

## Electronic supplementary information

### PREPARATION OF ALLYL-CONTAINING PDMS TELEHELICS BY THE ANIONIC RING-OPENING POLYMERIZATION

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#### Polymer 1

Polymer **1** was obtained as a colorless transparent liquid according to the general procedure from 0.51 g (2.4 mmol) of 1,3-diallyl-1,1,3,3-tetramethyldisiloxane, 1.48 g (5.0 mmol) of octamethylcyclotetrasiloxane, and 0.001 g (0.1 wt %) of tetramethylammonium hydroxide (TMAH) used as the catalyst. Yield: 1.74 g (86% yield).  $M_n$ , GPC (toluene) = 1480 g/mol,  $M_w/M_n = 1.5$  relative to the PS standards. <sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>):  $\delta$  5.87–5.71 (m, 1H, CH-allyl), 4.90–4.82 (m, 2H, CH<sub>2</sub>-allyl), 1.58–1.56 (m, 2H, Si-CH<sub>2</sub>), 0.08 (m, 3H, Si-CH<sub>3</sub>) ppm. <sup>13</sup>C NMR (77.5 MHz, CDCl<sub>3</sub>):  $\delta$  134.14, 113.14, 113.11, 26.09, 1.98, 1.35, 0.95, 0.86, 0.37, -0.49 ppm. <sup>29</sup>Si NMR (59.6 MHz, CDCl<sub>3</sub>):  $\delta$  4.38, -21.18, -21.26, -21.89, -21.97 ppm.

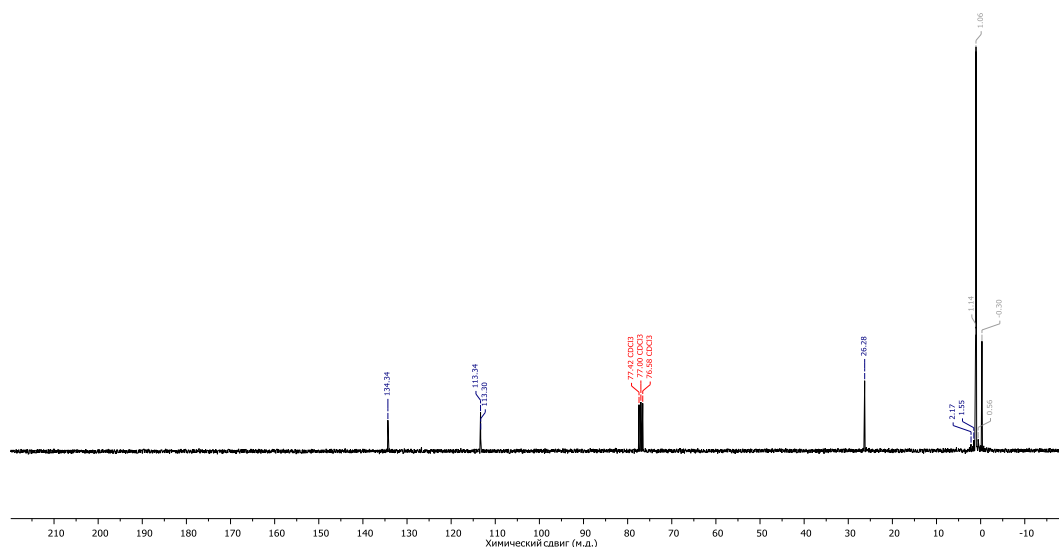
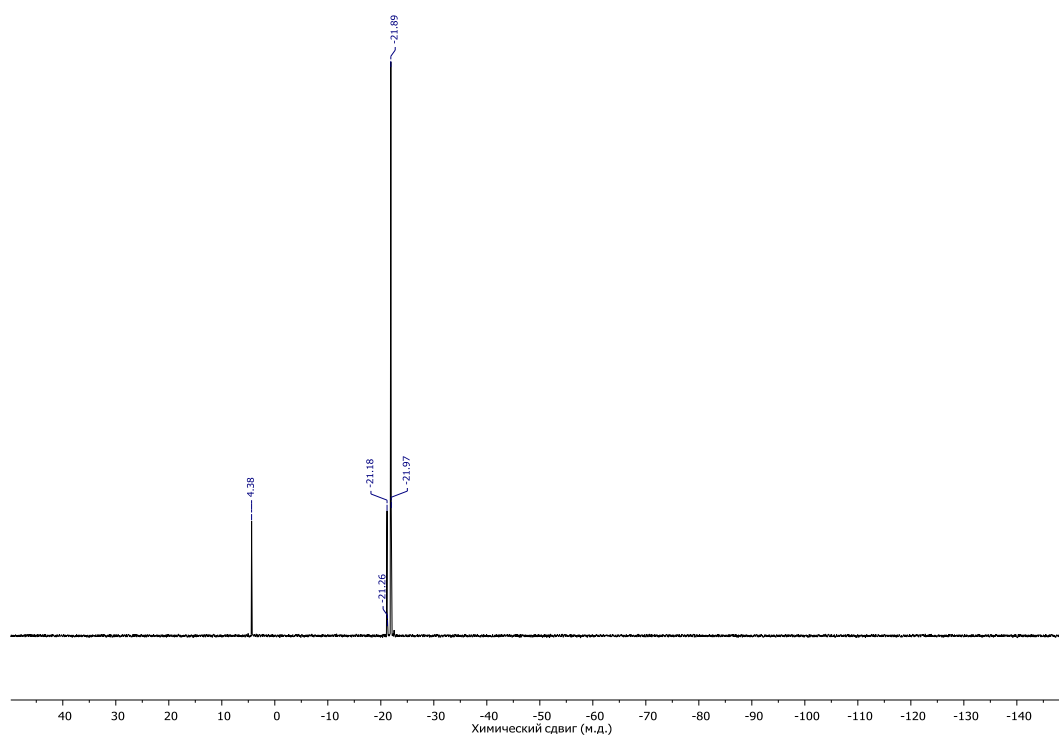


Figure S1. <sup>13</sup>C NMR spectrum of polymer 1.



**Figure S2.**  $^{29}\text{Si}$  NMR spectrum of polymer **1**.

### Polymer **2**

Polymer **2** was obtained as a colorless transparent liquid according to the general procedure from 0.51 g (2.0 mmol) of 1,3-diallyl-1,1,3,3-tetramethyldisiloxane, 4.64 g (15.6 mmol) of octamethylcyclotetrasiloxane, and 0.005 g (0.1 wt %) of TMAH used as the catalyst. Yield: 4.4 g (87%).  $M_n$ , GPC (toluene) = 4100 g/mol,  $M_w/M_n$  = 1.71 relative to the PS standards.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ):  $\delta$  5.87–5.71 (m, 1H,  $\text{CH}$ -allyl), 4.90–4.82 (m, 2H,  $\text{CH}_2$ -allyl), 1.58–1.56 (m, 2H, Si- $\text{CH}_2$ ), 0.08 (m, 3H, Si- $\text{CH}_3$ ) ppm.  $^{13}\text{C}$  NMR (77.5 MHz,  $\text{CDCl}_3$ ):  $\delta$  134.16, 113.14, 113.11, 26.09, 5.28, 1.97, 1.60, 1.35, 0.95, 0.86, 0.36, 0.18, -0.24, -0.49, -1.69 ppm.  $^{29}\text{Si}$  NMR (59.6 MHz,  $\text{CDCl}_3$ ):  $\delta$  4.38, -21.17, -21.26, -21.89, -21.96, -22.51 ppm.

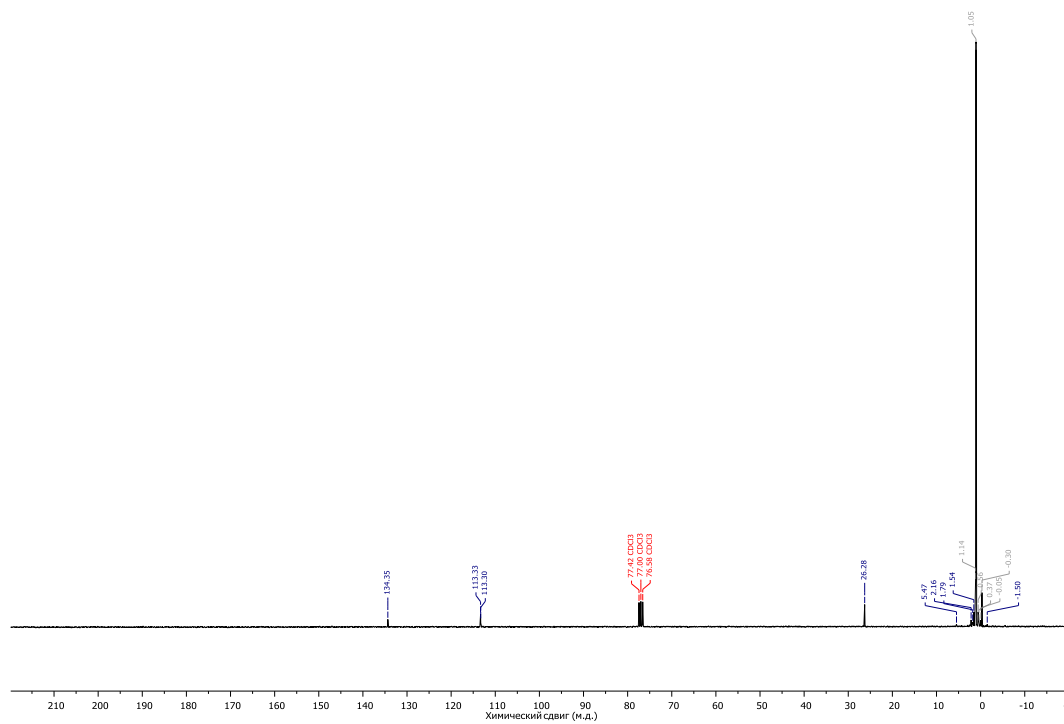


Figure S3.  $^{13}\text{C}$  NMR spectrum of polymer 2.

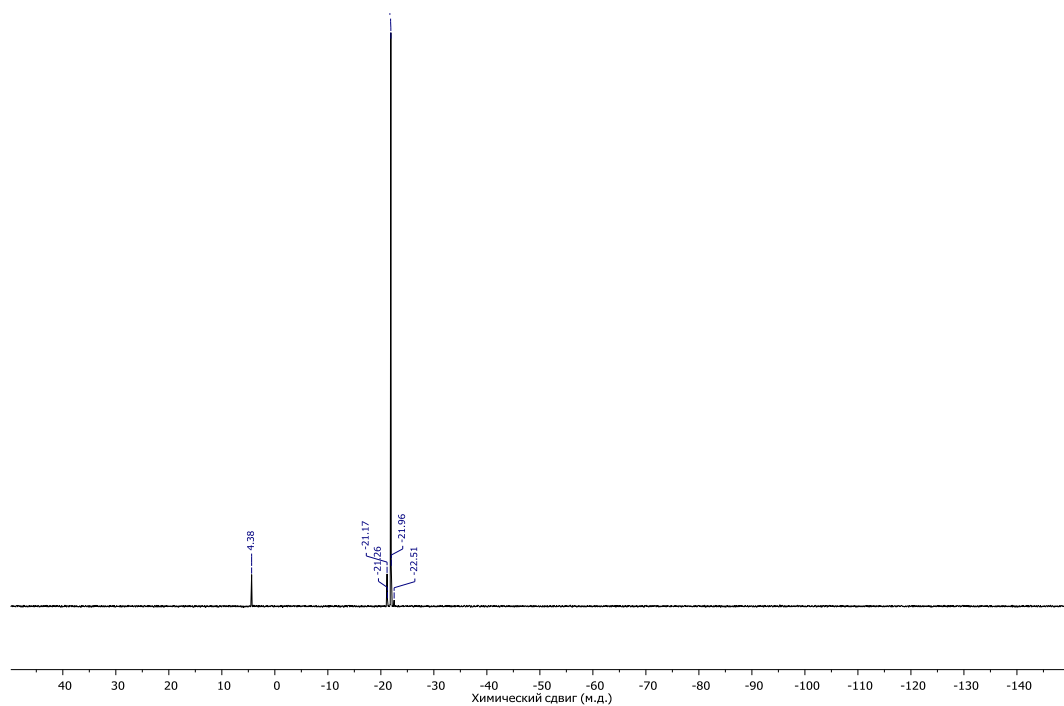
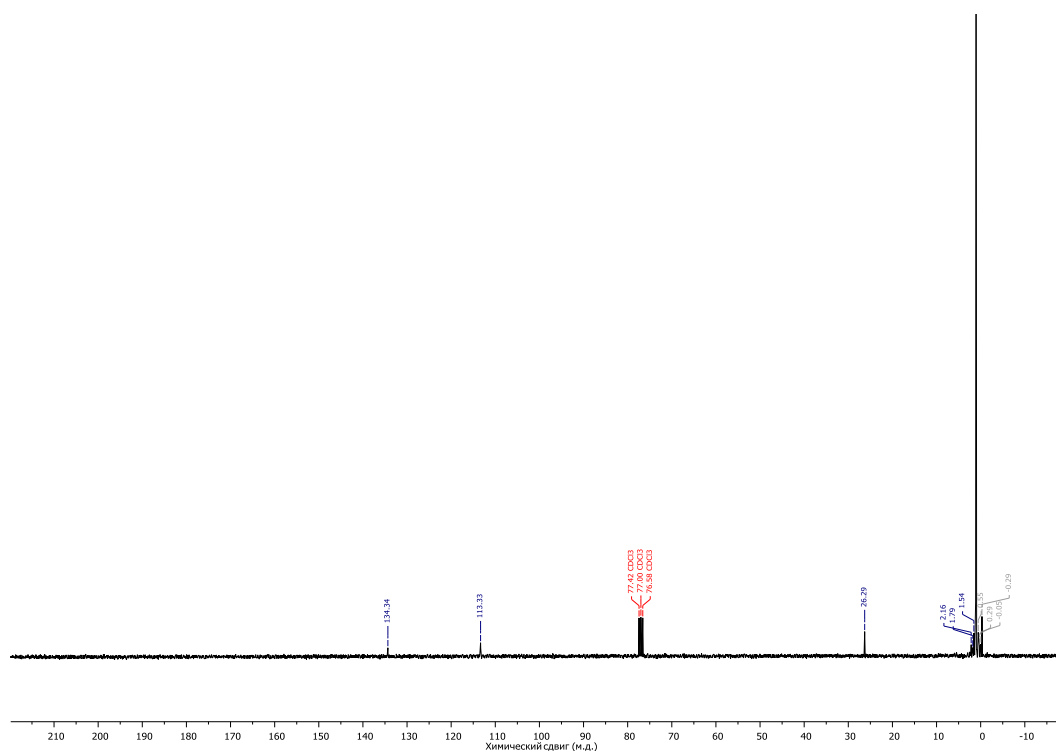


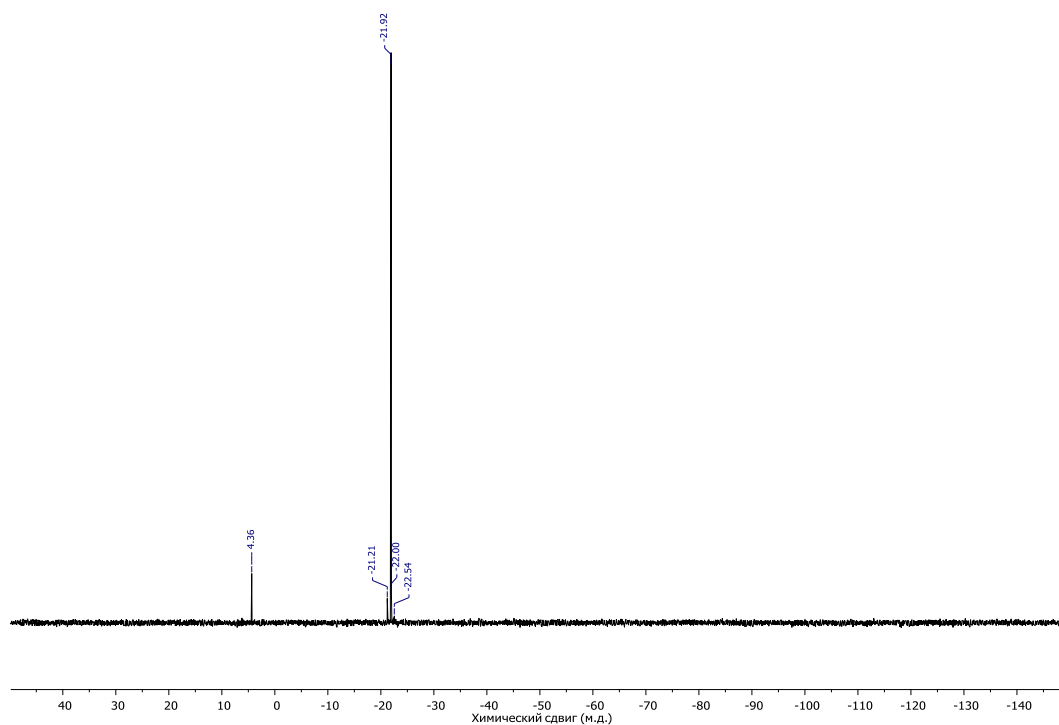
Figure S4.  $^{29}\text{Si}$  NMR spectrum of polymer 2.

### Polymer 3

Polymer **3** was obtained as a colorless transparent liquid according to the general procedure from 0.26 g (1.2 mmol) of 1,3-diallyl-1,1,3,3-tetramethyldisiloxane, 4.81 g (16.2 mmol) of octamethylcyclotetrasiloxane, and 0.005 g (0.1 wt %) of TMAH used as the catalyst. Yield: 4.3 g (87%).  $M_n$ , GPC (toluene) = 6100 g/mol,  $M_w/M_n$  = 1.6 relative to the PS standards.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ):  $\delta$  5.87–5.71 (m, 1H,  $\text{CH}$ -allyl), 4.90–4.82 (m, 2H,  $\text{CH}_2$ -allyl), 1.58–1.56 (m, 2H,  $\text{Si-CH}_2$ ), 0.08 (m, 3H,  $\text{Si-CH}_3$ ) ppm.  $^{13}\text{C}$  NMR (77.5 MHz,  $\text{CDCl}_3$ ):  $\delta$  -0.50, -0.25, 0.09, 0.35, 0.85, 1.34, 1.59, 1.95, 26.08, 113.13, 134.14 ppm.  $^{29}\text{Si}$  NMR (59.6 MHz,  $\text{CDCl}_3$ ):  $\delta$  4.36, -21.21, -21.92, -22.00, -22.54 ppm.



**Figure S5.**  $^{13}\text{C}$  NMR spectrum of polymer **3**.



**Figure S6.**  $^{29}\text{Si}$  NMR spectrum of polymer **3**.

#### Polymer **4**

Polymer **4** was obtained as a colorless transparent liquid according to the general procedure from 0.32 g (1.5 mmol) of 1,3-diallyl-1,1,3,3-tetramethyldisiloxane, 9.73 g (32.8 mmol) of octamethylcyclotetrasiloxane, and 0.010 g (0.1 wt %) of TMAH used as the catalyst. Yield: 8.65 g (87%).  $M_n$ , GPC (toluene) = 9200 g/mol,  $M_w/M_n$  = 1.75 relative to the PS standards.  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ):  $\delta$  5.87–5.71 (m, 1H,  $\text{CH}$ -allyl), 4.90–4.82 (m, 2H,  $\text{CH}_2$ -allyl), 1.58–1.56 (m, 2H, Si- $\text{CH}_2$ ), 0.08 (m, 3H, Si- $\text{CH}_3$ ) ppm.  $^{13}\text{C}$  NMR (77.5 MHz,  $\text{CDCl}_3$ ):  $\delta$  134.16, 113.14, 113.11, 26.09, 6.03, 5.63, 5.28, 4.92, 4.17, 2.73, 2.32, 1.97, 1.61, 1.35, 0.86, 0.36, 0.10, -0.24, -0.49, -1.69, -2.10, -5.77, -8.31, -8.73 ppm.  $^{29}\text{Si}$  NMR (59.6 MHz,  $\text{CDCl}_3$ ):  $\delta$  4.38, -21.17, -21.25, -21.88, -21.96, -22.45, -22.50 ppm.

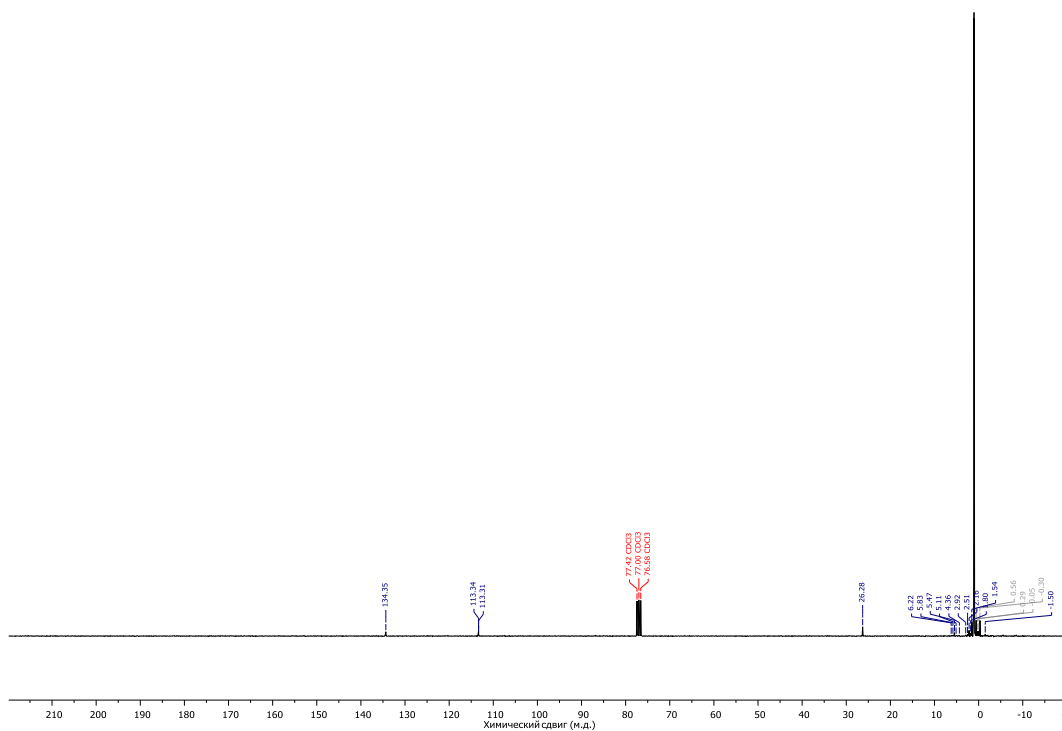


Figure S7.  $^{13}\text{C}$  NMR spectrum of polymer 4.

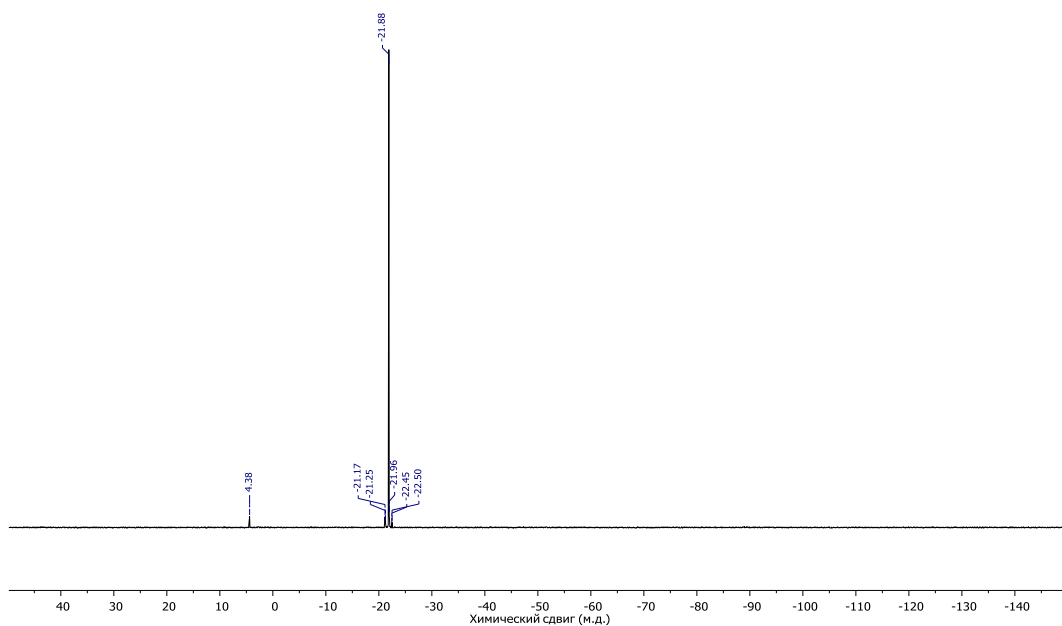


Figure S8.  $^{29}\text{Si}$  NMR spectrum of polymer 4.

### Polymer 5

Polymer **5** was obtained as a colorless transparent liquid according to the general procedure from 0.21 g (1.0 mmol) of 1,3-diallyl-1,1,3,3-tetramethyldisiloxane, 9.83 g (33.1 mmol) of octamethylcyclotetrasiloxane, and 0.010 g (0.1 wt %) of TMAH used as the catalyst. Yield: 8.72 g (87%).  $M_n$ , GPC (toluene) = 12300 g/mol,  $M_w/M_n$  = 1.76 relative to the PS standards.  $^1\text{H}$  NMR

(300 MHz,  $\text{CDCl}_3$ ):  $\delta$  5.87–5.71 (m, 1H,  $\text{CH}$ -allyl), 4.90–4.82 (m, 2H,  $\text{CH}_2$ -allyl), 1.58–1.56 (m, 2H,  $\text{Si-CH}_2$ ), 0.08 (m, 3H,  $\text{Si-CH}_3$ ) ppm.  $^{13}\text{C}$  NMR (77.5 MHz,  $\text{CDCl}_3$ ):  $\delta$  134.16, 113.14, 26.09, 5.28, 4.16, 2.72, 2.31, 1.97, 1.61, 1.35, 0.86, 0.36, 0.10, -0.24, -0.49, -1.70 ppm.  $^{29}\text{Si}$  NMR (59.6 MHz,  $\text{CDCl}_3$ ):  $\delta$  4.38, -21.17, -21.26, -21.89, -21.96, -22.45, -22.51 ppm.

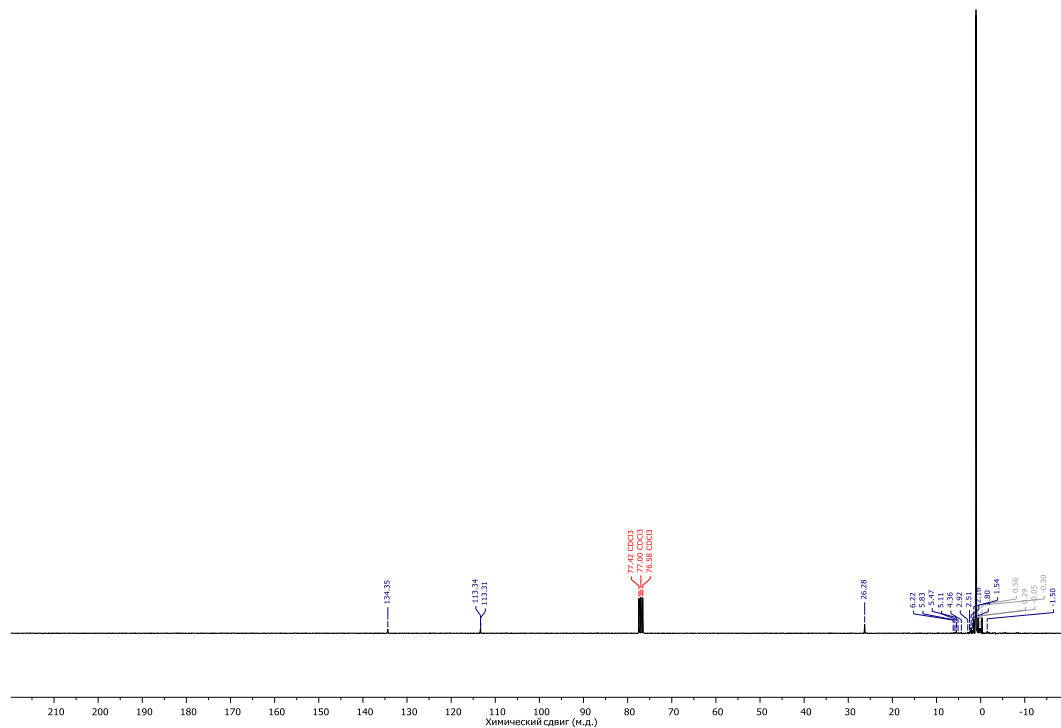


Figure S9.  $^{13}\text{C}$  NMR spectrum of polymer 5.

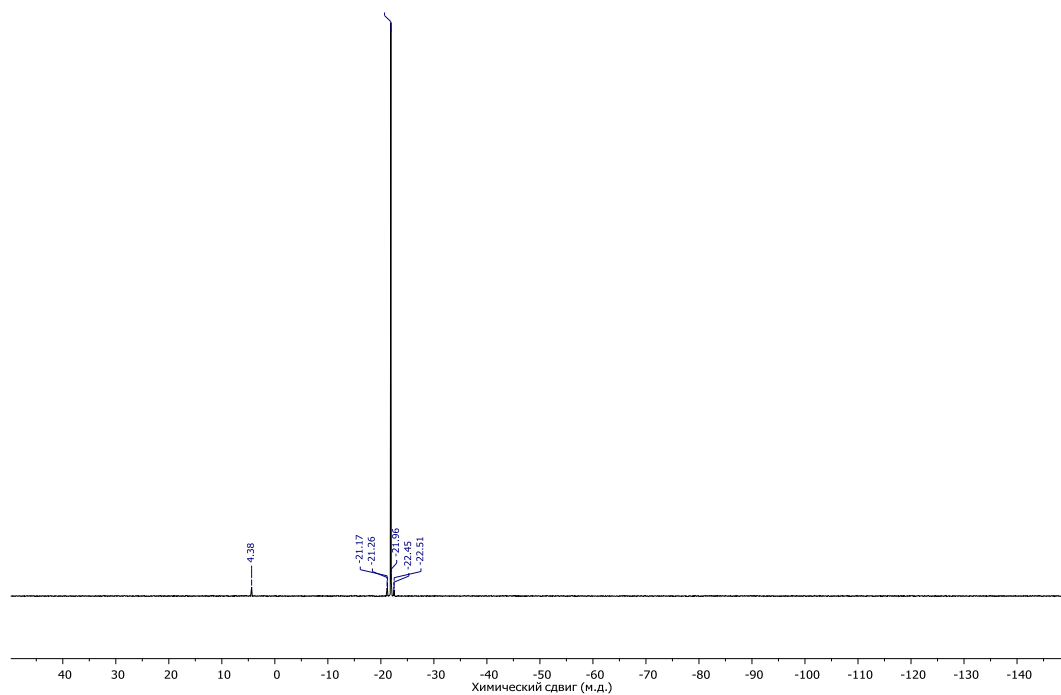
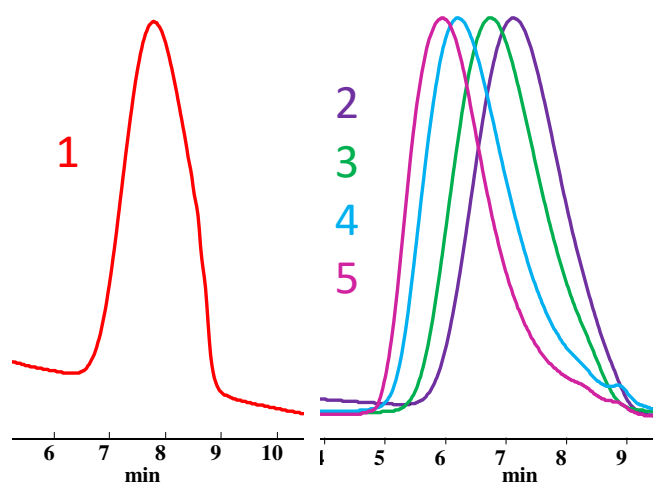


Figure S10.  $^{29}\text{Si}$  NMR spectrum of polymer 5.



**Figure S11.** GPC curves of the resulting polymers.