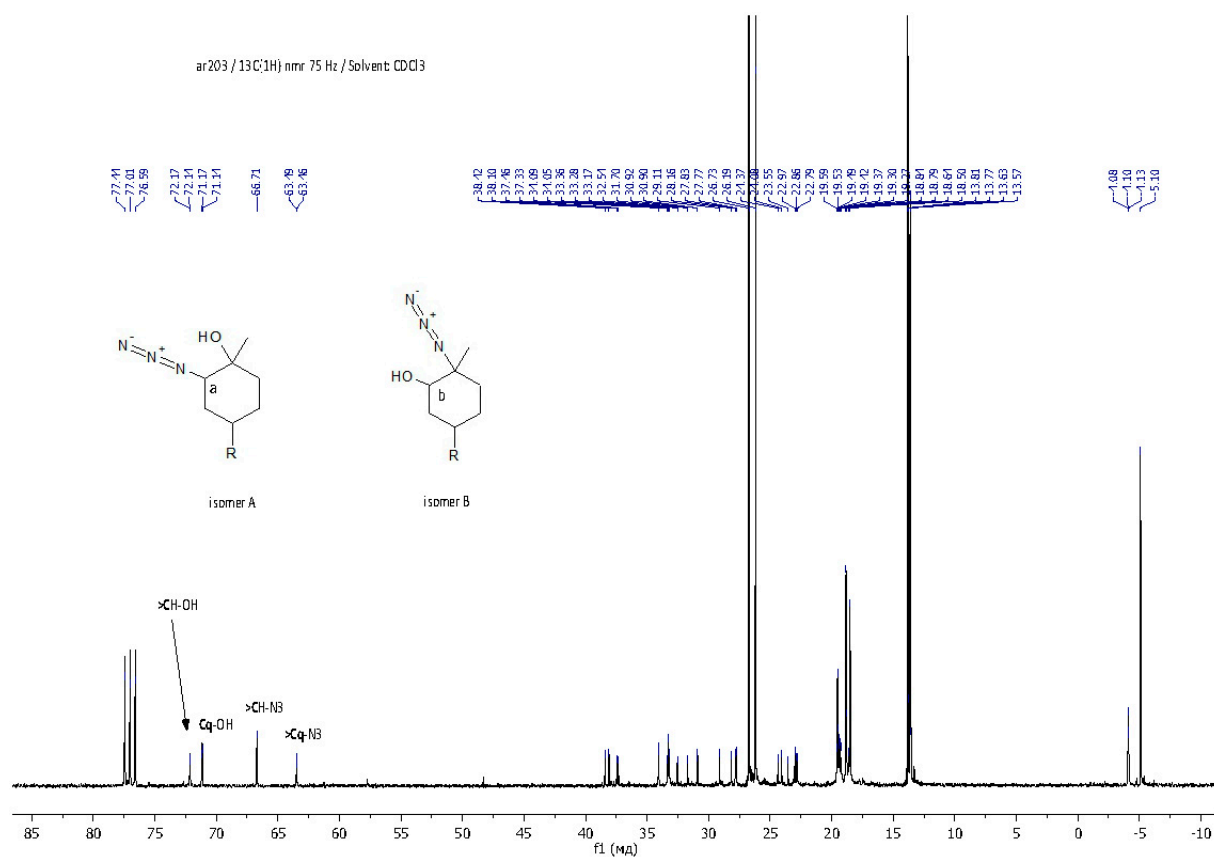


Figure S49. ^{13}C NMR spectrum of $\text{LimN}_3\text{-G}_1\text{Bu}^4$.

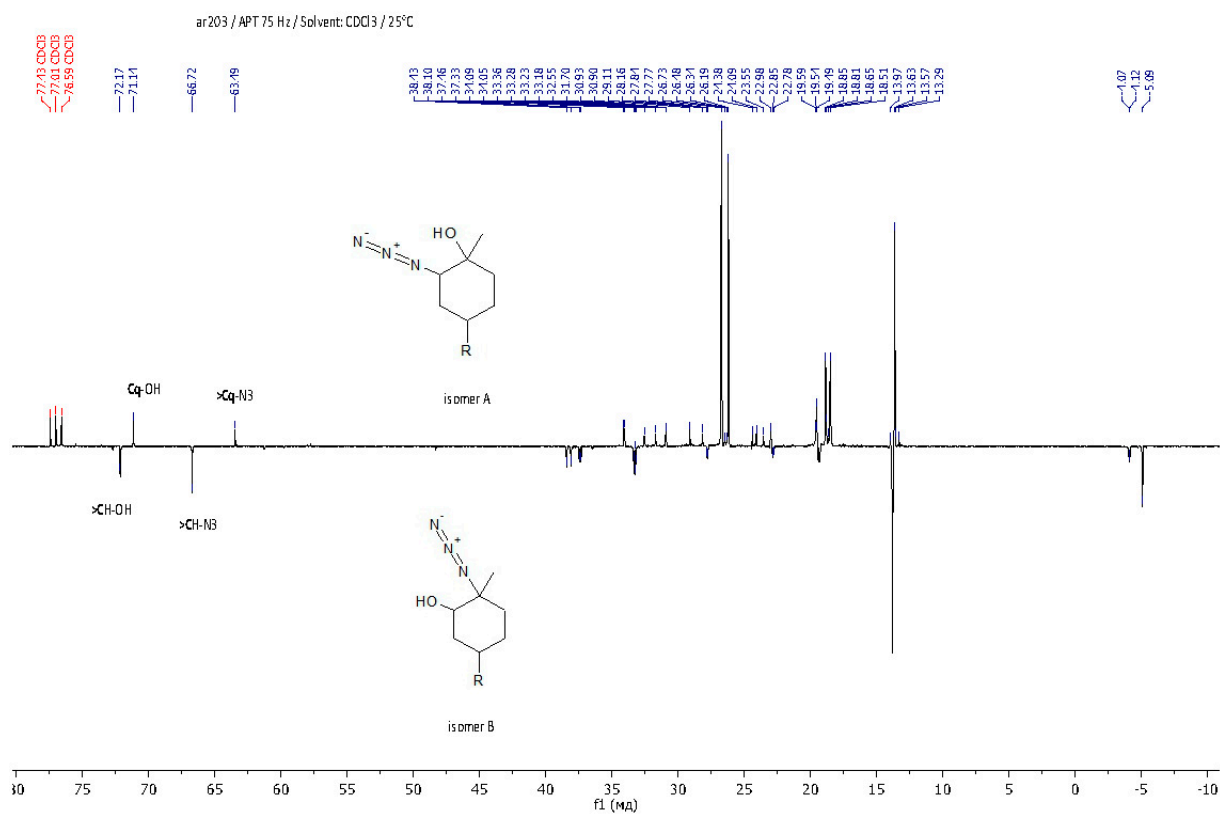


Figure S50. APT NMR spectrum of $\text{LimN}_3\text{-G}_1\text{Bu}^4$.

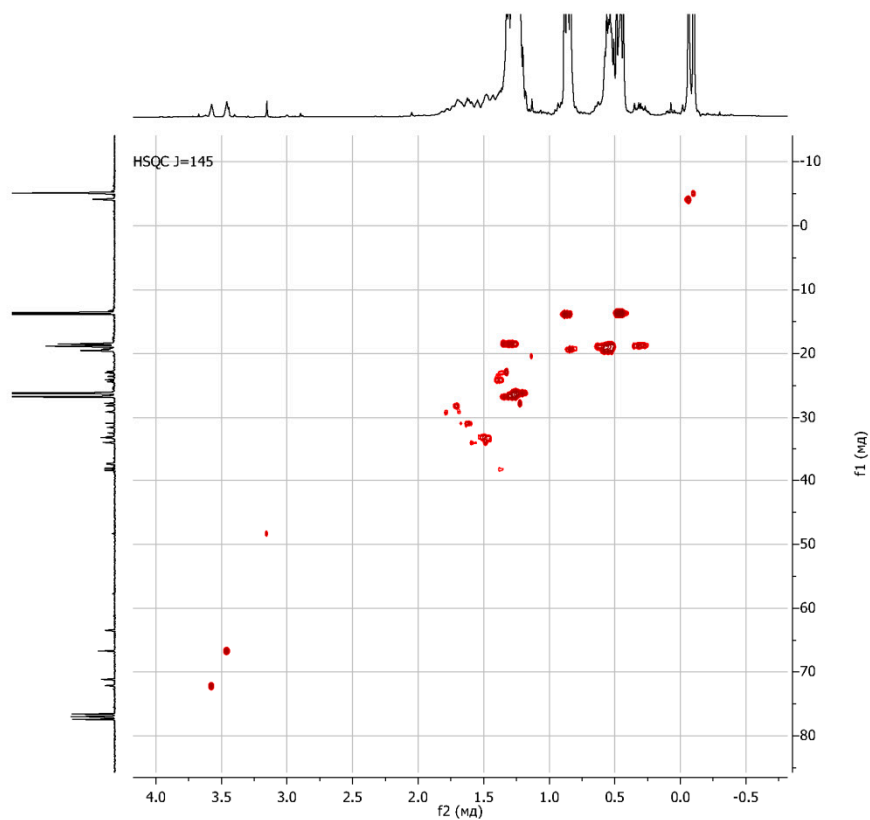


Figure S51. $\{^1\text{H } ^{13}\text{C}\}$ HSQC NMR spectrum of $\text{LimN}_3\text{-G}_1\text{Bu}^4$.

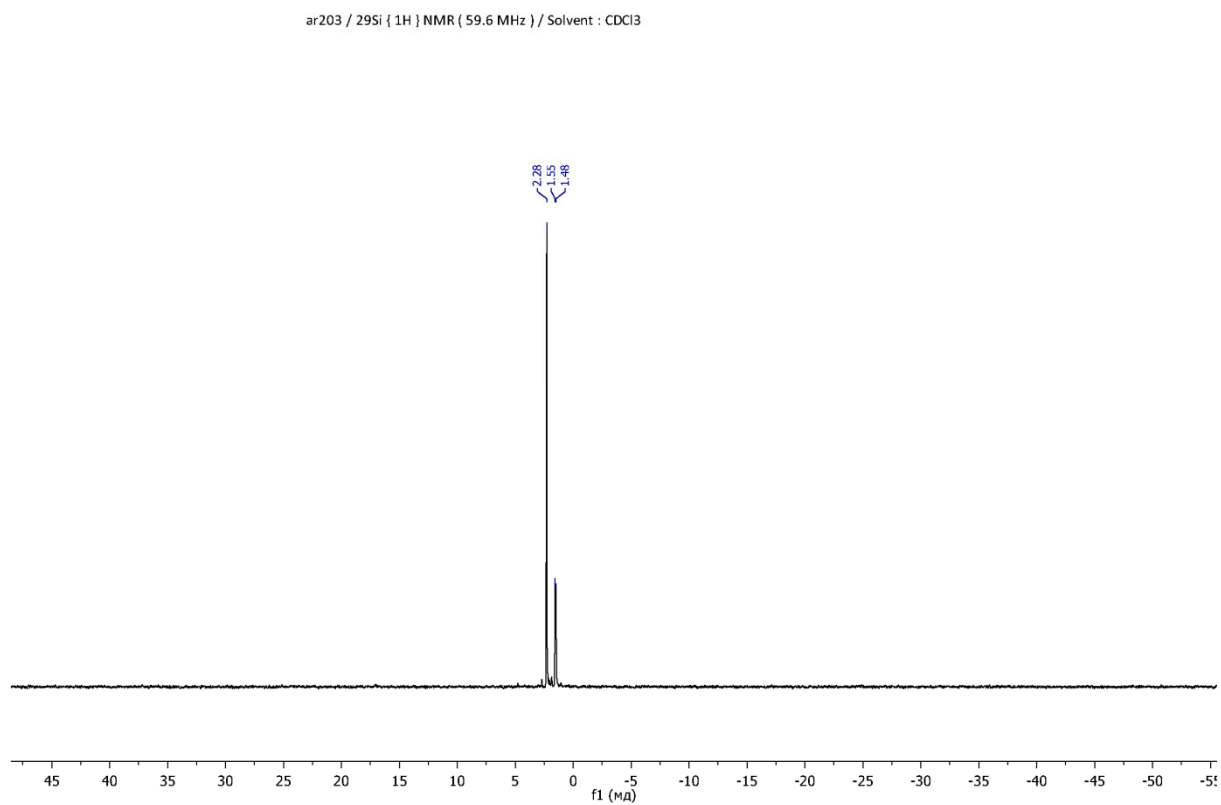


Figure S52. ^{29}Si NMR spectrum of $\text{LimN}_3\text{-G}_1\text{Bu}^4$.

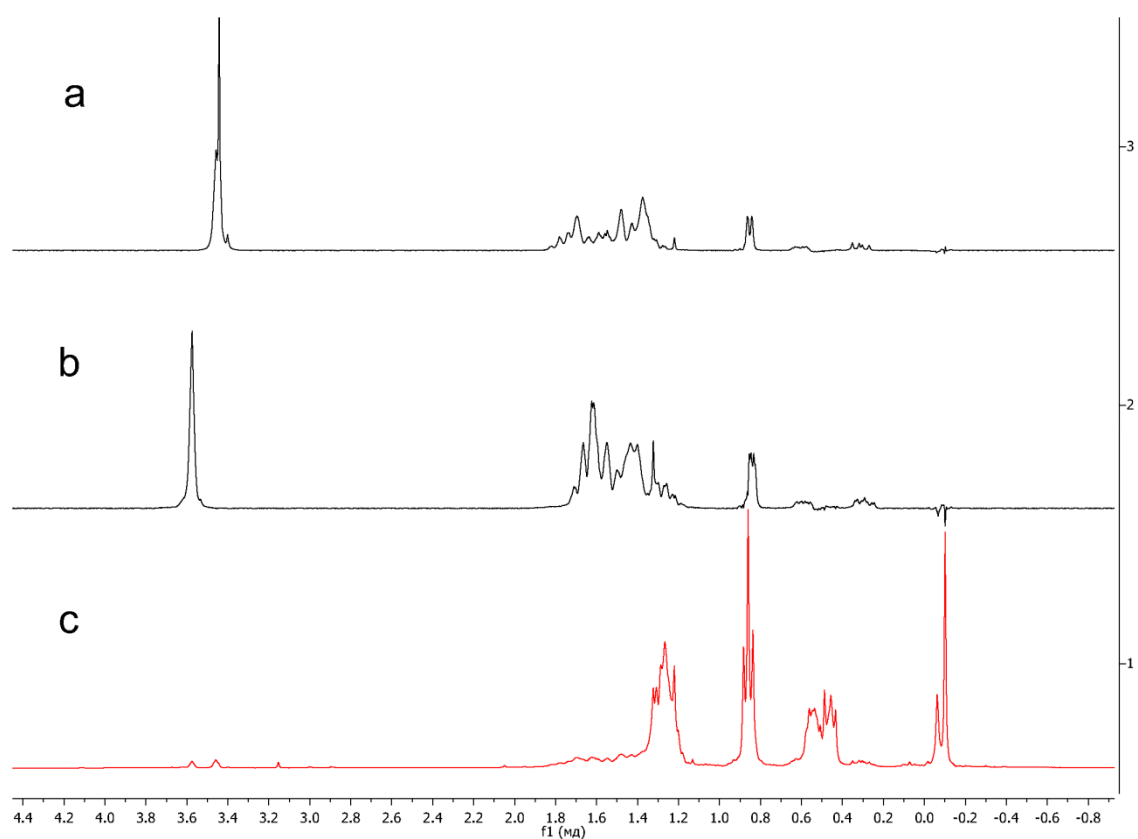


Figure S53. a,b - $\{^1\text{H}-^1\text{H}\}$ TOCSY NMR spectrum of *LimN₃-G₁Bu⁴*; c - ^1H NMR spectrum of *LimN₃-G₁Bu⁴*.

ar203 | $^{15}\text{N}\{^1\text{H}\}$ NMR (30MHz) | Solvent: CDCl_3 , $\text{Cr}(\text{acac})_3$, r.t.

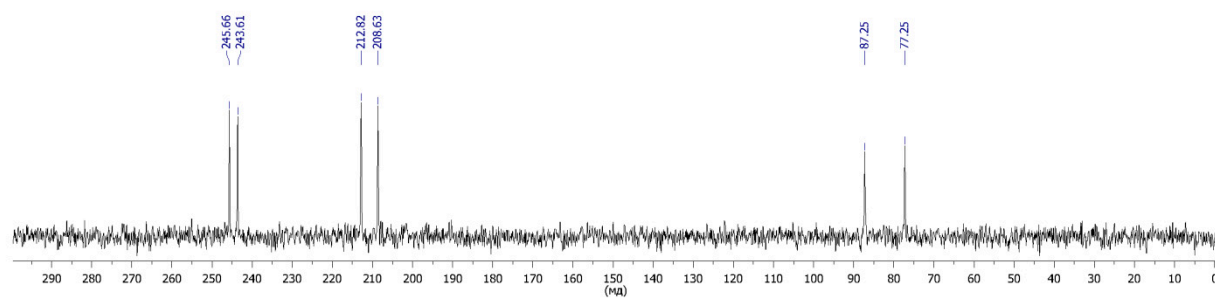


Figure S54. ^{15}N NMR spectrum of *LimN₃-G₁Bu⁴*.

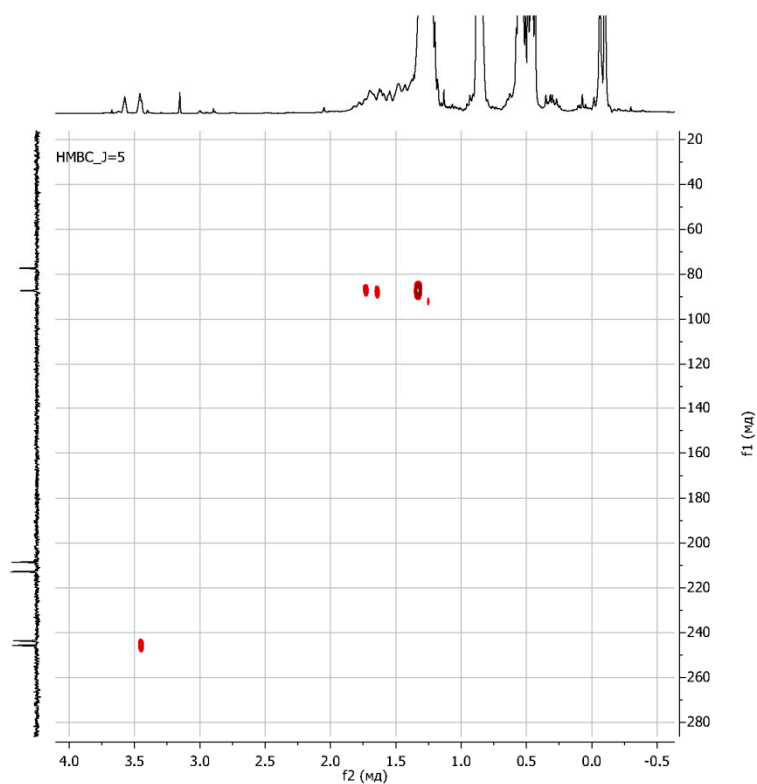


Figure S55. $\{^1\text{H } ^{15}\text{N}\}$ HMBC NMR spectrum of *LimN₃-G₁Bu⁴*.

ar296_epox-LAG.1.1.1r
1H_

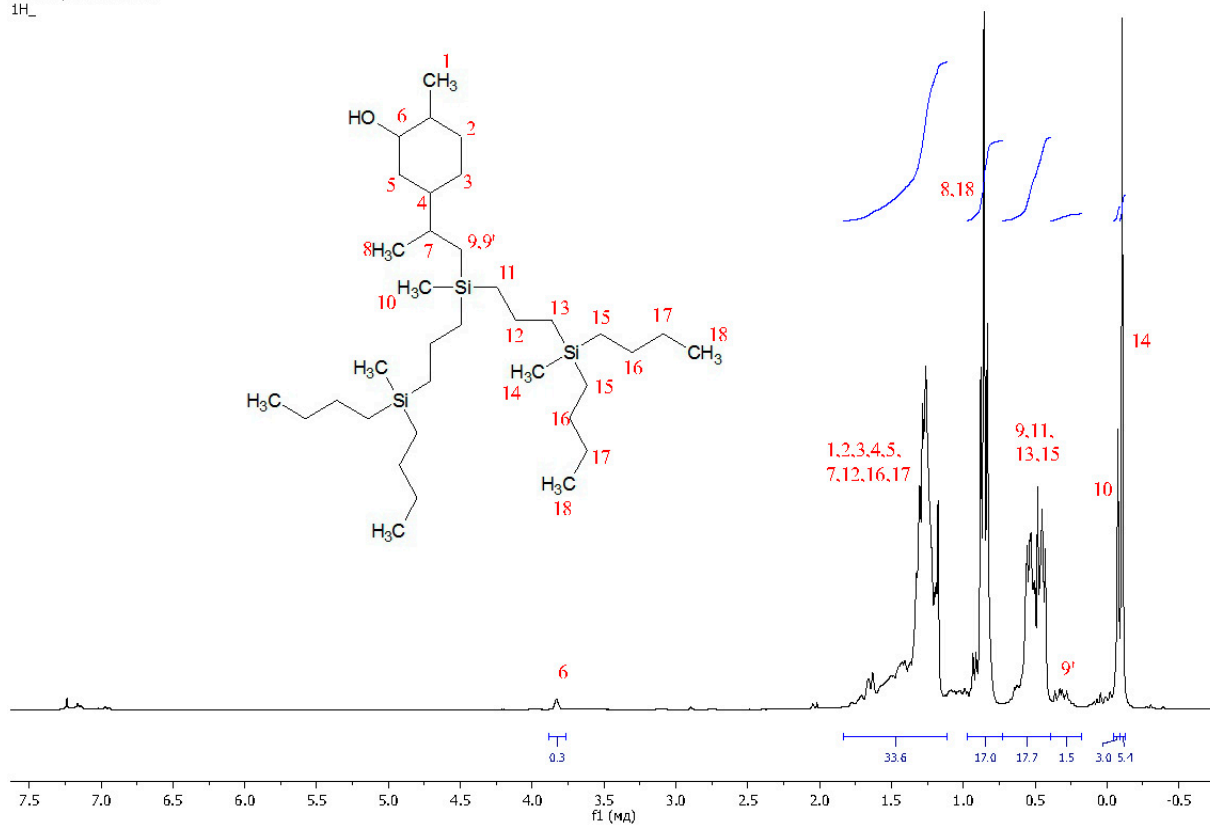


Figure S56. ^1H NMR spectrum of *LimOH-G₁Bu⁴*.

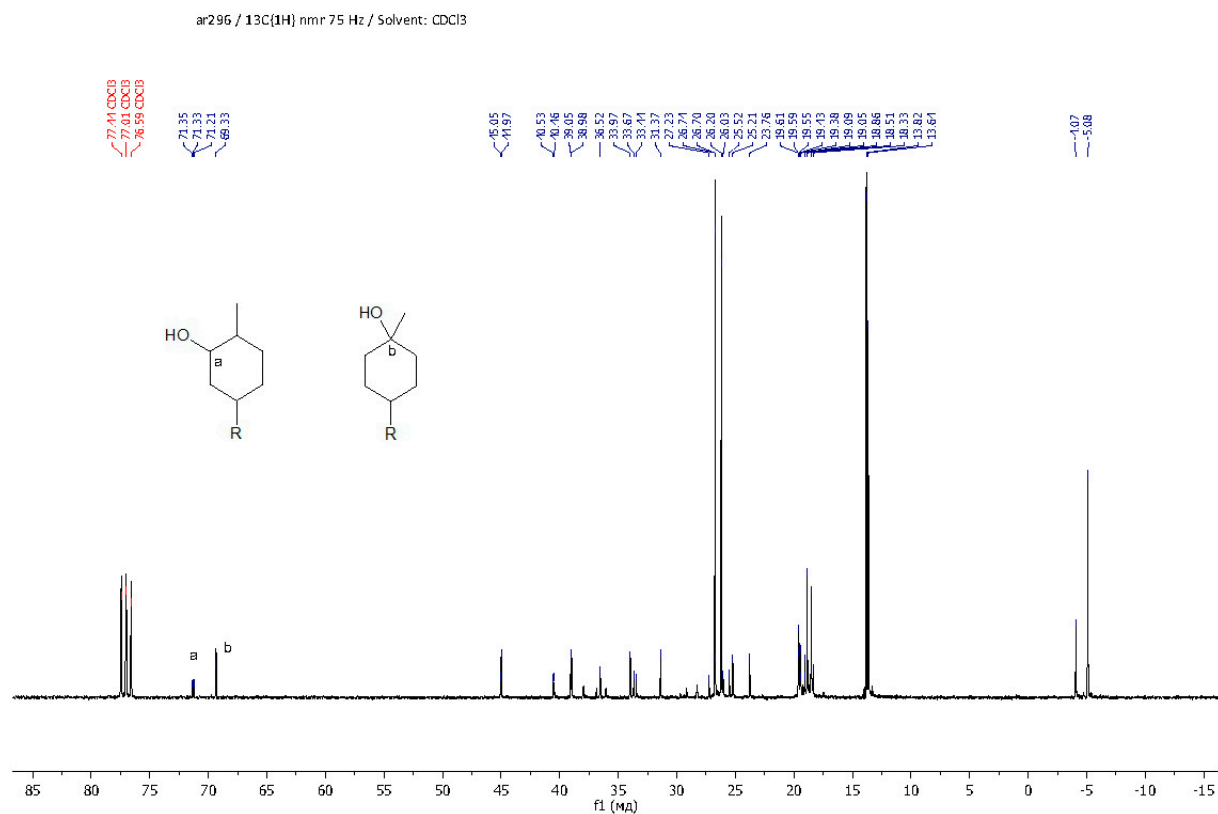


Figure S57. ^{13}C NMR spectrum of *LimOH-G₁Bu⁴*.

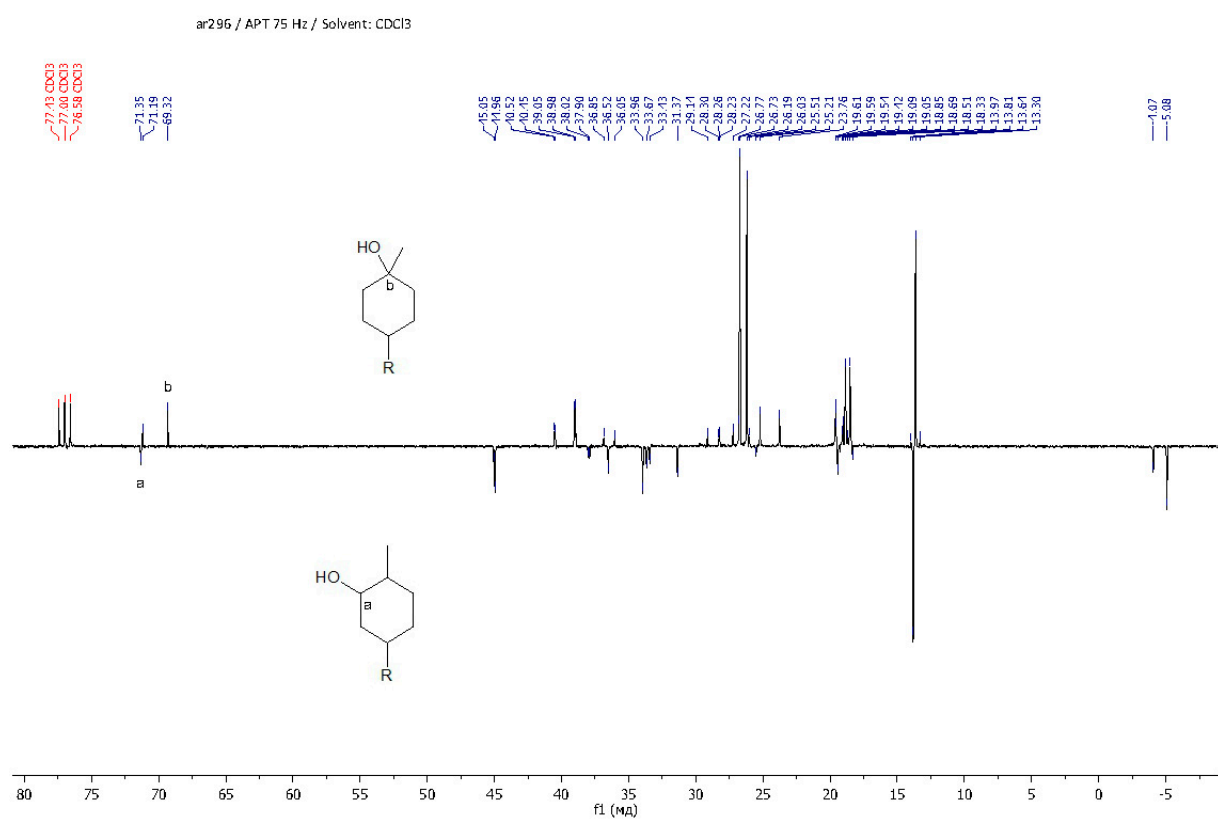


Figure S58. APT NMR spectrum of *LimOH-G₁Bu⁴*.

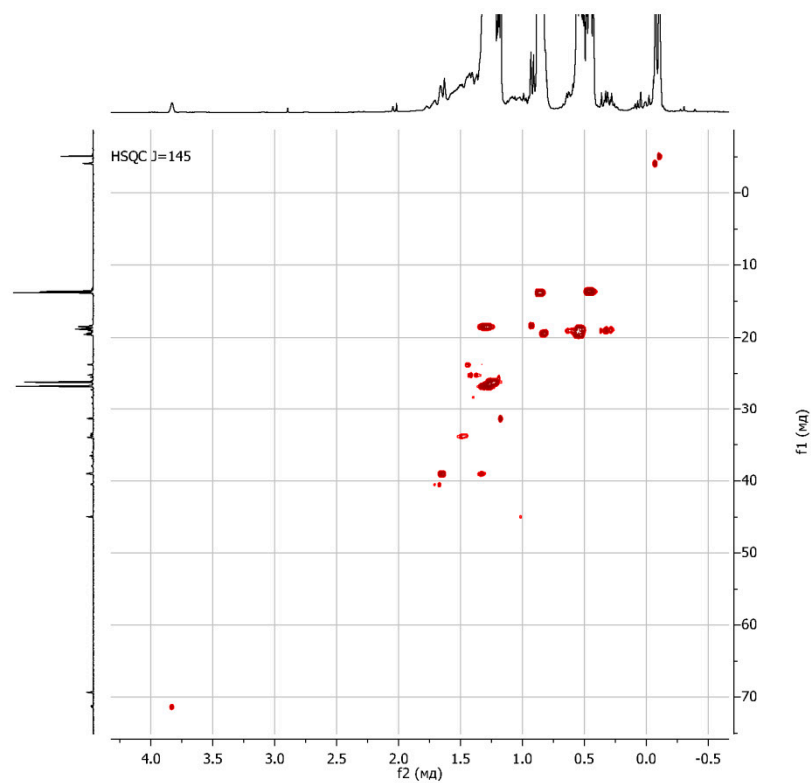


Figure S59. $\{^1\text{H } ^{13}\text{C}\}$ HSQC NMR spectrum of *LimOH-G₁Bu⁴*.

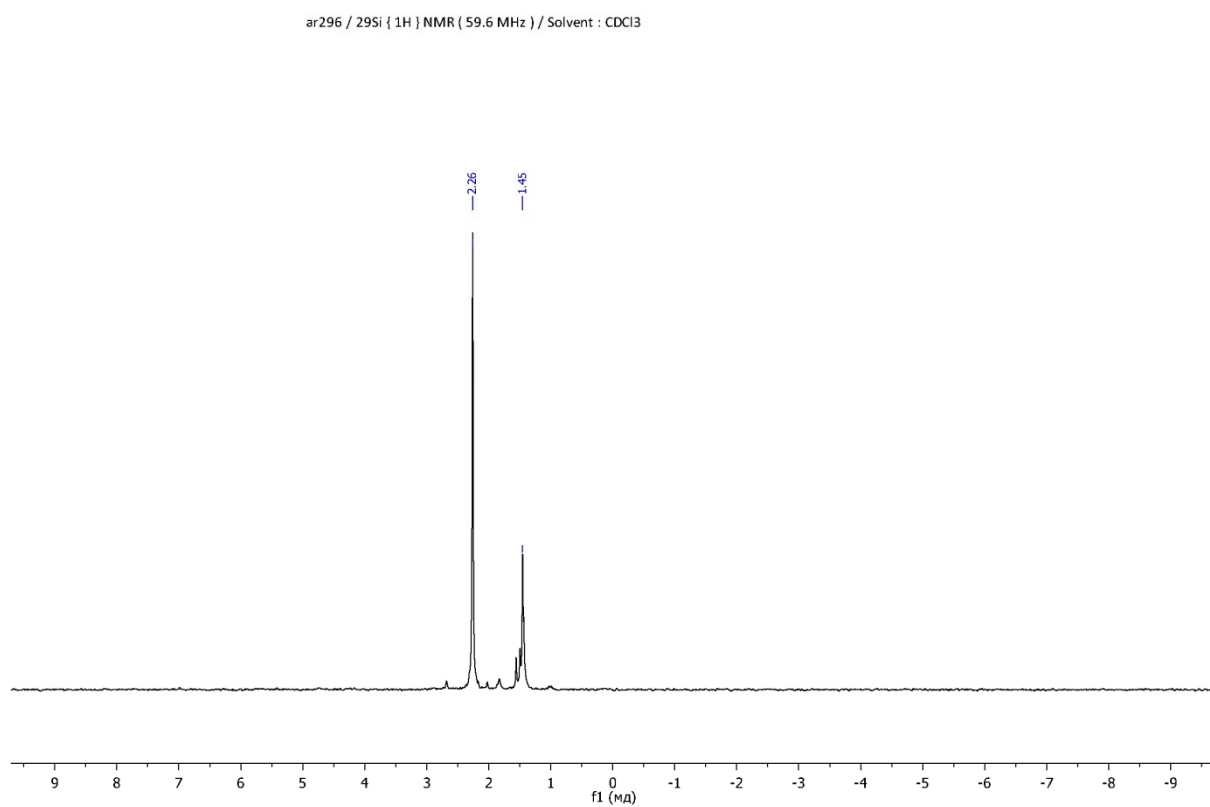


Figure S60. ^{29}Si NMR spectrum of *LimOH-G₁Bu⁴*.

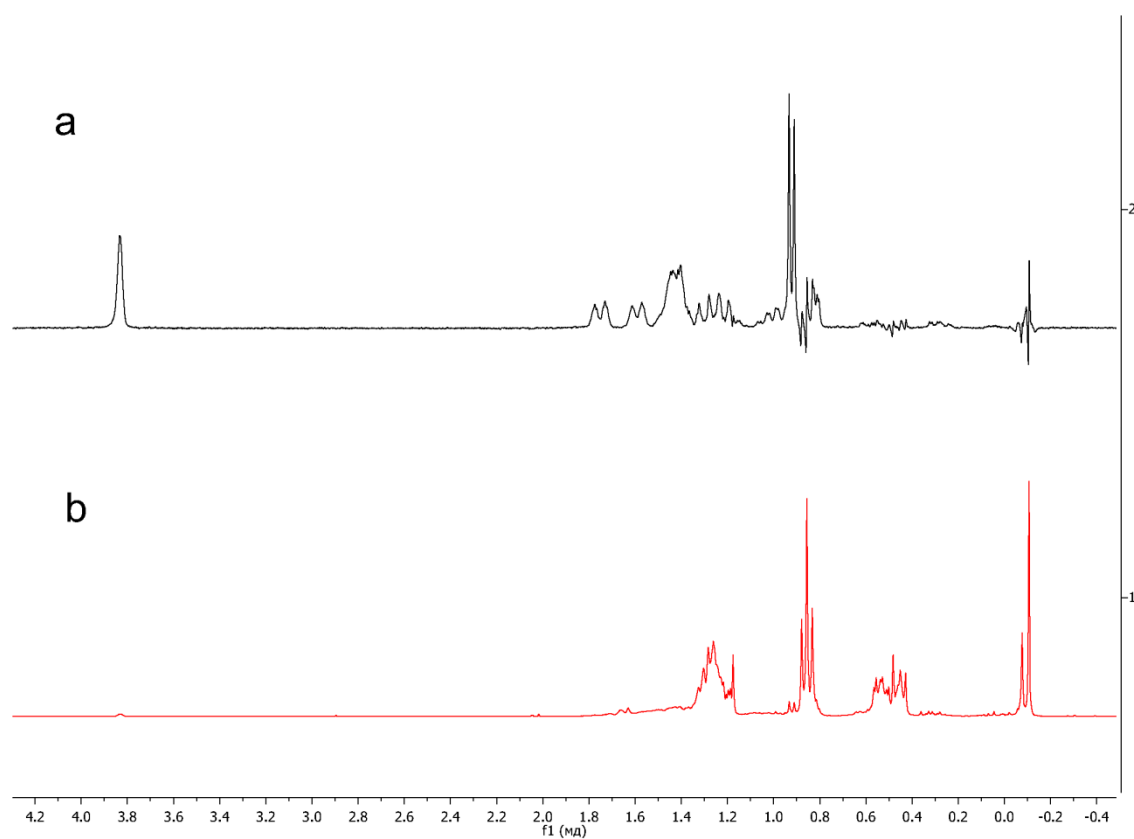


Figure S61. a - $\{^1\text{H}-^1\text{H}\}$ TOCSY NMR spectrum of *LimOH-G₁Bu⁴*; b - ^1H NMR spectrum of *LimOH-G₁Bu⁴*.

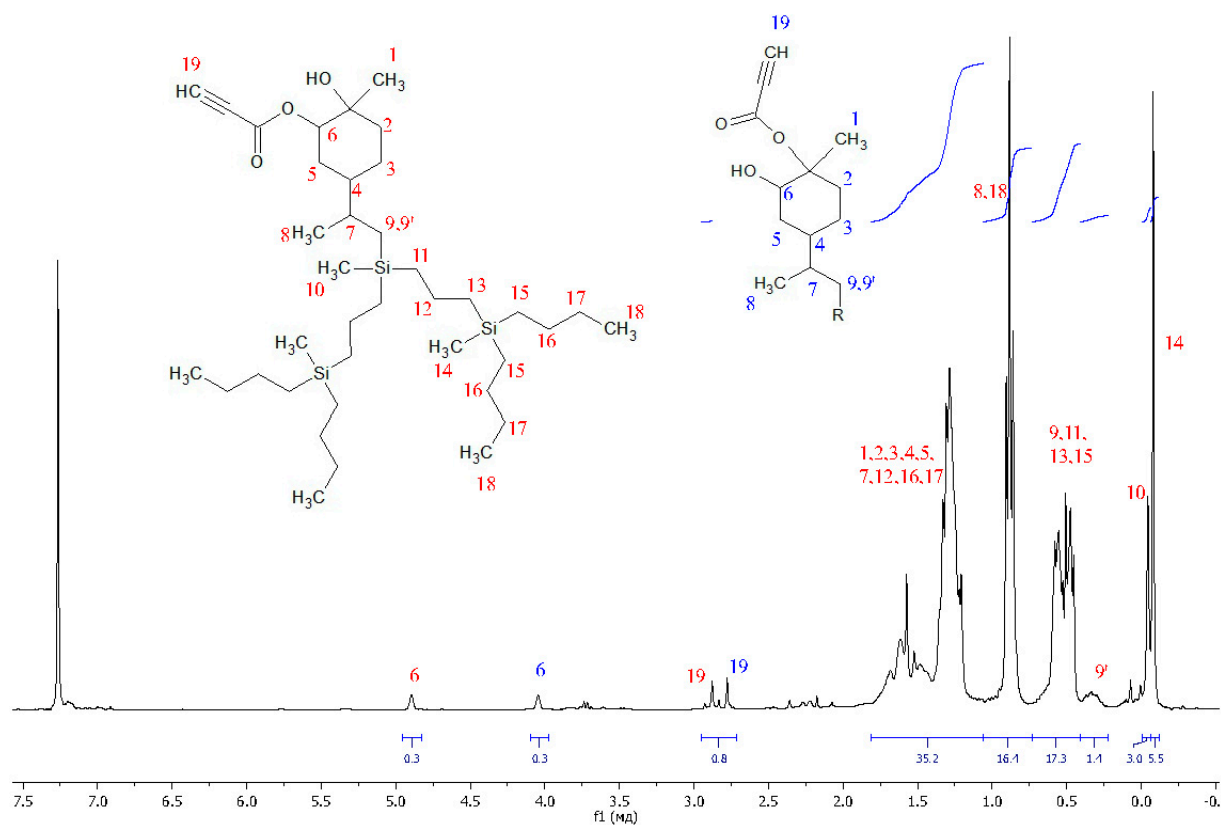


Figure S62. ^1H NMR spectrum of *LimC \equiv C-G₁Bu⁴*.

ar298 / $^{13}\text{C}\{^1\text{H}\}$ nmr 75 Hz / Solvent: CDCl_3

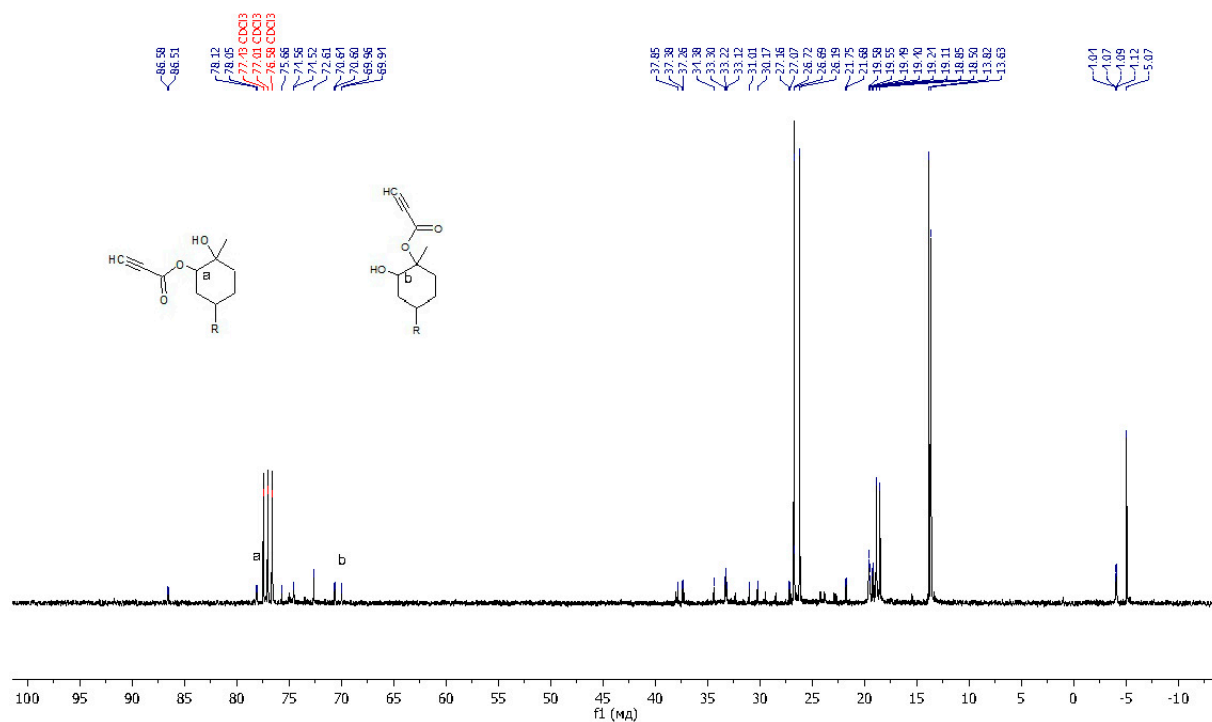


Figure S63. ^{13}C NMR spectrum of $\text{LimC}\equiv\text{C-G}_1\text{Bu}^4$.

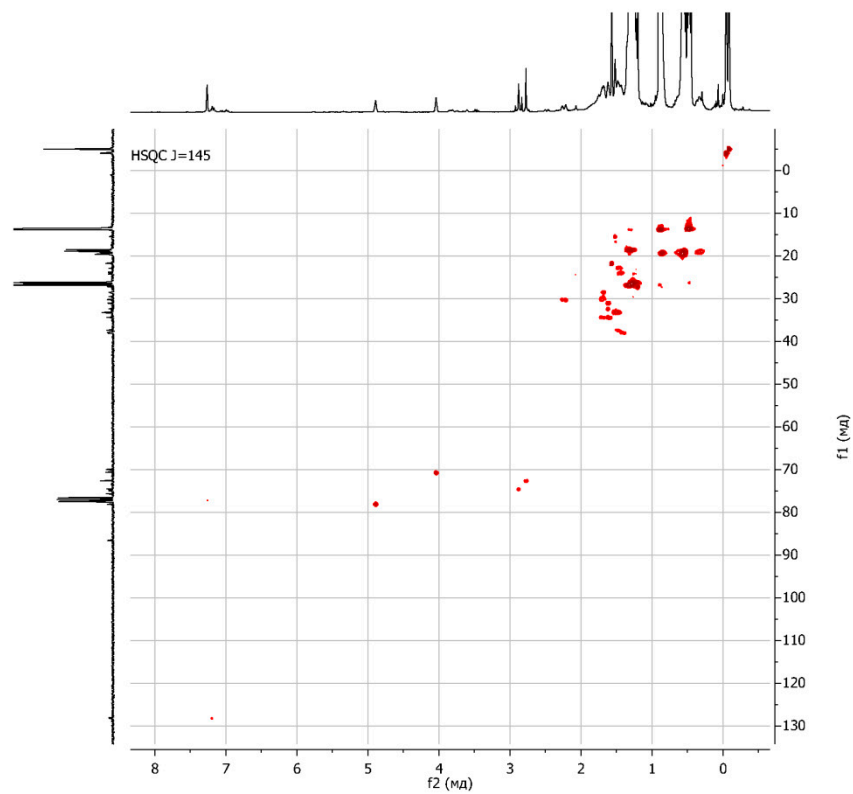


Figure S64. $\{^1\text{H} \ ^{13}\text{C}\}$ HSQC NMR spectrum of $\text{LimC}\equiv\text{C-G}_1\text{Bu}^4$.

SI2. GPC curves

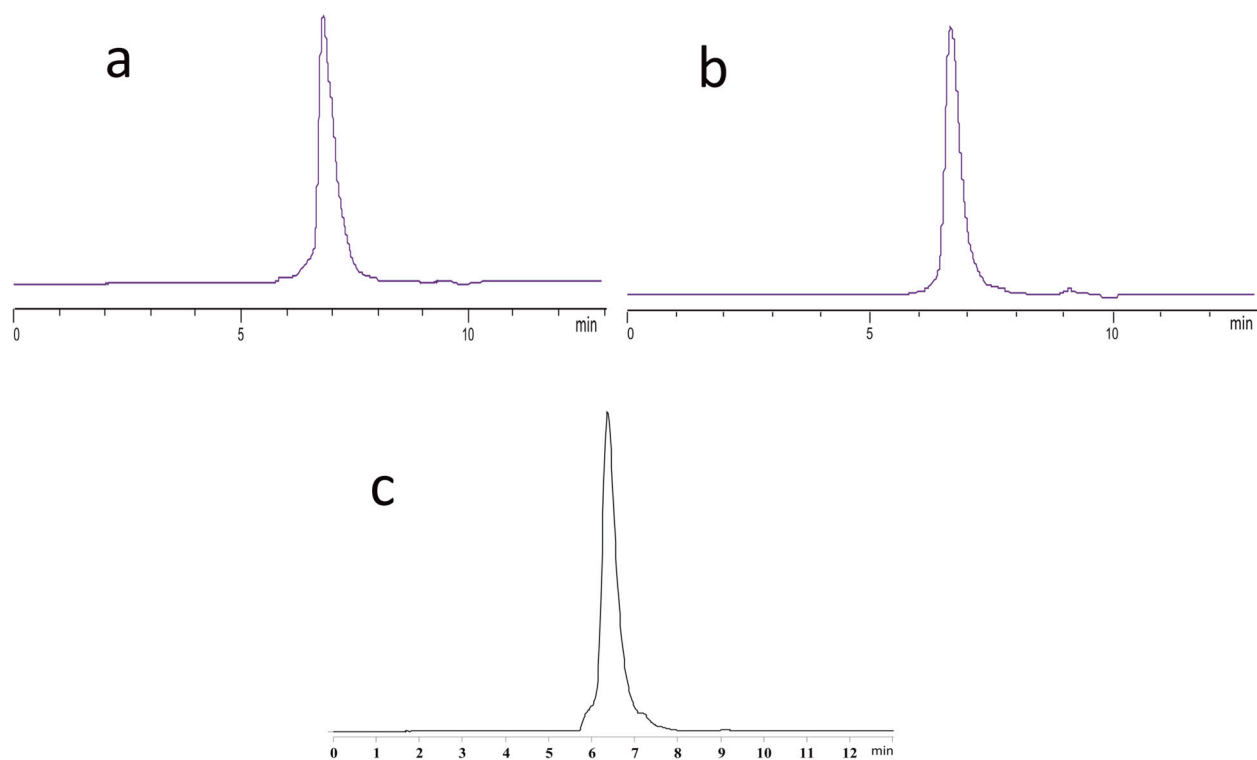


Figure S65. GPC chromatograms of dendrons based on limonene with azide functionality on the periphery («a» - $\text{Lim-G}_0(\text{PrN}_3)^2$, «b» - $\text{Lim-G}_1(\text{PrN}_3)^3$, «c» - $\text{Lim-G}_2(\text{PrN}_3)^4$).

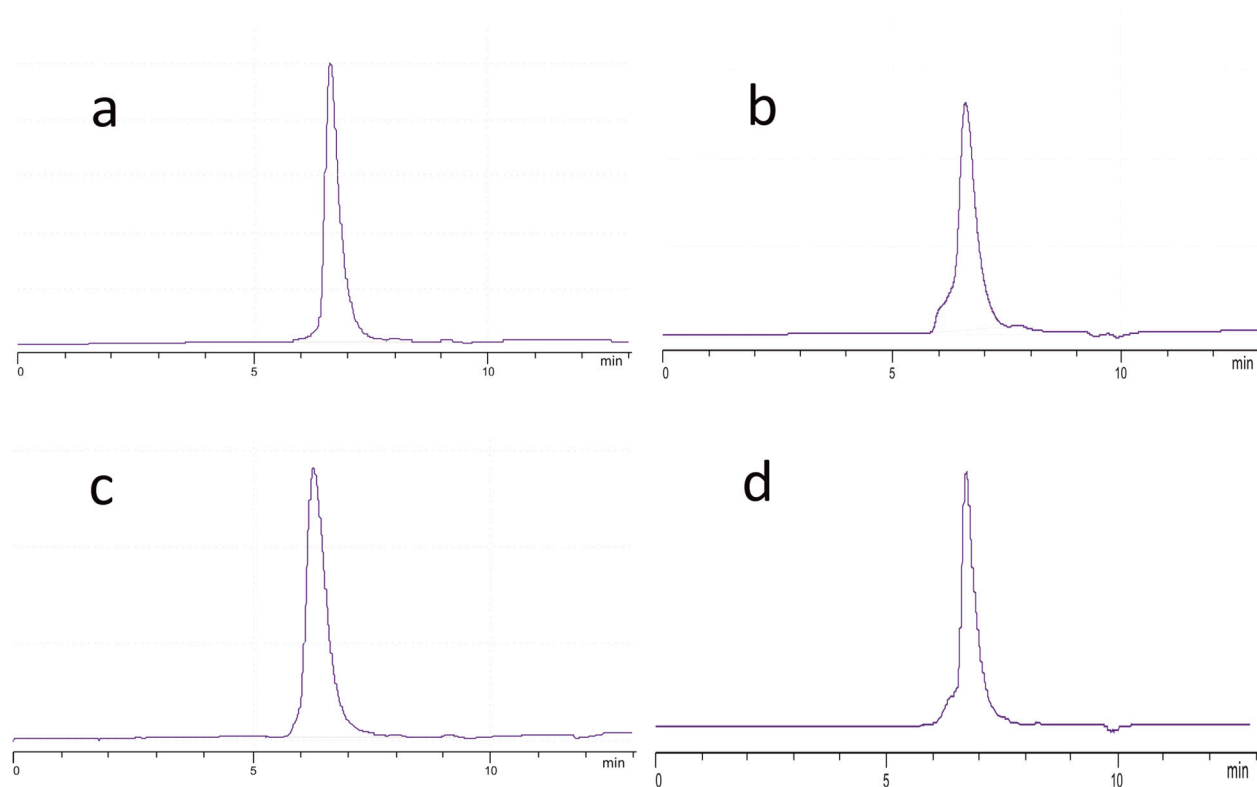


Figure S66. GPC chromatograms of dendrons based on limonene with epoxy functionality at the focal point («a» - $\text{LimOx-G}_{1,5}\text{TMS}^4$, «b» - $\text{LimOx-G}_{1,5}\text{TMS}^6$, «c» - $\text{LimOx-G}_{2,5}\text{TMS}^8$, «d» - $\text{LimOx-G}_1\text{Bu}^4$).

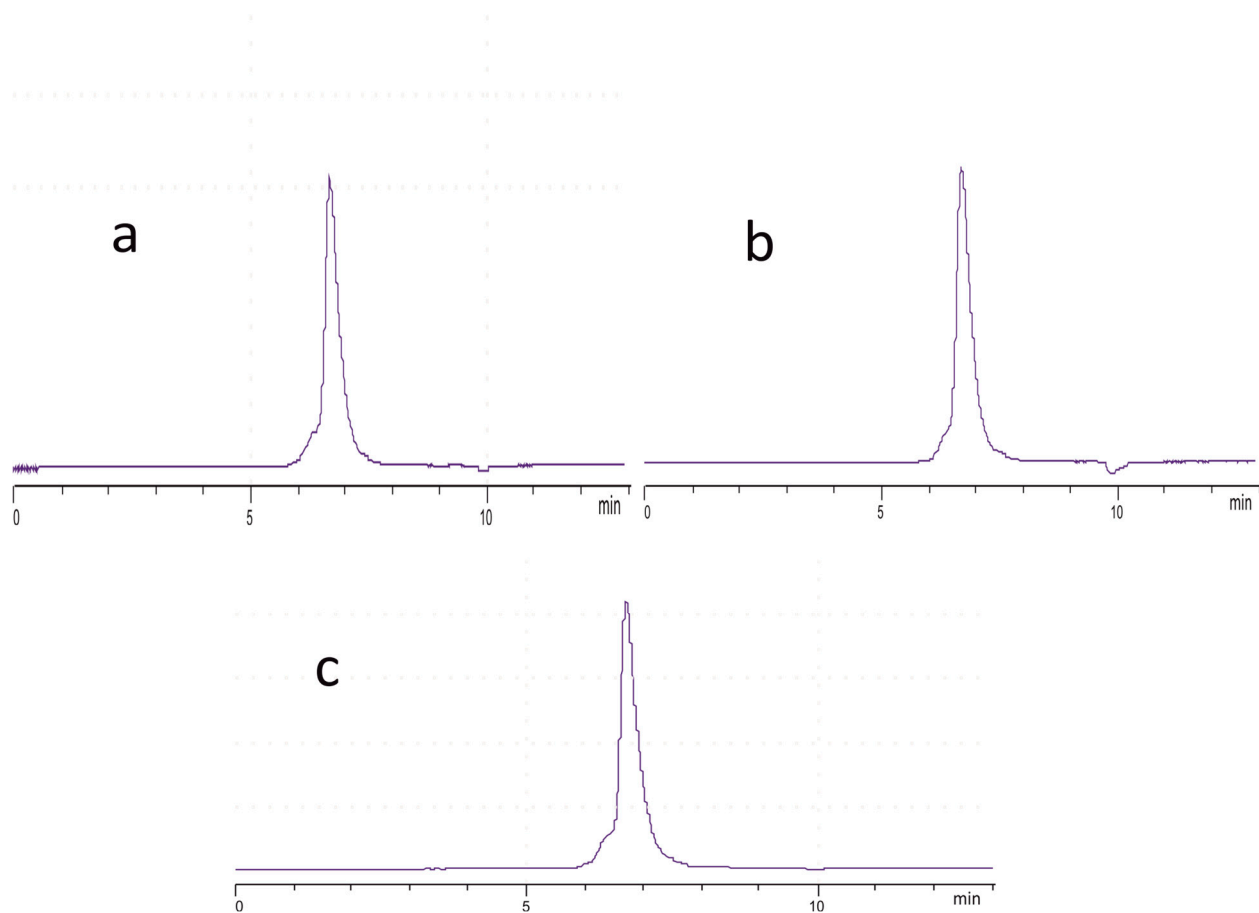


Figure S67. GPC chromatograms of carbosilane dendrons based on limonene with different functionality at the focal point («a» - $\text{LimOH-G}_1\text{Bu}^4$, «b» - $\text{LimN}_3\text{-G}_1\text{Bu}^4$, «c» - $\text{LimC}\equiv\text{C-G}_1\text{Bu}^4$).

SI3. GC curves

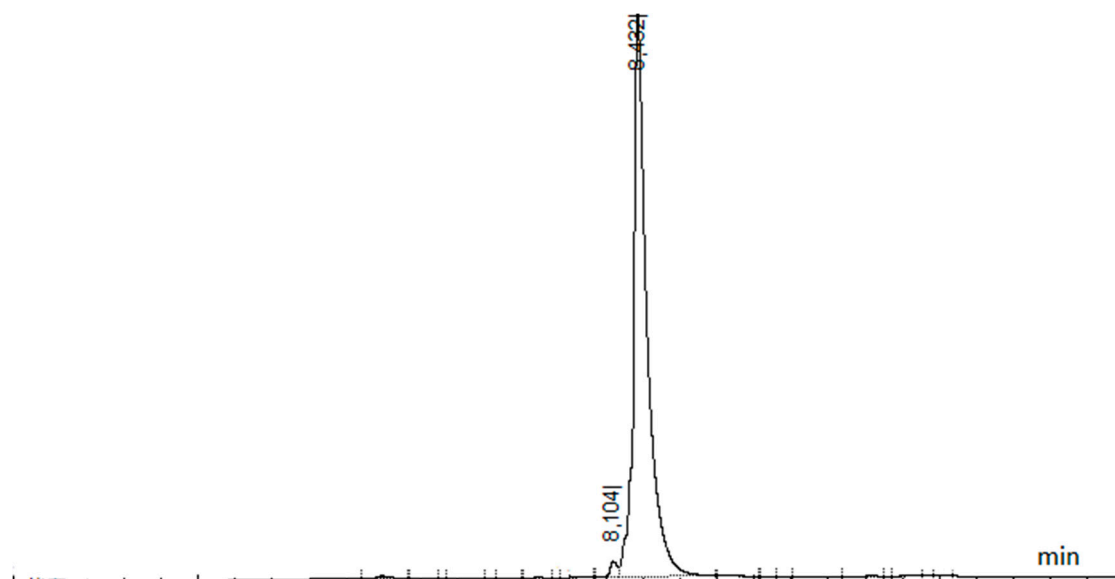


Figure S68. GC chromatogram of $\text{LimOx-G}_{0.5}\text{TMS}^2$.