

## Supporting Information

# Polyphosphazene Elastomers with Alkoxy and Trifluoroethoxy Side Groups

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**Table S1.**  $^{31}\text{P}$  NMR Spectral Shifts of Polymers 6-14

Polymer	Formula	$^{31}\text{P}$ NMR
6 <sup>a</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{0.43}(\text{OCH}_2\text{CF}_3)_{1.57}]_n$	-7.5 – -6.5 (m, 38.0%), -9.5 – -7.5 (m, 62.0%)
7 <sup>a</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{1.01}(\text{OCH}_2\text{CF}_3)_{0.99}]_n$	-4.3 – -3.0 (m, 14.3%), -6.2 – -4.3 (m, 66.4%), -8.5 – -6.2 (m, 19.3%)
8 <sup>b</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{1.44}(\text{OCH}_2\text{CF}_3)_{0.56}]_n$	-10.0 – -5.0 (m, 100%)
9 <sup>a</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{0.53}(\text{OCH}_2\text{CF}_3)_{1.47}]_n$	-7.8 – -5.5 (m, 47.0%), -9.5 – -7.8 (m, 53.0%)
10 <sup>a</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{0.91}(\text{OCH}_2\text{CF}_3)_{1.09}]_n$	-8.2 – -4.5 (m, 60.8%), -10.5 – -8.2 (m, 39.2%)
11 <sup>b</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{1.59}(\text{OCH}_2\text{CF}_3)_{0.41}]_n$	-10.5 – -5.5 (m, 100%)
12 <sup>a</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{0.56}(\text{OCH}_2\text{CF}_3)_{1.44}]_n$	-7.8 – -5.0 (m, 53.5%), -9.8 – -7.8 (m, 46.5%)
13 <sup>a</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{0.99}(\text{OCH}_2\text{CF}_3)_{1.01}]_n$	-6.6 – -5.0 (m, 16.6%), -8.6 – -6.6 (m, 62.8%), -11.0 – -8.6 (m, 21.6%)
14 <sup>b</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{1.48}(\text{OCH}_2\text{CF}_3)_{0.52}]_n$	-10.0 – -5.0 (m, 100%)

a. Dissolved in acetone-d<sub>6</sub>.

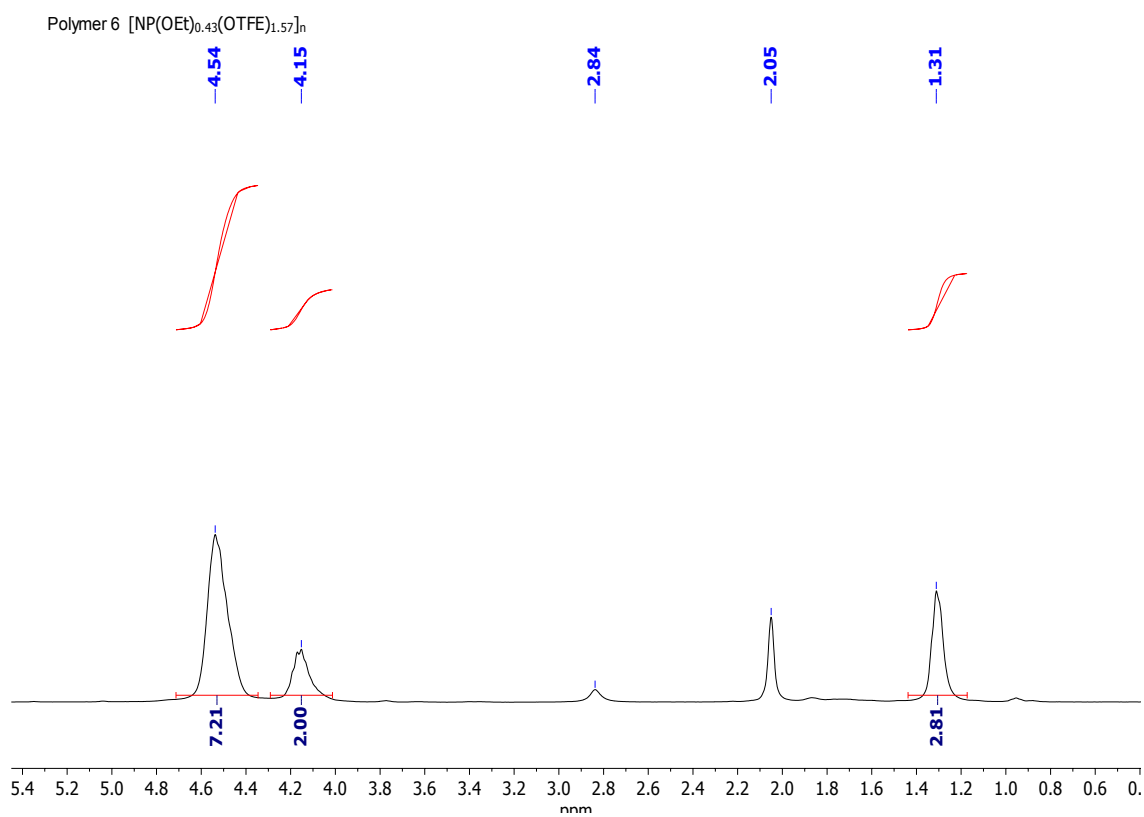
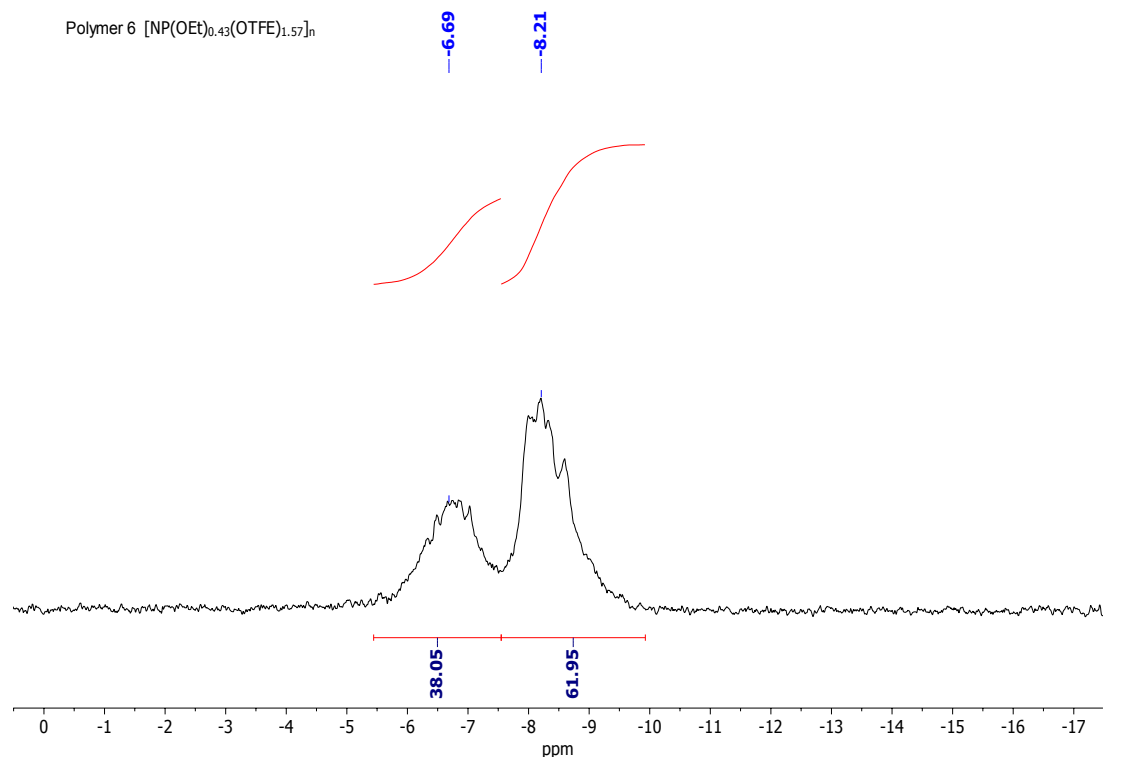
b. Dissolved in chloroform-d<sub>3</sub>.

**Table S2.**  $^1\text{H}$  NMR Spectral Shifts of Polymers 6-14

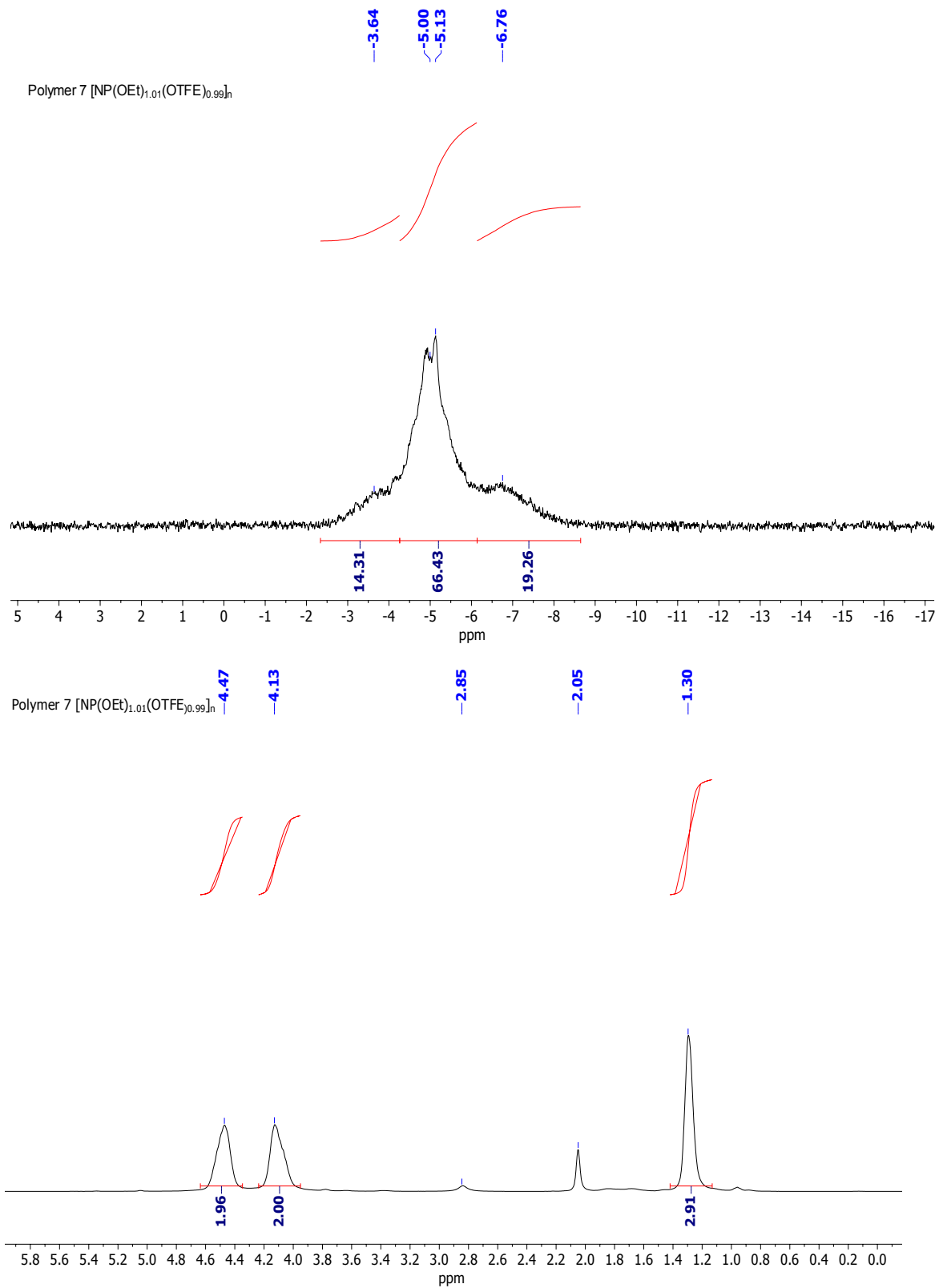
Polymer	Formula	$^1\text{H}$ NMR
6 <sup>a</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{0.43}(\text{OCH}_2\text{CF}_3)_{1.57}]_n$	4.54 (m, 7.21H), 4.15 (m, 2.00H), 1.31 (m, 2.81H)
7 <sup>a</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{1.01}(\text{OCH}_2\text{CF}_3)_{0.99}]_n$	4.47 (m, 1.96H), 4.13 (m, 2.00H), 1.30 (m, 2.91H)
8 <sup>b</sup>	$[\text{NP}(\text{OCH}_2\text{CH}_3)_{1.44}(\text{OCH}_2\text{CF}_3)_{0.56}]_n$	4.29 (m, 0.77H), 3.99 (m, 2.00H), 1.23 (m, 3.06H)
9 <sup>a</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{0.53}(\text{OCH}_2\text{CF}_3)_{1.47}]_n$	4.51 (m, 5.61H), 4.05 (m, 2.00H), 1.70 (m, 1.99H), 0.96 (m, 2.84H)
10 <sup>a</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{0.91}(\text{OCH}_2\text{CF}_3)_{1.09}]_n$	4.09 (m, 2.38H), 4.03 (m, 2.00H), 1.69 (m, 2.09H), 0.96 (m, 3.12H)
11 <sup>b</sup>	$[\text{NP}(\text{OC}_2\text{H}_4\text{CH}_3)_{1.59}(\text{OCH}_2\text{CF}_3)_{0.41}]_n$	4.30 (m, 0.52H), 3.88 (m, 2.00H), 1.61 (m, 2.09H), 0.91 (m, 3.05H)
12 <sup>a</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{0.56}(\text{OCH}_2\text{CF}_3)_{1.44}]_n$	4.51 (m, 5.13H), 4.10 (m, 2.00H), 1.67 (m, 2.02H), 1.43 (m, 1.86H), 0.93 (m, 2.86H)
13 <sup>a</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{0.99}(\text{OCH}_2\text{CF}_3)_{1.01}]_n$	4.46 (m, 2.06H), 4.06 (m, 2.00H), 1.65 (m, 2.04H), 1.42 (m, 1.95H), 0.94 (m, 2.91H)
14 <sup>b</sup>	$[\text{NP}(\text{OC}_3\text{H}_6\text{CH}_3)_{1.48}(\text{OCH}_2\text{CF}_3)_{0.52}]_n$	4.28 (m, 0.71H), 3.90 (m, 2.00H), 1.56 (m, 2.09H), 1.37 (m, 1.97H), 0.91 (m, 2.97H)

a. Dissolved in acetone-d<sub>6</sub>.

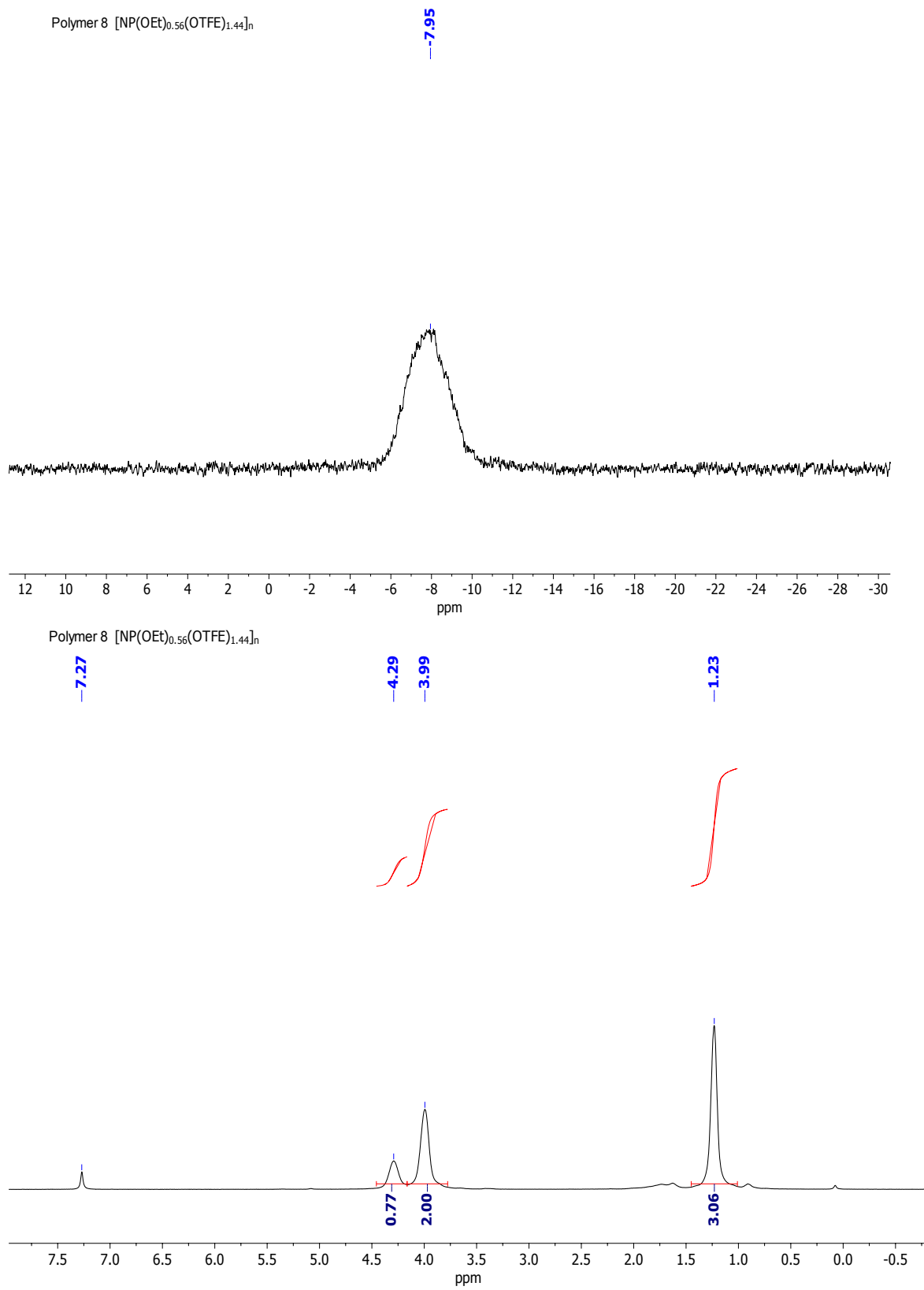
b. Dissolved in chloroform-d<sub>3</sub>.



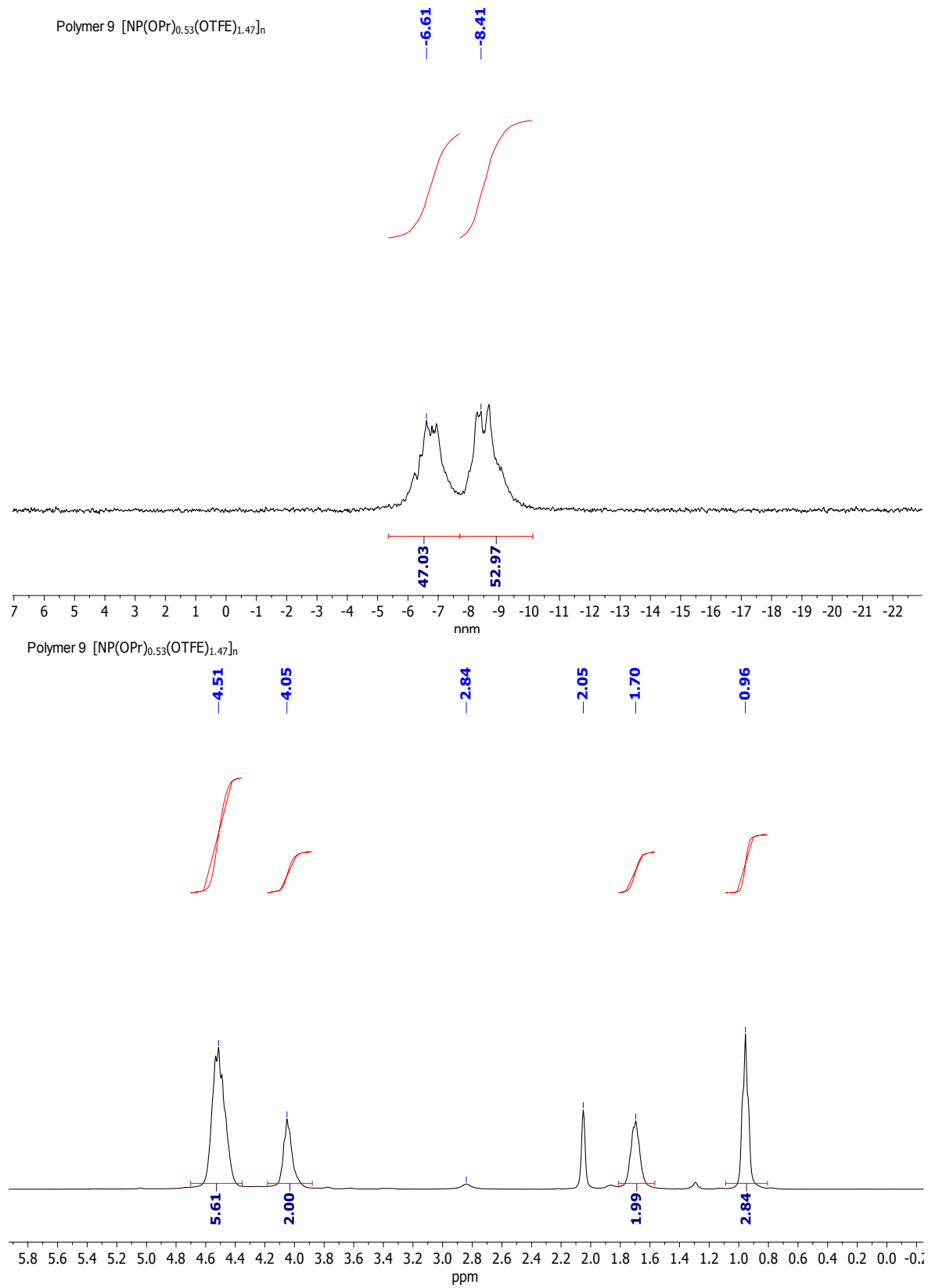
**Figure S1.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 6.



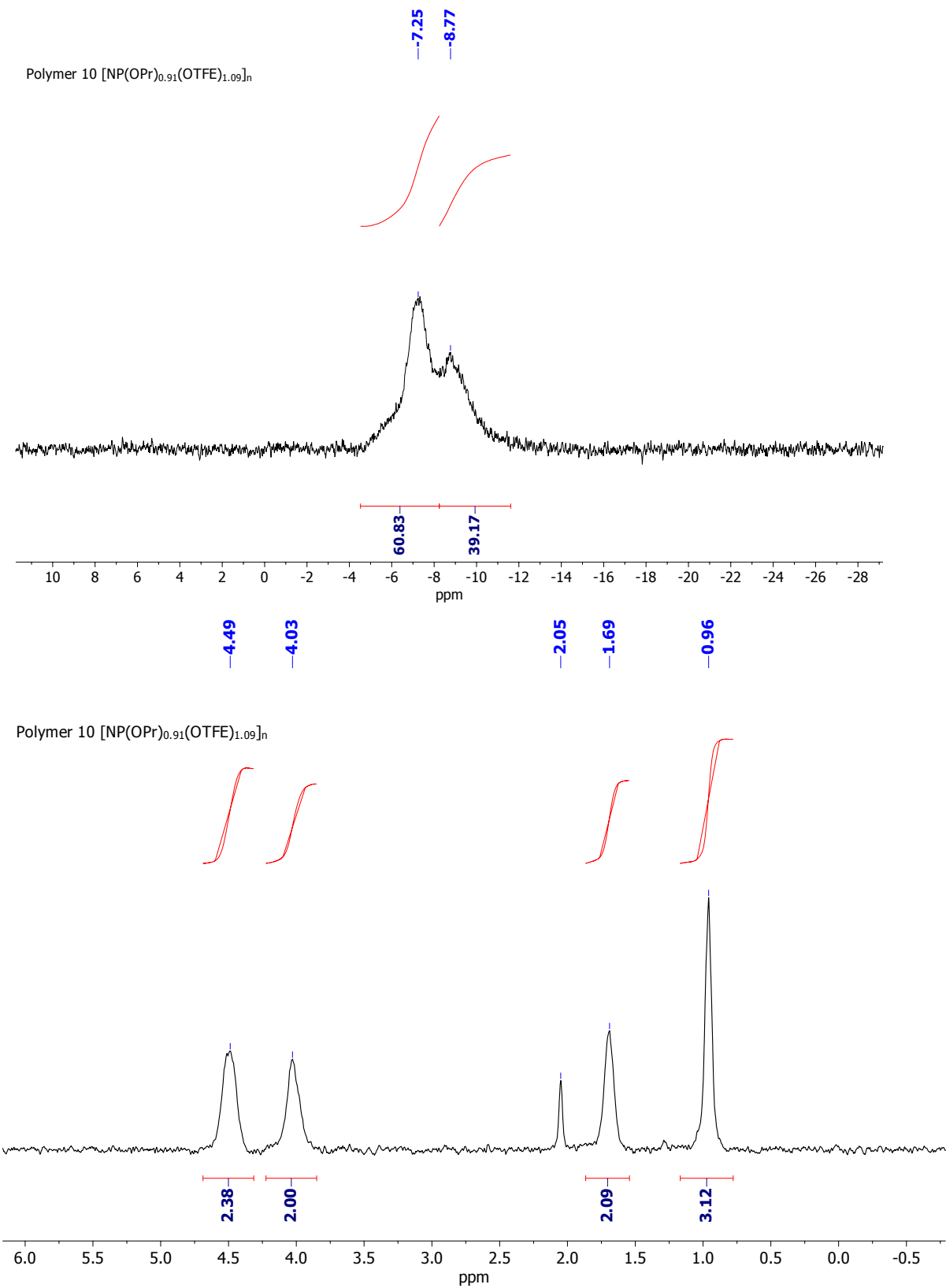
**Figure S2.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 7.



**Figure S3.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 8.

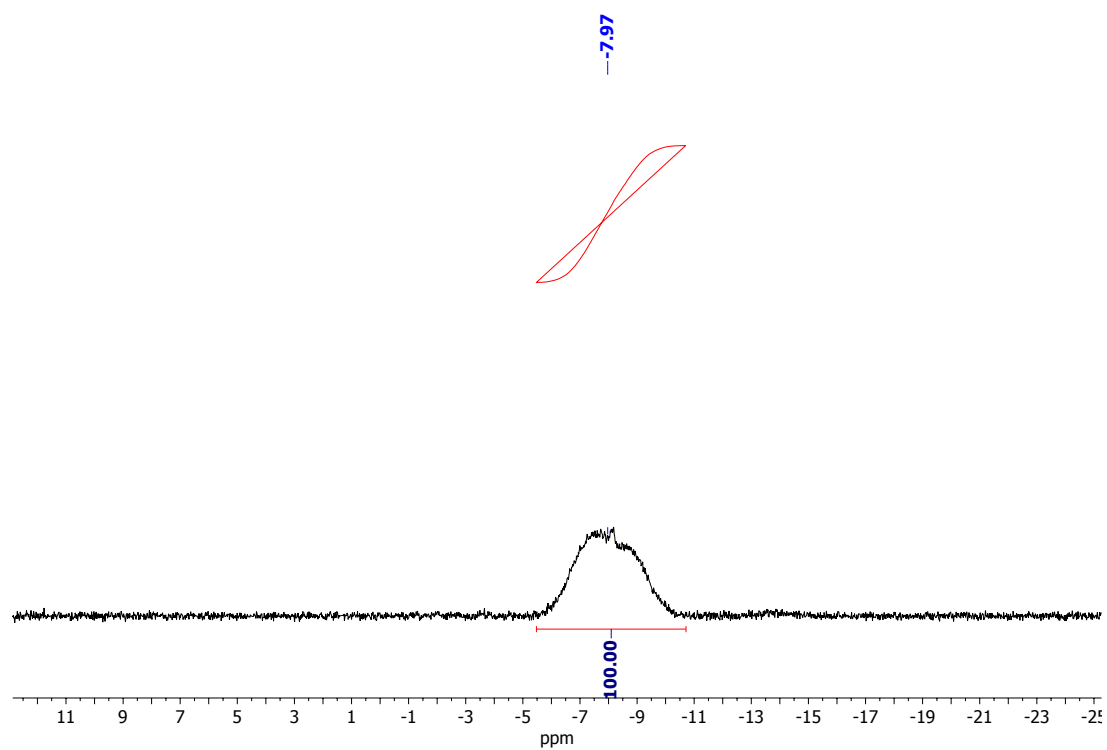


**Figure S4.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 9.



**Figure S5.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 10.

Polymer 11 [NP(OPr)<sub>1.59</sub>(OTFE)<sub>0.41</sub>]<sub>n</sub>



Polymer 11 [NP(OPr)<sub>1.59</sub>(OTFE)<sub>0.41</sub>]<sub>n</sub>

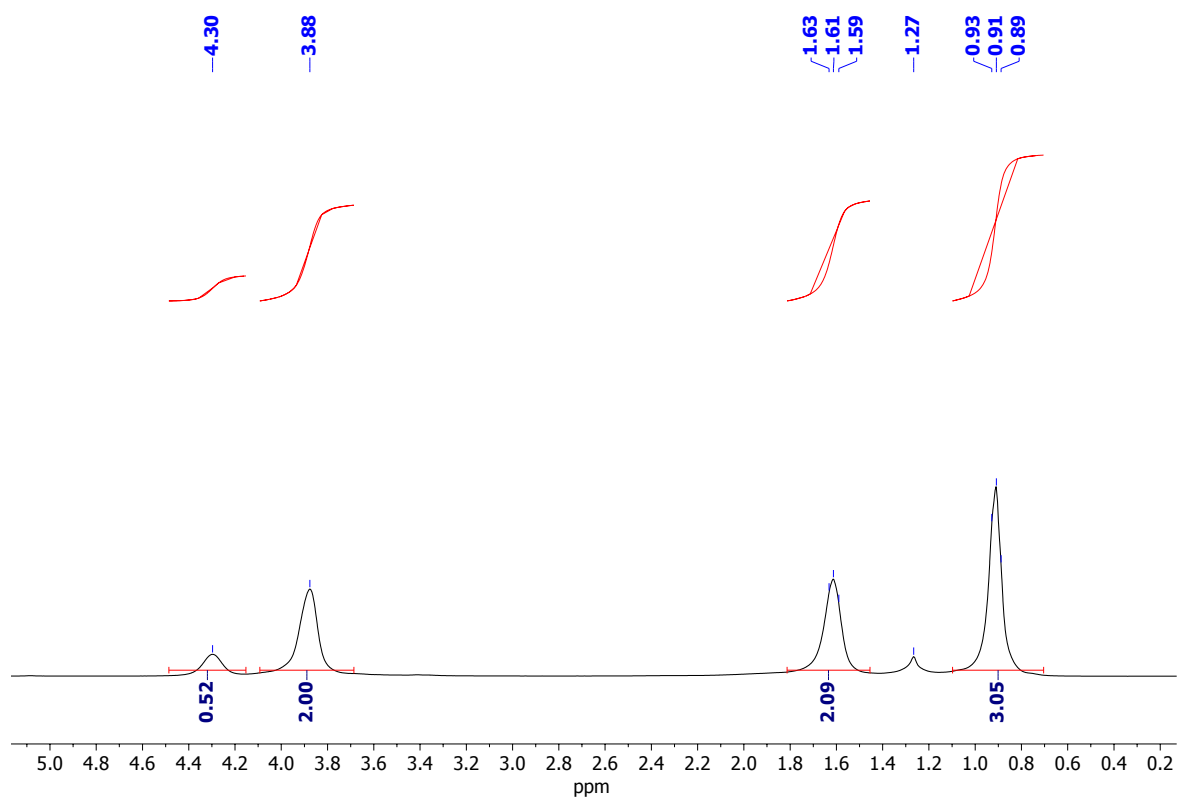
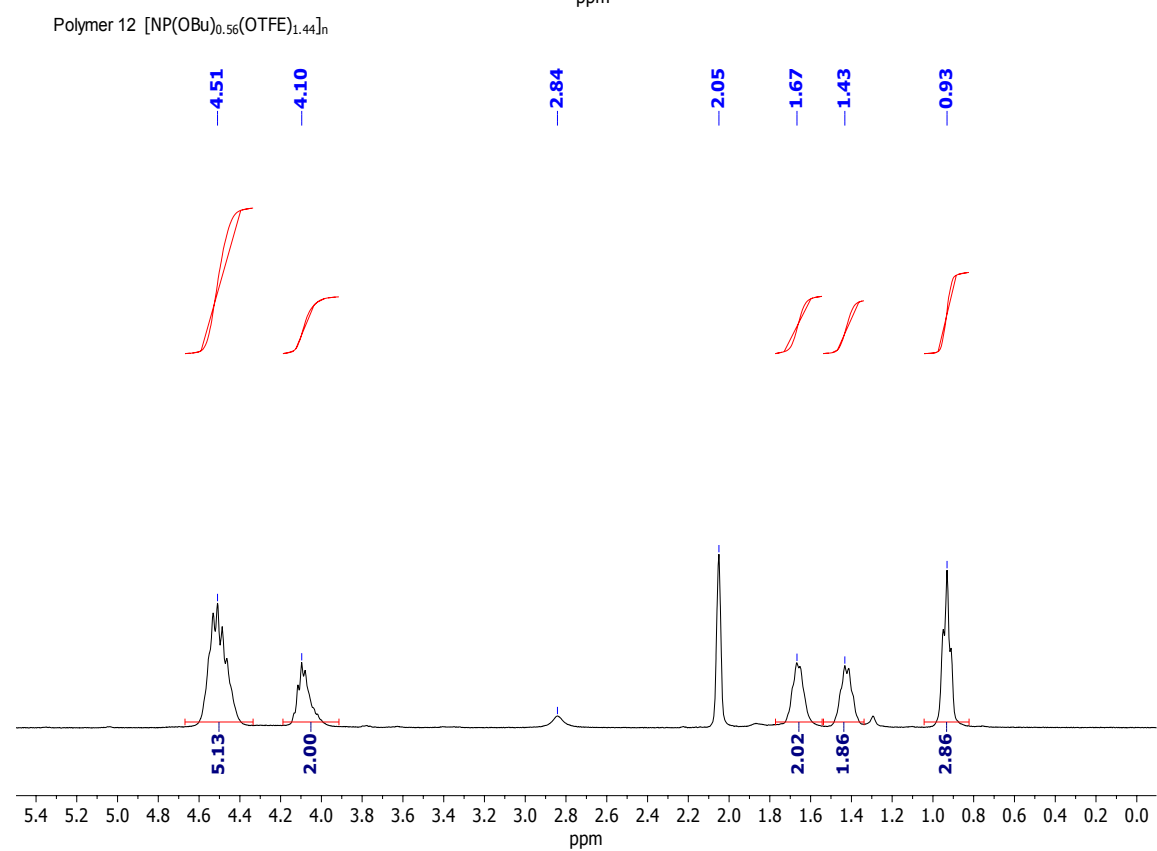
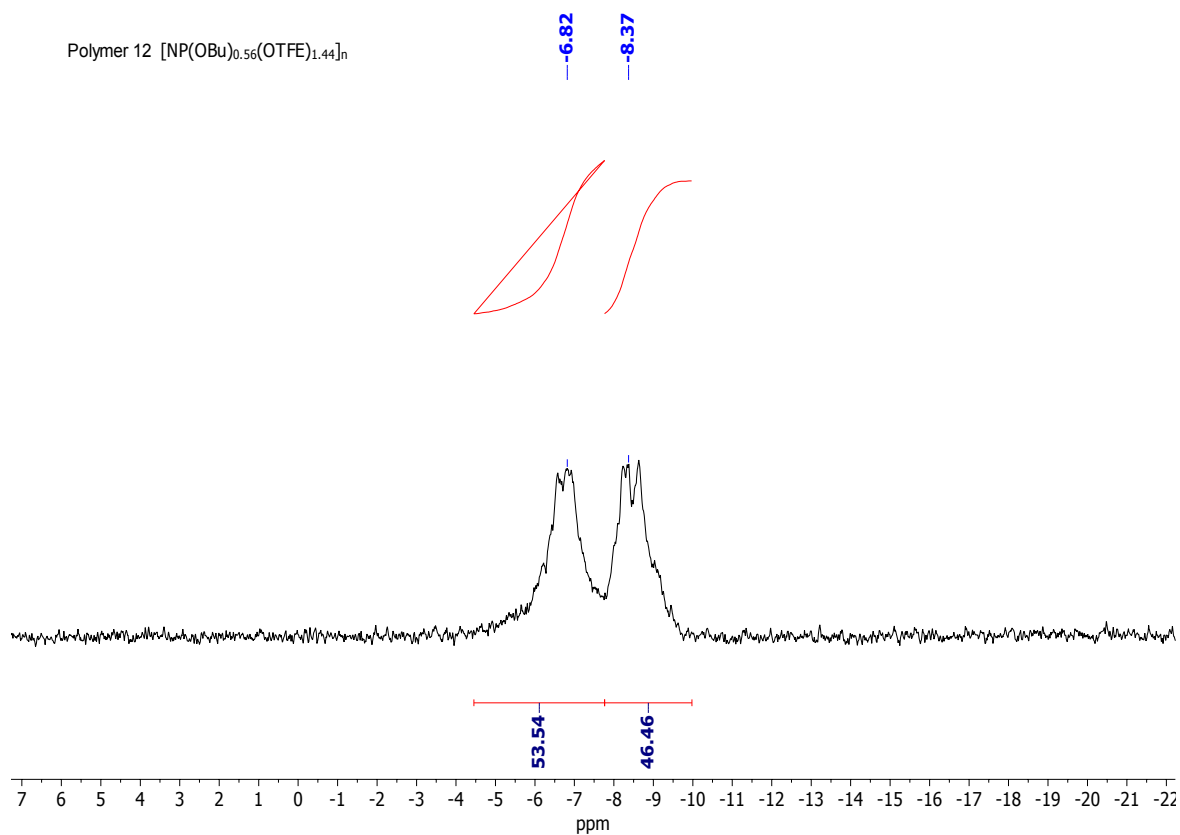
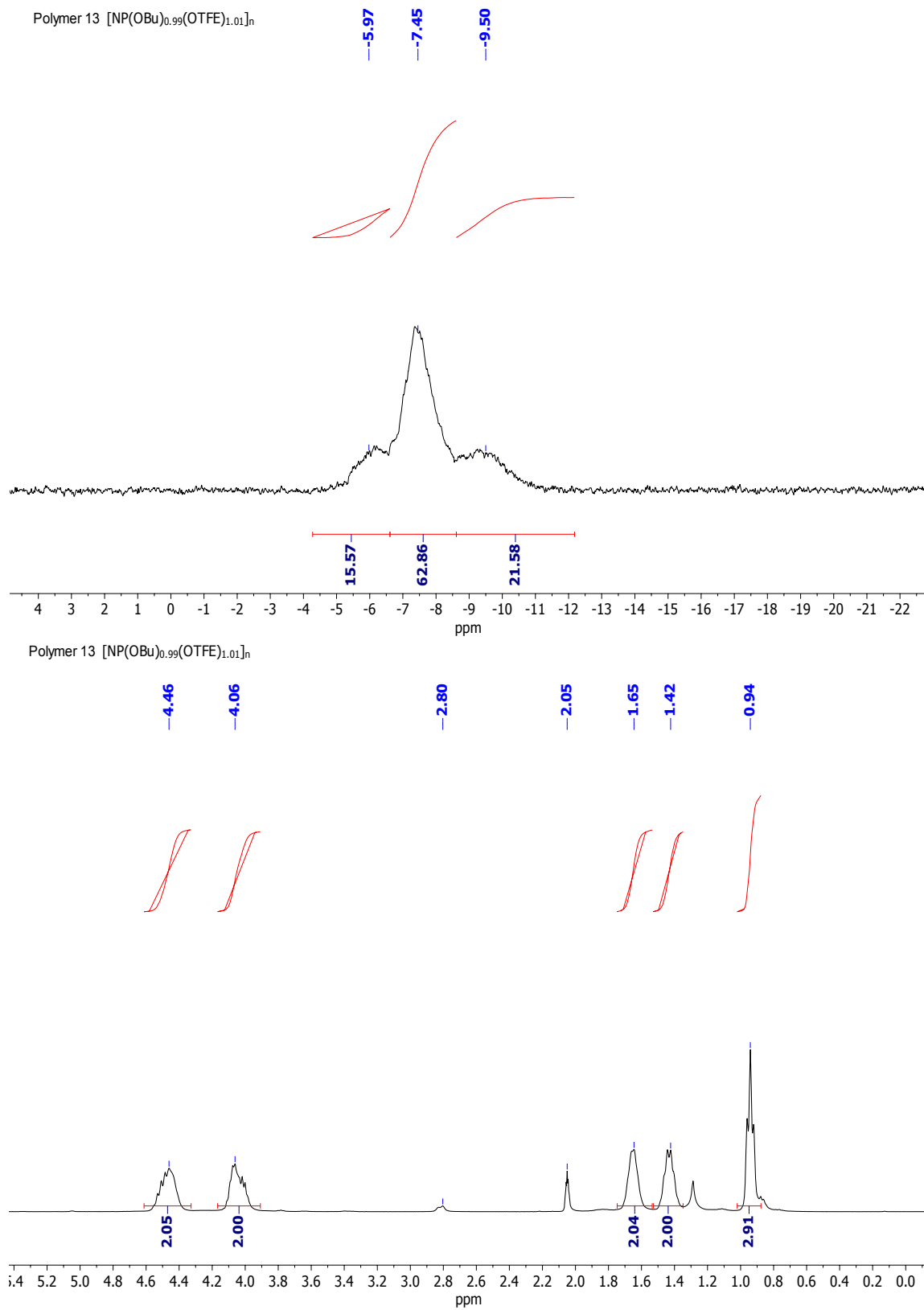


Figure S6. <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 11.



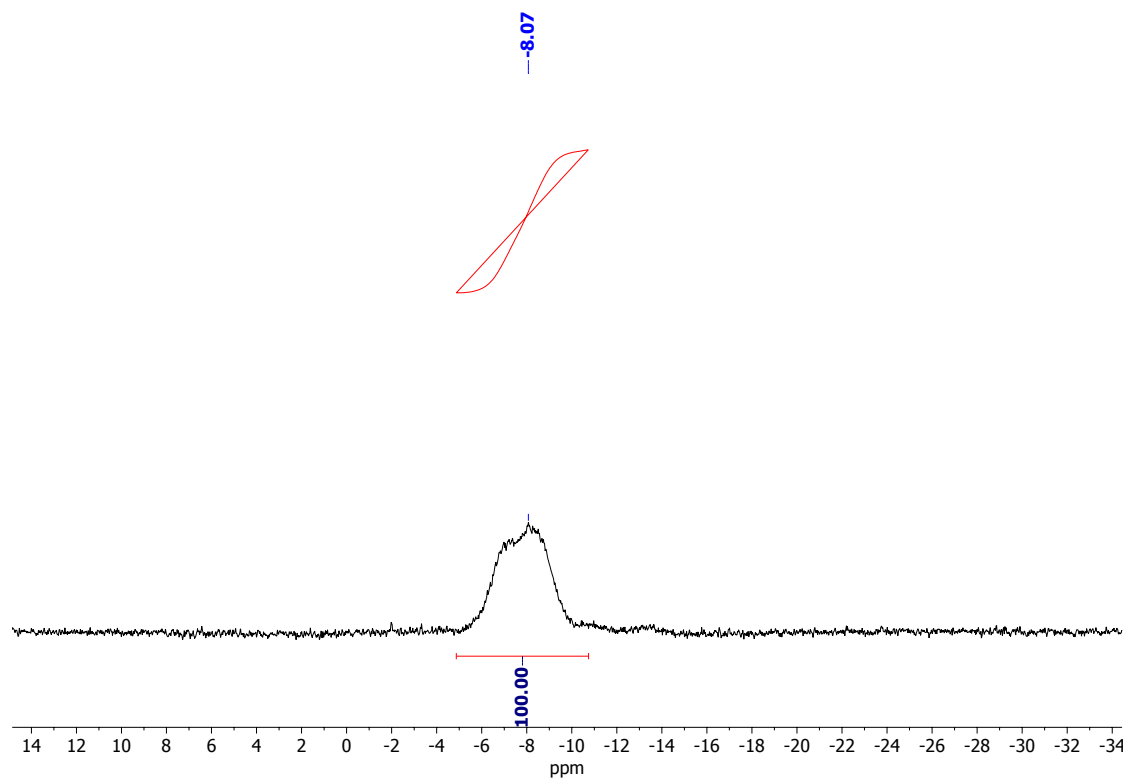


**Figure S7.**  $^{31}\text{P}$  and  $^1\text{H}$  NMR Spectra of Polymers 12.

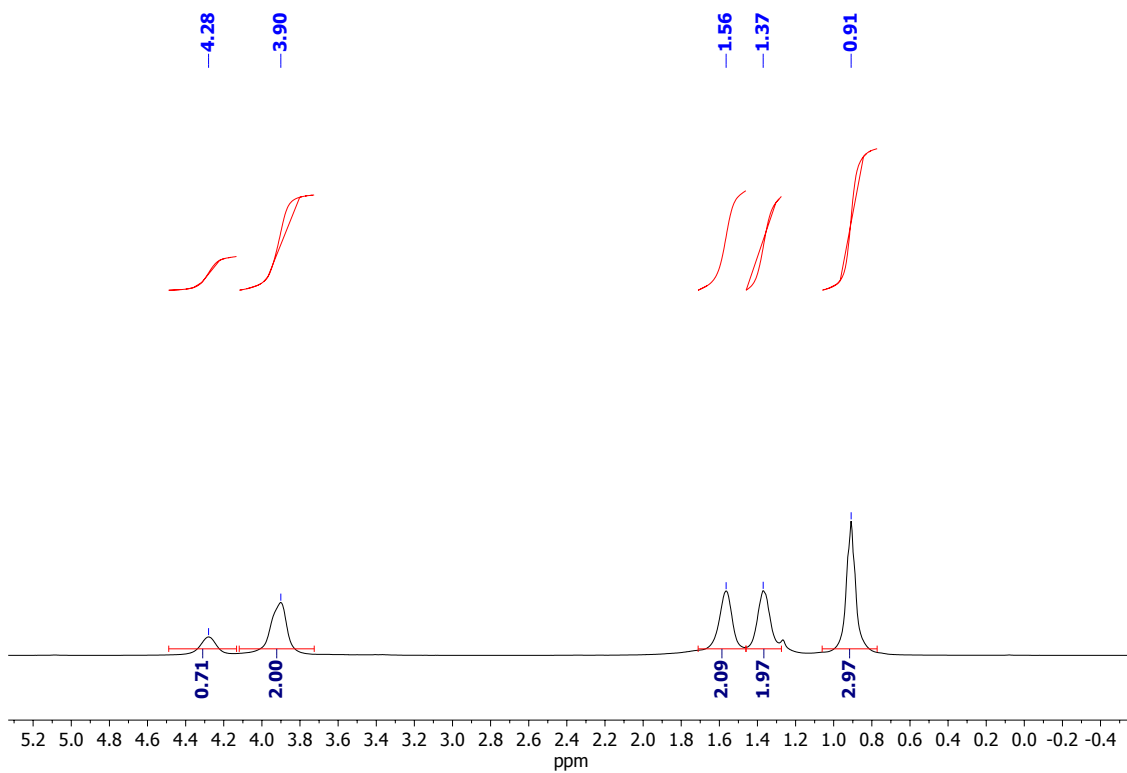


**Figure S8.**  $^{31}\text{P}$  and  $^1\text{H}$  NMR Spectra of Polymers 13.

Polymer 14 [NP(OBu)<sub>1.48</sub>(OTFE)<sub>0.52</sub>]<sub>n</sub>



Polymer 14 [NP(OBu)<sub>1.48</sub>(OTFE)<sub>0.52</sub>]<sub>n</sub>



**Figure S9.** <sup>31</sup>P and <sup>1</sup>H NMR Spectra of Polymers 14.