Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

A user-guide for polymer purification using dialysis

Timo Schütt,[a, b] Ilya Anufriev,[a, b] Patrick Endres,[a, b] Steffi Stumpf,[a, b] Ivo Nischang,[a, b] Stephanie Hoeppener [a, b] Stefan Zechel,[a, b] Ulrich S. Schubert*[a, b] and Robert Geitner*[c]

[a] Laboratory of Organic and Macromolecular Chemistry (IOMC), Friedrich Schiller University Jena, Humboldstr. 10, 07743 Jena, Germany

[b] Jena Center for Soft Matter (JCSM), Friedrich Schiller University Jena, Philosophenweg 7, 07743 Jena, Germany

[c] Institute for Chemistry and Bioengineering, Technical University Ilmenau, Weimarer Str. 32, 98693 Ilmenau

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1. NMR measurement scripts

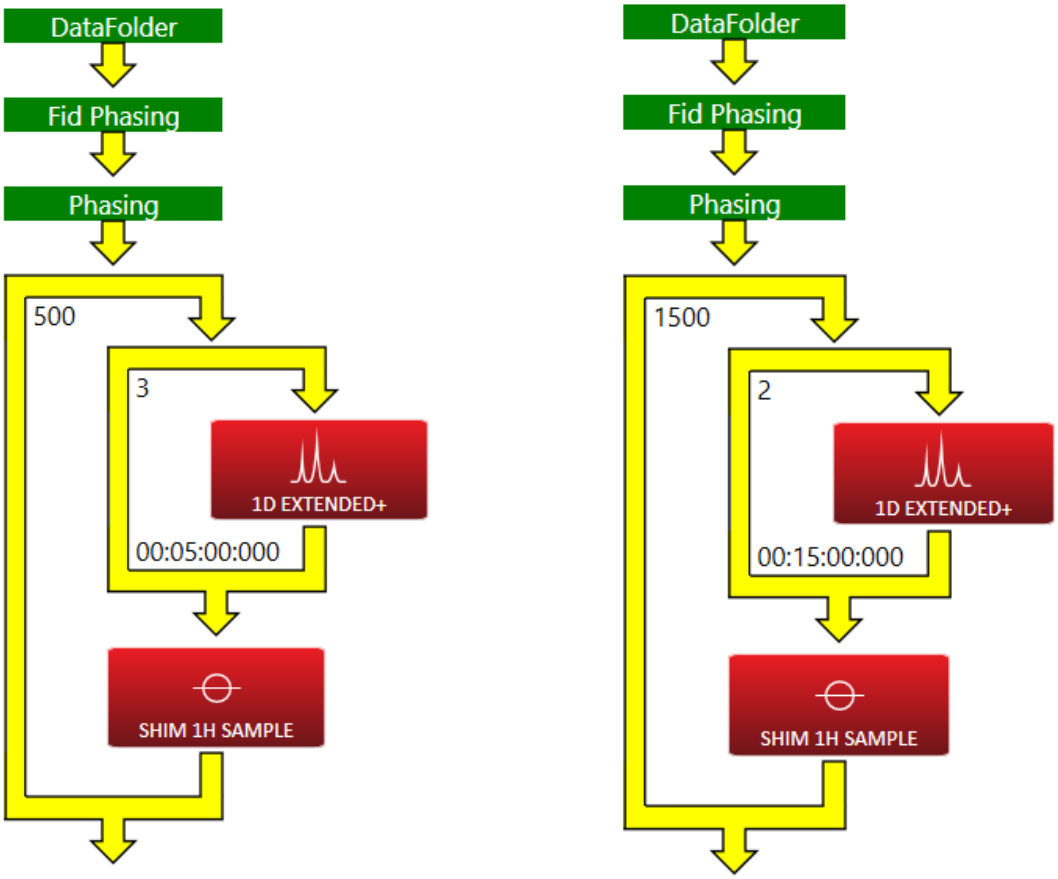

Figure S1: Schematic representation of the NMR-measurement-script shown in the Spinsolve software. Left: THF and toluene experiments. Right: Chloroform measurements.

2. Experimental conditions and parameters

Table S1: Experimental conditions and parameters of all dialysis approaches.

Exp.	solv.	mon.	memb. [kDa]	M_{polym} [g mol^{-1}]	$\sigma_{solution}$ [g cm^{-3}]	$N_{Solution}$ [mPa s]	alpha	$k_{exp.}$ [s^{-1}]	yield [%]	σ_{Solv} [g cm^{-3}]	$M_{solv.}$ [g mol^{-1}]	$\mu_{solv.}$	σ_{mono} [g cm^{-3}]	M_{mono} [g mol^{-1}]	μ_{Mono}
D1	THF	MMA	1	11,700	0.9021	0.7205	0.7	7.00E-05	98	0.888	72.11	1.63	0.94	100.12	1.7
D2	THF	MMA	1	28,400	0.903	1.0097	0.7	1.12E-04	82	0.888	72.11	1.63	0.94	100.12	1.7
D3	THF	Styrene	1	8,000	0.899	0.7893	0.725	4.83E-05	94	0.888	72.11	1.63	0.91	104.15	0.13
D4	THF	Styrene	1	30,900	0.8991	1.397	0.725	4.86E-05	100	0.888	72.11	1.63	0.91	104.15	0.13
D5	THF	PEGMEMA	1	8,900	0.9637	8.1975	0.75	1.62E-05	85	0.888	72.11	1.63	1.08	500	1.039
D6	THF	PEGMEMA	1	23,200	0.9576	3.4042	0.75	1.08E-05	70	0.888	72.11	1.63	1.08	500	1.039
D7	THF	MMA	8	11,700	0.9021	0.7205	0.7	9.89E-05	102	0.888	72.11	1.63	0.94	100.12	1.7
D8	THF	MMA	8	28,400	0.903	1.0097	0.7	8.56E-05	102	0.888	72.11	1.63	0.94	100.12	1.7
D9	THF	Styrene	8	8,000	0.899	0.7893	0.725	6.22E-05	91	0.888	72.11	1.63	0.91	104.15	0.13
D10	THF	Styrene	8	30,900	0.8991	1.397	0.725	4.27E-05	86	0.888	72.11	1.63	0.91	104.15	0.13
D11	THF	PEGMEMA	8	8,900	0.9637	8.1975	0.75	9.94E-06	98	0.888	72.11	1.63	1.08	500	1.039
D12	THF	PEGMEMA	8	23,200	0.9576	3.4042	0.75	2.49E-05	55	0.888	72.11	1.63	1.08	500	1.039
D13	Toluene	MMA	1	11,700	0.883	0.8332	0.75	5.80E-06	95	0.867	92.14	0.375	0.94	100.12	1.7

D14	Toluene	MMA	1	28,400	0.8837	1.14	0.75	6.34E-06	100	0.867	92.14	0.375	0.94	100.12	1.7
D15	Toluene	Styrene	1	8,000	0.8789	0.9071	0.725	6.36E-06	96	0.867	92.14	0.375	0.91	104.15	0.13
D16	Toluene	Styrene	1	30,900	0.8802	1.6505	0.725	0	96	0.867	92.14	0.375	0.91	104.15	0.13
D17	Toluene	PEGMEMA	1	8,900	0.9479	3.4656	0.7	3.90E-07	136	0.867	92.14	0.375	1.08	500	1.039
D18	Toluene	PEGMEMA	1	23,200	0.9424	3.8152	0.7	6.40E-07	135	0.867	92.14	0.375	1.08	500	1.039
D19	Toluene	MMA	8	11,700	0.883	0.8332	0.75	6.90E-06	95	0.867	92.14	0.375	0.94	100.12	1.7
D20	Toluene	MMA	8	28,400	0.8837	1.14	0.75	6.59E-06	102	0.867	92.14	0.375	0.94	100.12	1.7
D21	Toluene	Styrene	8	8,000	0.8789	0.9071	0.725	0	101	0.867	92.14	0.375	0.91	104.15	0.13
D22	Toluene	Styrene	8	30,900	0.8802	1.6505	0.725	0	101	0.867	92.14	0.375	0.91	104.15	0.13
D23	Toluene	PEGMEMA	8	8,900	0.9479	3.4656	0.7	3.07E-07	130	0.867	92.14	0.375	1.08	500	1.039
D24	Toluene	PEGMEMA	8	23,200	0.9424	3.8152	0.7	5.74E-06	131	0.867	92.14	0.375	1.08	500	1.039
D25	Chloroform	MMA	8	28,400	1.4512	1.4626	0.8	0	91	1.4887	119.38	1.04	0.94	100.12	1.7
D26	Chloroform	Styrene	8	30,900	1.4401	1.6027	0.725	0	92	1.4887	119.38	1.04	0.91	104.15	0.13
D27	Chloroform	PEGMEMA	8	23,200	1.3781	9.3317	0.6	1.49E-06	0	1.4887	119.38	1.04	1.08	500	1.039
D28	THF	-	1	8,000	-	-	-	1.3E-05	-	-	-	-	-	-	-
D29	THF	MMA	1	10,200	-	-	-	18.5E-05 (DMF) 19.9E-05 (MMA)	-	-	-	-	-	-	-

σ = density, v = viscosity, μ = dipole moment

Figure S2: Pairs plot showing correlation between all investigated parameters.

3. SEM pictures of the freeze-dried dialysis tubings

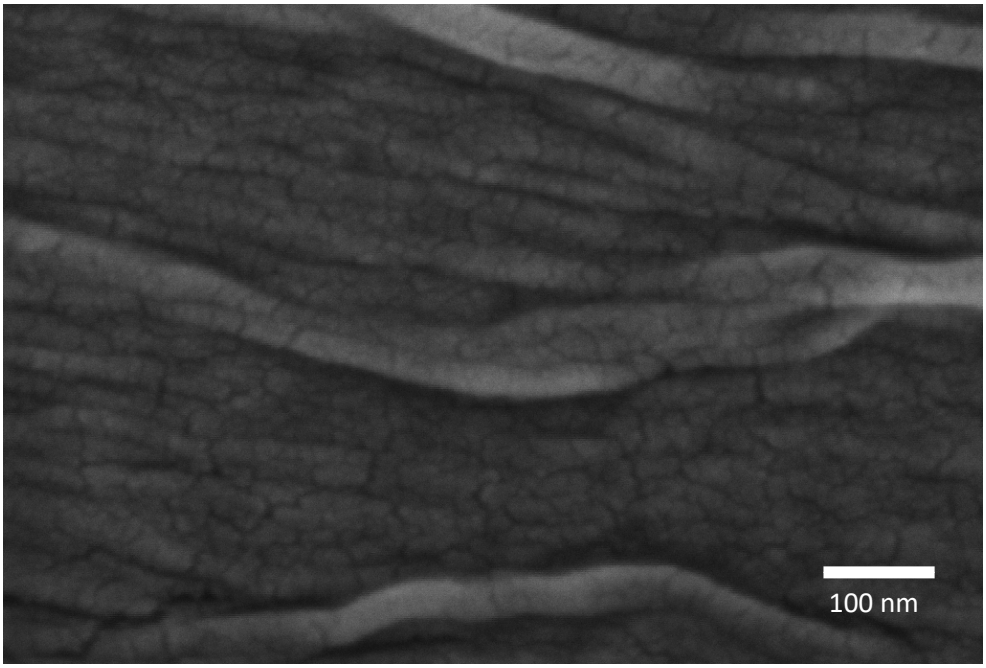

Figure S3: SEM-image of a dialysis tubing with a cut-off of 1 kDa freeze dried from water.

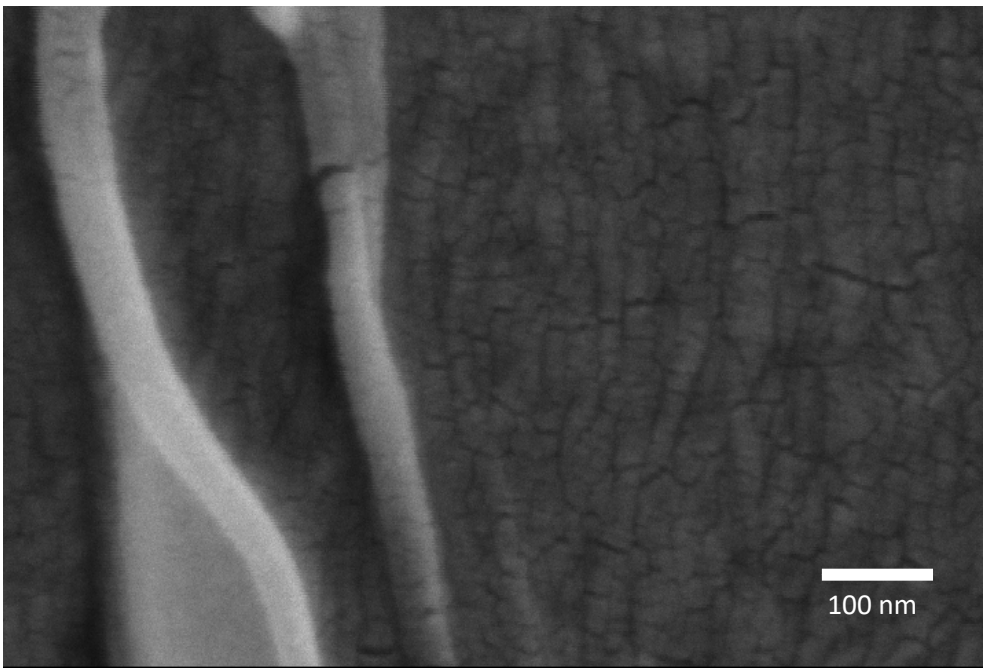

Figure S4: SEM-image of a dialysis tubing with a cut-off of 8 kDa freeze dried from water.

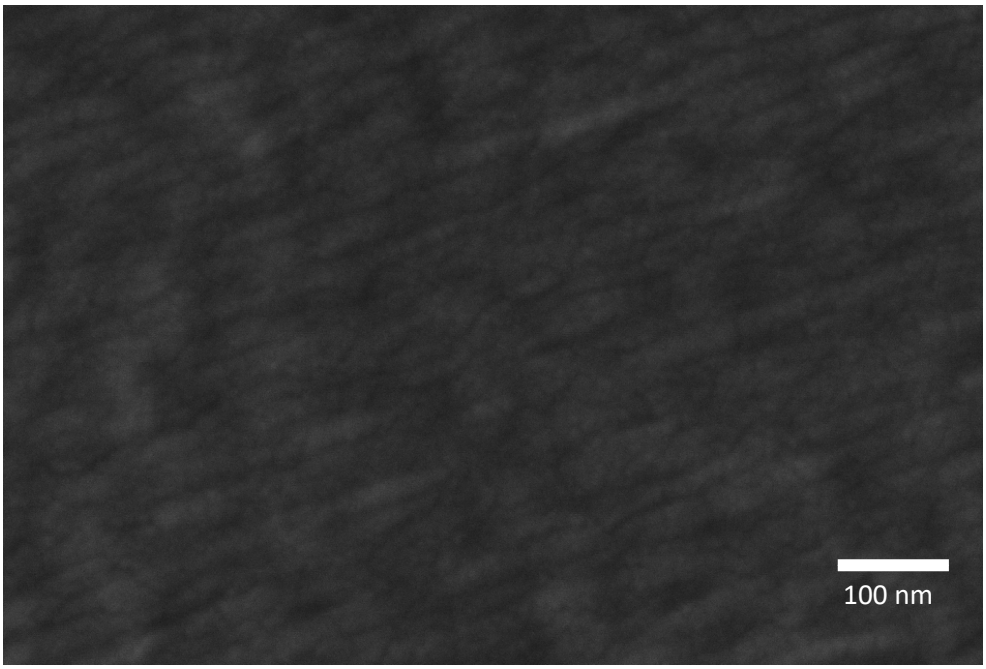

Figure S5: SEM-image of a dialysis tubing with a cut-off of 1 kDa freeze dried from chloroform.

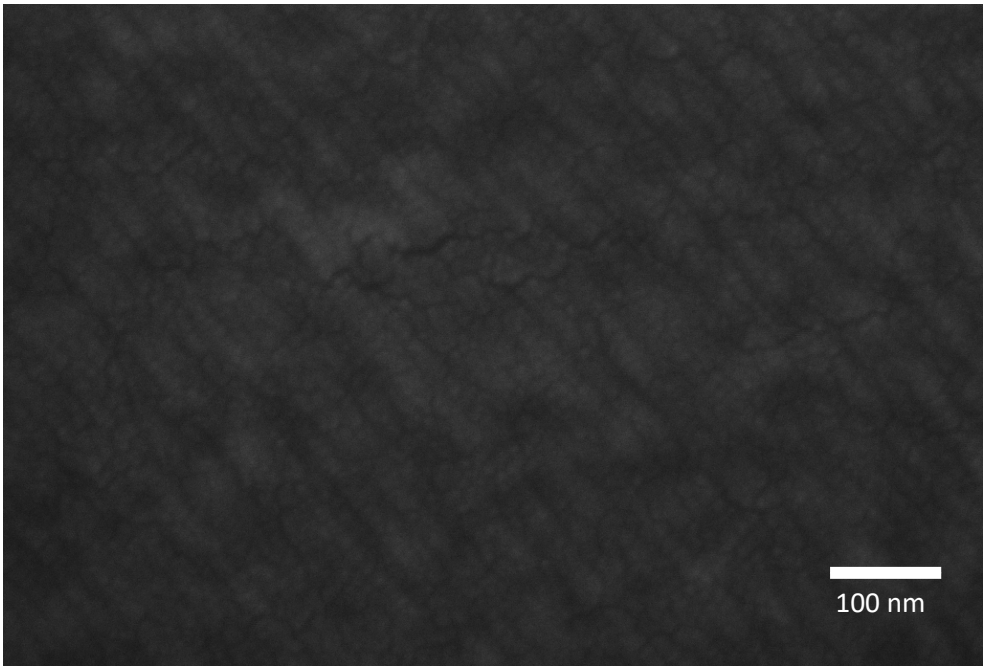

Figure S6: SEM-image of a dialysis tubing with a cut-off of 8 kDa freeze dried from chloroform.

4. Swelling degree experiments

Table S2: Results of the swelling degree experiments.

Experiment	Solvent	Mass dried membrane [mg]	Mass swollen membrane [mg]	Mass increase [%]
W1	Water	71.1	194.9	174.12
W2	Water	63.0	150.4	138.73
W3	Water	80.0	189.7	137.13
W4	THF	73.3	77.7	6.00
W5	THF	70.1	75.5	7.70
W6	THF	78.9	84.5	7.10
W7	Toluene	68.9	83	20.46
W8	Toluene	79.5	92.7	16.60
W9	Toluene	72.9	84.7	16.19
W10	$CHCl_3$	73.0	79.6	9.04
W11	$CHCl_3$	65.5	68.9	5.19
W12	$CHCl_3$	72.0	77.5	7.64

Table S3: Average swelling degree and standard deviation of the dialysis membranes in the respective solvent.

Solvent	Average swelling degree [%]	Standard deviation [%]
Water	149.99	20.91
THF	6.93	0.86
Toluene	17.75	2.36
$CHCl_3$	7.29	1.95

5. SEC-elugrams of the synthesized polymers

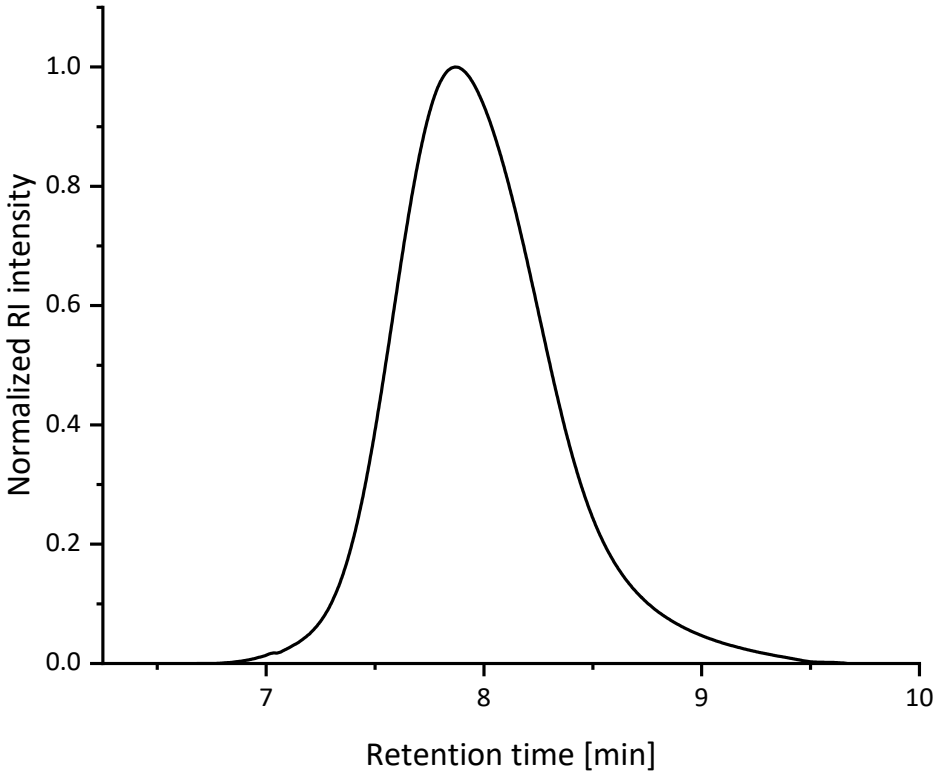

Figure S7: SEC-elugram of polymer **P1** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

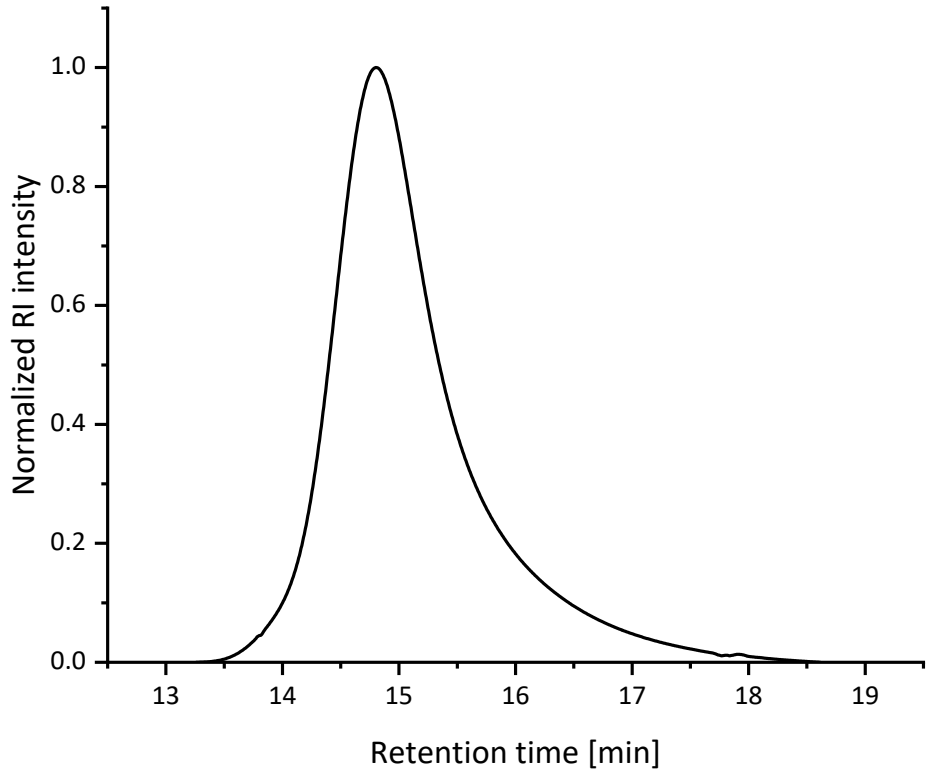

Figure S8: SEC-elugram of polymer **P2** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

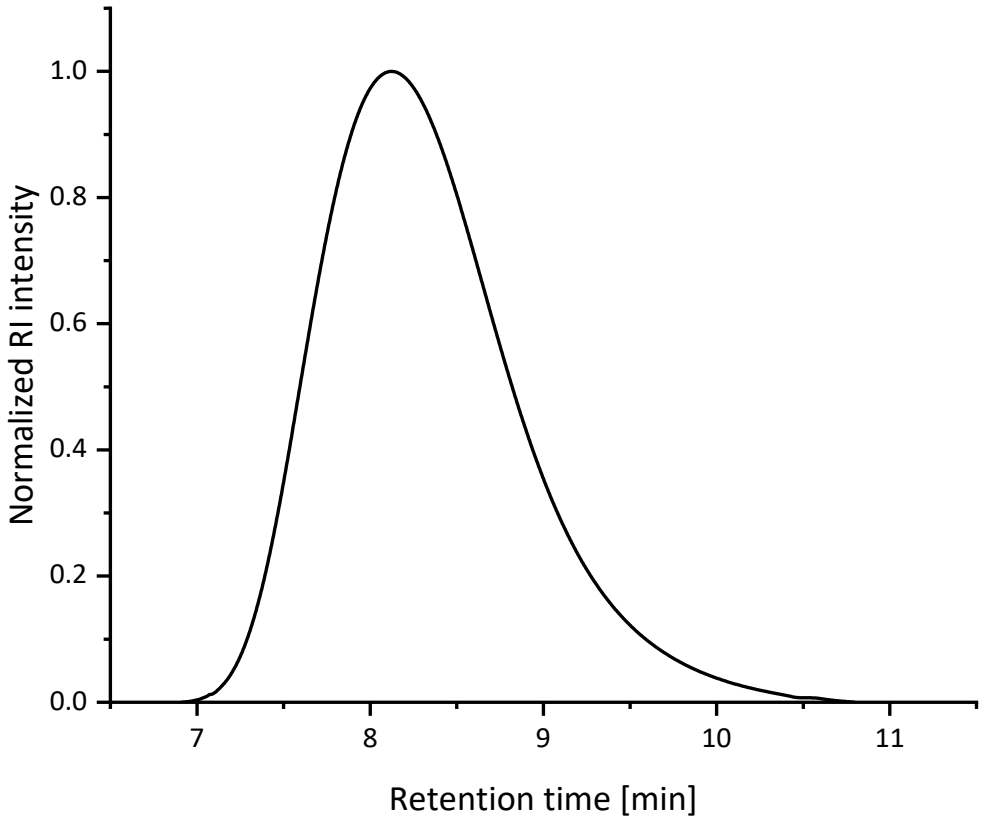

Figure S9: SEC-elugram of polymer **P3** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

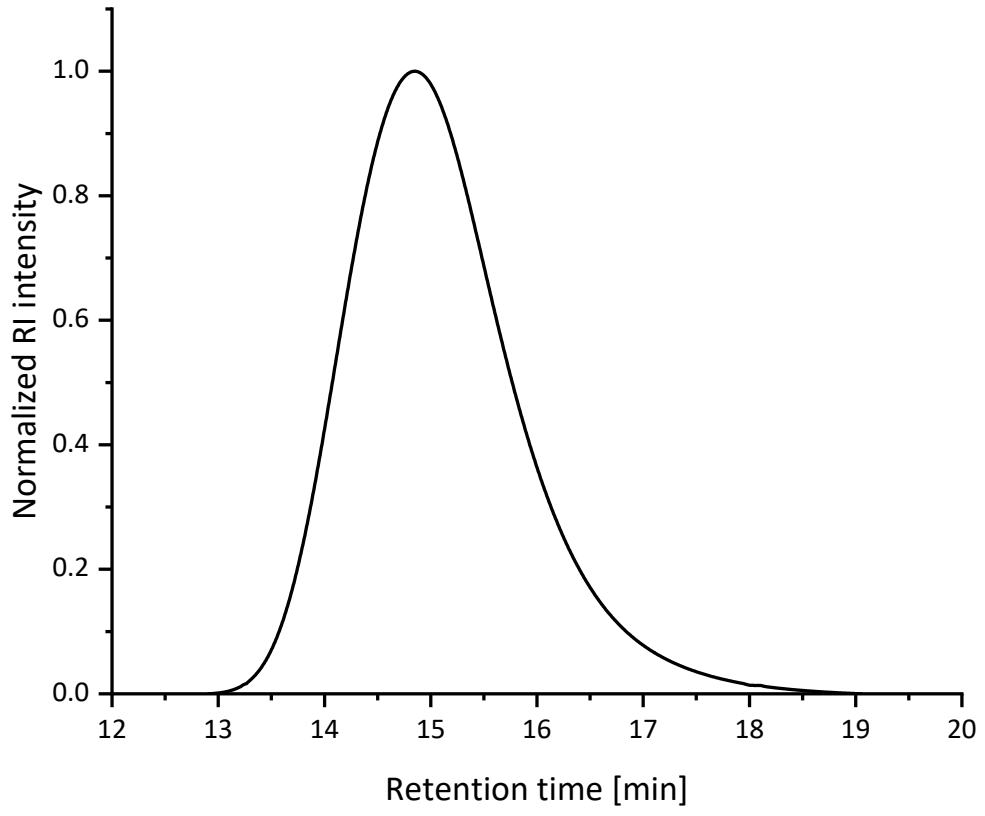

Figure S10: SEC-elugram of polymer **P4** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

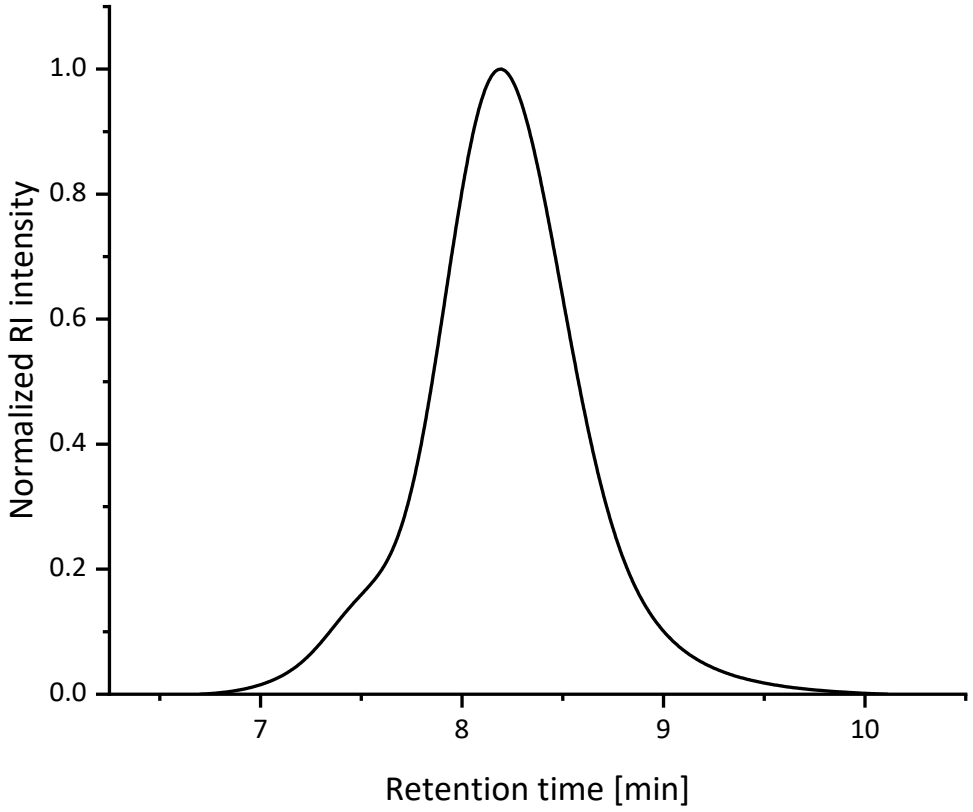

Figure S11: SEC-elugram of polymer **P5** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

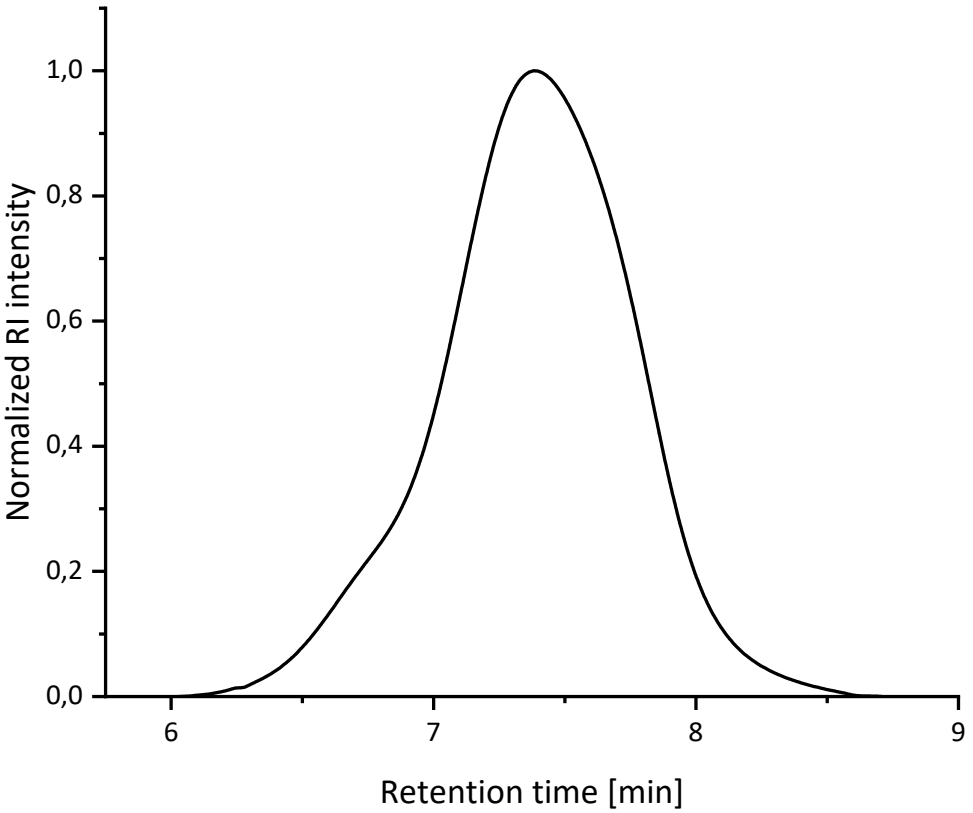

Figure S12: SEC-elugram of polymer **P6** (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).

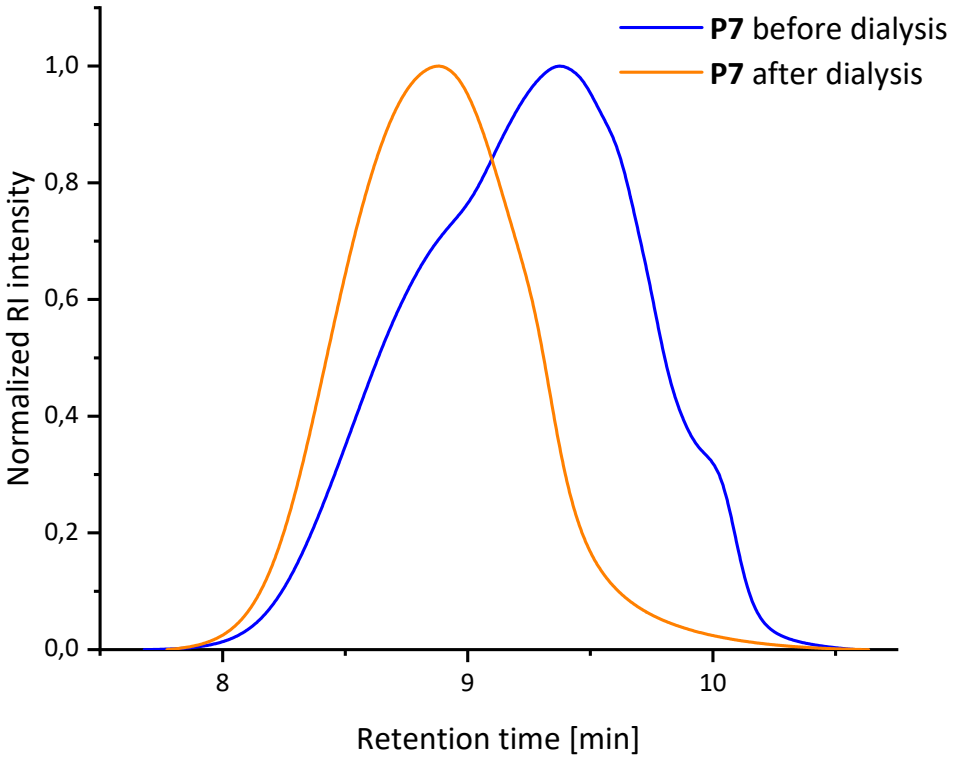

Figure S13: SEC-elugrams of Polymer **P7** before (blue) and after (orange) dialysis (chloroform/isopropanol/triethylamine [94/2/4], PMMA-standard).