

Supporting Information to: Capillary Zone Electrophoresis with Light-Emitting Diode-Induced Fluorescence Detection for the Analysis of Monoclonal Antibodies: Detector Optimization through Design of Experiments and Comparison to UV Detection

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1. Materials and Methods

The dilution schemes for the signal-to-noise ratio (S/N) and linearity measurements is provided below for matuzumab (Table S1) and NISTmAb (Table S2).

Table S1. Matuzumab dilution scheme; from dilution 1 to 4, a 10 mg/mL mAb stock solution was used (V(mAb)), starting with dilution 5, dilution 1 (1 mg/mL) was used instead of the mAb stock solution.

Dilution	V(mAb)[μ L]	V(water)[μ L]	V(total)[μ L]	c(mAb)[mg/mL]
1	40	360	400	1
2	10	190	200	0.5
3	10	390	400	0.25
4	10	990	1000	0.1
V(Dilution 1) [μ L]				
5	10	190	200	0.05
6	10	240	250	0.04
7	9	291	300	0.03
8	10	490	500	0.02
9	10	990	1000	0.01
10	0	1000	1000	0

Citation: Zagst, H.; Hartung, S.; Menges, D.-M.; Wittmann, A.; Wätzig, H. Capillary Zone Electrophoresis with Light-Emitting Diode-Induced Fluorescence Detection for the Analysis of Monoclonal Antibodies: Detector Optimization through Design of Experiments and Comparison to UV Detection. *Separations* **2023**, *10*, 320. <https://doi.org/10.3390/separations10050320>

Academic Editor: Irina Ielciu and Arnaud Delobel

Received: 19 April 2023

Revised: 10 May 2023

Accepted: 15 May 2023

Published: 21 May 2023



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Table S2. NISTmAb dilution scheme. From dilution 1 to 6, a 1 mg/mL mAb stock solution was used (V(mAb)), starting with dilution 7, dilution 1 (0.5 mg/mL) was used instead of the mAb stock solution.

Dilution	V(mAb) [μ L]	V(water) [μ L]	V(total) [μ L]	c(mAb) [mg/mL]
0	35	0	35	1
1	15	15	30	0.5
2	10	40	50	0.2
3	10	90	100	0.1
4	5	95	100	0.05
5	5	245	250	0.02
6	5	495	500	0.01
V(Dilution 1) [μ L]				
7	10	190	200	0.005
8	10	240	250	0.004
9	9	291	300	0.003
10	10	490	500	0.002
11	10	990	1000	0.001
12	0	100	100	0

Table S3. Factor settings (PMHV, RiT, and frequency) and obtained response values (S/N Basic, S/N Main, P/V Acidic, P/V Basic) for all 18 runs of the experimental design.

Run	PMHV	RiT	Frequency	S/N Basic	S/N Main	P/V Acidic	P/V Basic
1	520	0.8	20	460.64042	25204.33259	1.4071	1.1345
2	470	0.8	100	2018.68808	114059.1368	1.4026	1.0822
3	570	1	20	2432.07911	96890.91929	1.2674	1.0526
4	530	0.6	100	231.14859	10699.23825	1.4639	1.1876
5	520	0.8	20	568.43791	23119.62414	1.429	1.1445
6	510	1	100	2352.58006	44527.45457	1.2609	1.0045
7	570	1	100	1386.22294	13170.17951	1.4829	1.2804
8	470	1	20	1844.82842	87068.78229	1.2577	0.9737
9	470	1	20	1869.08898	55191.8554	1.2219	0.967
10	570	0.6	100	245.72012	9555.14844	1.4657	1.1786
11	470	0.6	100	650.94952	21266.34473	1.47	1.1547
12	570	0.8	100	285.86125	10743.47091	1.4362	1.1591
13	570	0.6	20	337.60948	8428.03655	1.4828	1.1891
14	570	0.6	20	255.87375	11075.52143	1.488	1.1998
15	570	1	20	2642.66139	79714.81652	1.2871	1.0648
16	470	0.6	20	628.55875	25114.2722	1.4804	1.1647
17	470	0.6	20	549.54438	28220.25225	1.4631	1.168
18	470	1	100	2335.35049	61003.00189	1.2469	0.9955

2. Results

2.1. Design of Experiments

The results from the experiments are provided in combination with the individual factor levels of the respective experiment in Table S3.

Term Significance															
Term	1/sqrt(S/NB)				1/sqrt(S/NM)				P/VA			P/VB			
Constant	4.78543e-09	1 df	In		9.81548e-13	1 df	In		0.00000	1 df	In		0.00000	1 df	In
PMHV	0.000225216	1 df	In		0.00182079	1 df	In		0.00239882	1 df	In		2.63058e-07	1 df	In
RiT	3.70338e-07	1 df	In		1.01948e-06	1 df	In		3.80806e-14	1 df	In		8.22009e-13	1 df	In
Fr	0.464510	1 df	In		0.628741	1 df	Out		0.685705	1 df	Out		0.424293	1 df	Out
PMHV * RiT	0.00765395	1 df	In		0.00181808	1 df	In		0.0491679	1 df	In		0.00113529	1 df	In
Fr * PMHV	0.0142526	1 df	In		0.432796	1 df	Out		0.675583	1 df	Out		0.806892	1 df	Out
Fr * RiT	0.542989	1 df	Out		0.695605	1 df	Out		0.161947	1 df	Out		0.213018	1 df	Out
PMHV^2	0.0609053	1 df	In		0.235183	1 df	Out		0.700511	1 df	Out		0.242117	1 df	Out
RiT^2	0.317148	1 df	Out		0.604914	1 df	Out		2.65909e-06	1 df	In		0.000163136	1 df	In
R-Square	0.9394				0.8757				0.9899			0.9855			
Adj R-Square	0.906272				0.849014				0.986738			0.981062			
RMS Error	0.005216805				0.001087718				0.011568139			0.011027157			
Condition No	2.966773233				1.143432726				3.17893093			3.17893093			
Pure Error	0.003089837				0.000547726				0.015734262			0.006473871			
Residual df	11				14				13			13			
Transformation	1/sart(y)				1/sart(y)				Untransformed			Untransformed			

Figure S1. Overview over the terms (left column) and the corresponding responses (top row) of the DoE. Fr is the frequency, other abbreviations as in the main text: photomultiplier high voltage supply (PMHV), rise time (RiT), signal-to-noise ratio of the main peak (S/N Main), signal-to-noise ratio of the first basic peak (S/N Basic), peak-to-valley ratio of the last basic peak (P/V Basic), and peak-to-valley ratio of the first acidic peak (P/V Acidic). For each term/response combination, the significance level, the reduction of the degrees freedom (df) of the regression through the inclusion of the term, and if the term was included for the prediction of a response (In/Out), is provided. In rows 11–15, several statistical parameters of the regression are provided, row 16 indicates the residual degrees freedom (df) and in the last row it is annotated if and how a response has been transformed.

2.2. Validation/Verification Design of Experiments Results

Table S4. Individual results of the runs summarized in Table 1.

Run	S/N Basic	S/N Main	P/V Acidic	P/V Basic
1	714.7	2.396E4	1.425	1.135
2	725.1	2.404E4	1.42	1.142
3	706.7	2.4E4	1.416	1.135
4	701.7	2.413E4	1.421	1.13
5	599.2	2.44E4	1.411	1.121

Table S5. The calculation with outlier included (n=5) for the response S/N Basic.

Response	S/N Basic (n=5)
Mean	689.5
SDV	51.25
95% CI	625.8–753.1
RSD	7.433%
Predicted value	778.4
Absolute deviation experimental value	–88.94
Relative deviation	–11.43%

2.3. Signal-to-Noise Ratio

The following figures provide exemplary electropherograms for all concentration levels.

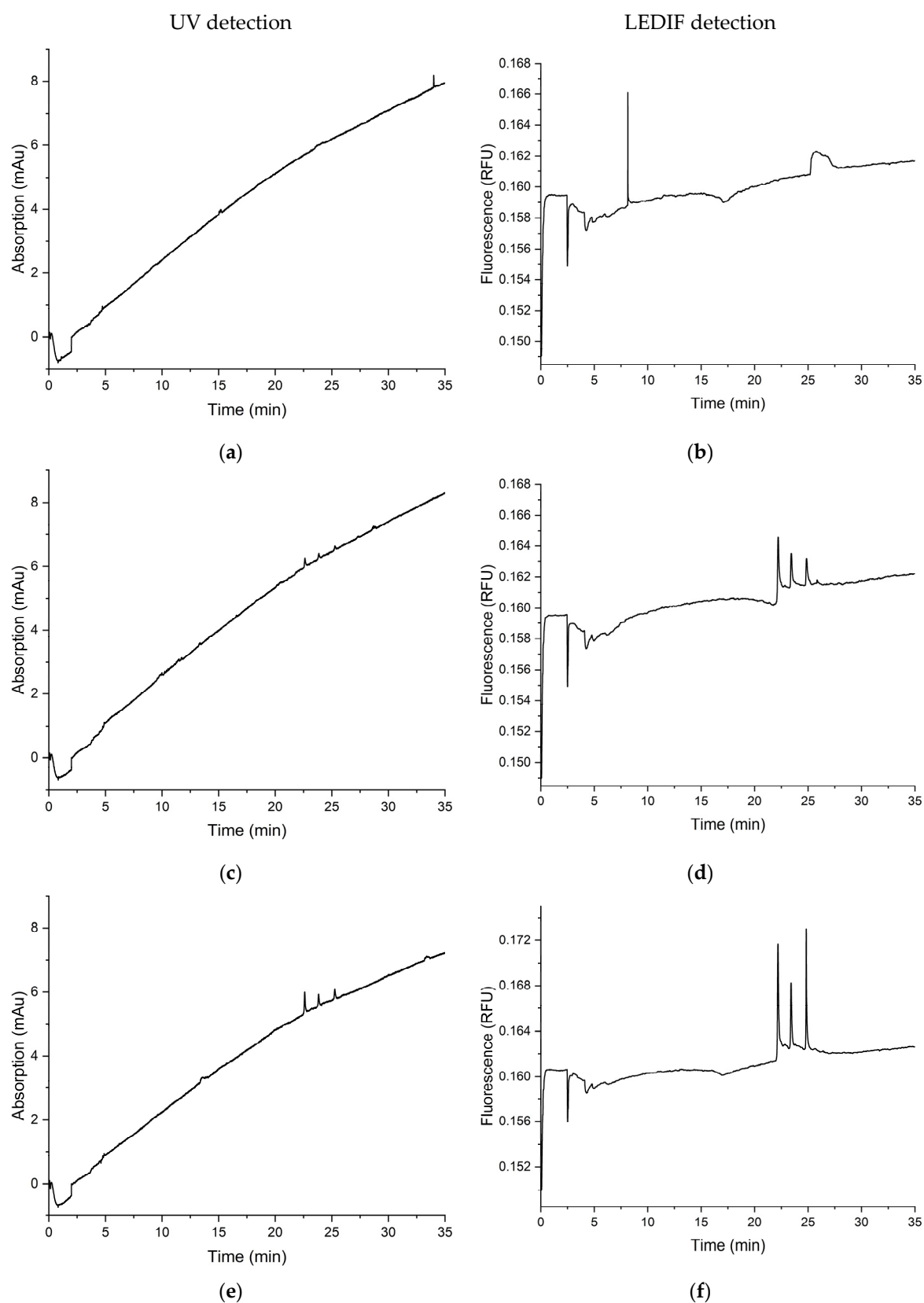


Figure S2. Exemplary electropherograms of matuzumab at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) blank run; (c) and (d) 0.01 mg/mL; (e) and (f) 0.02 mg/mL.

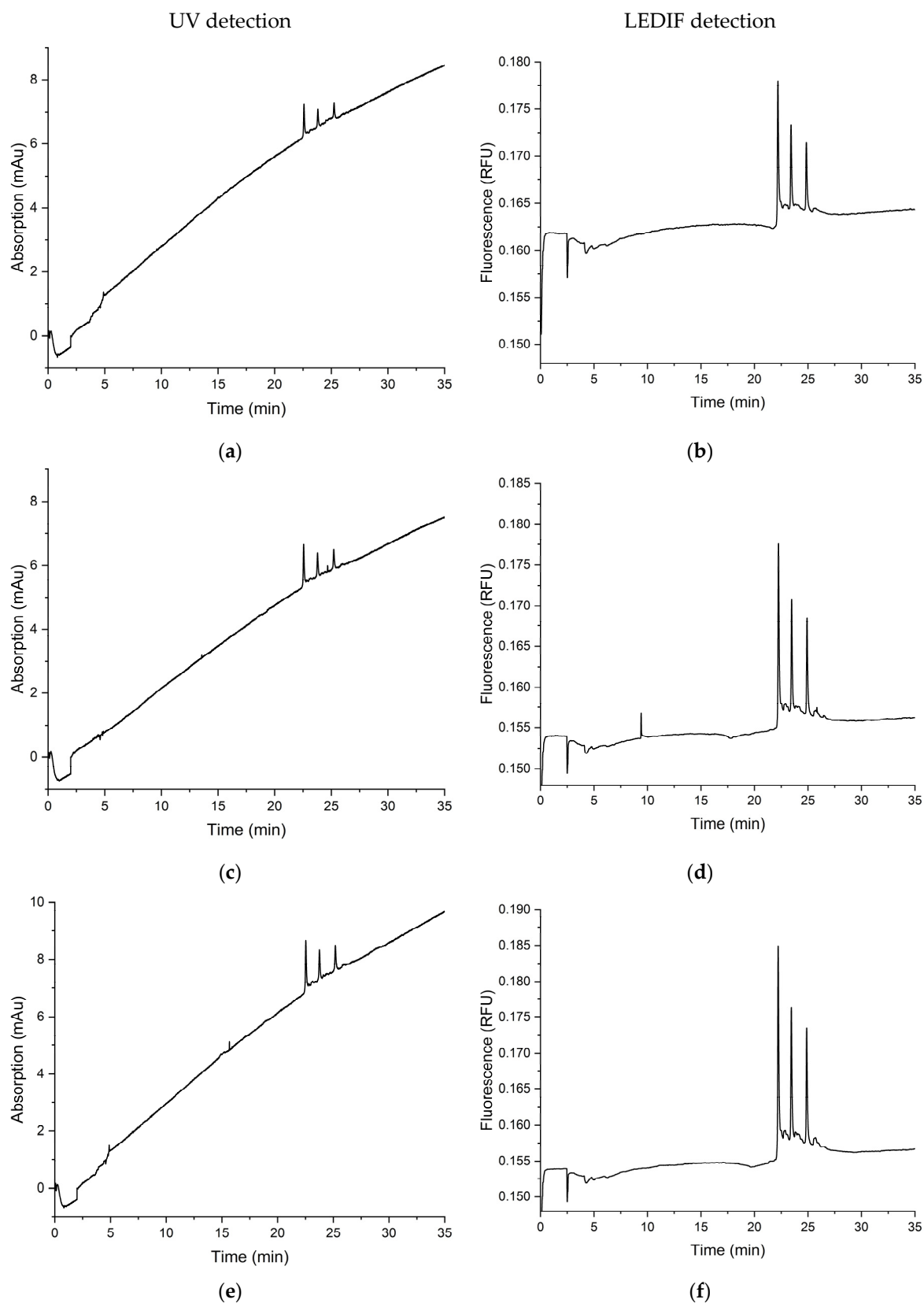


Figure S3. Exemplary electropherograms of matuzumab at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) 0.03 mg/mL; (c) and (d) 0.04 mg/mL; (e) and (f) 0.05 mg/mL.

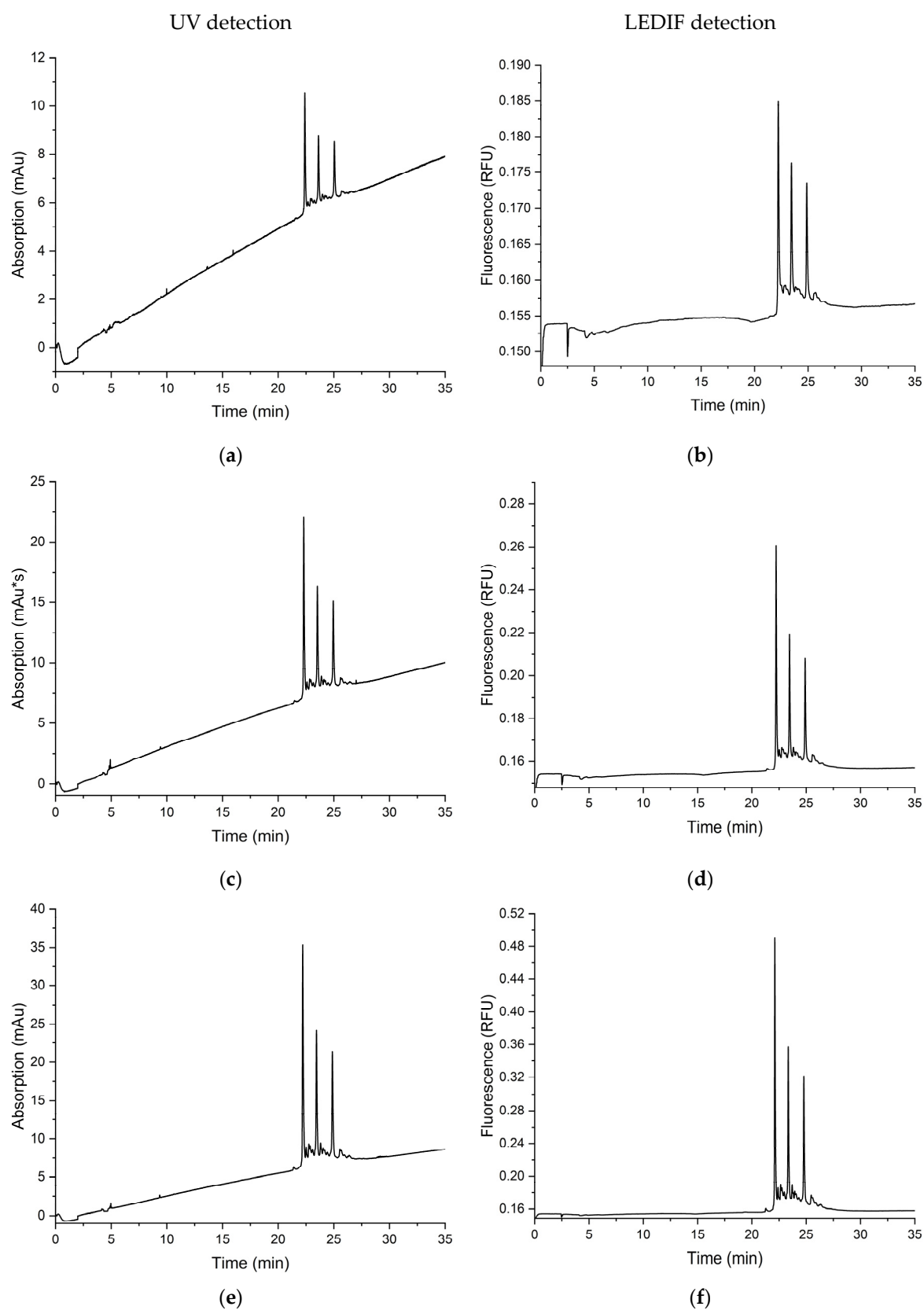


Figure S4. Exemplary electropherograms of matuzumab at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) 0.10 mg/mL; (c) and (d) 0.25 mg/mL; (e) and (f) 0.50 mg/mL.

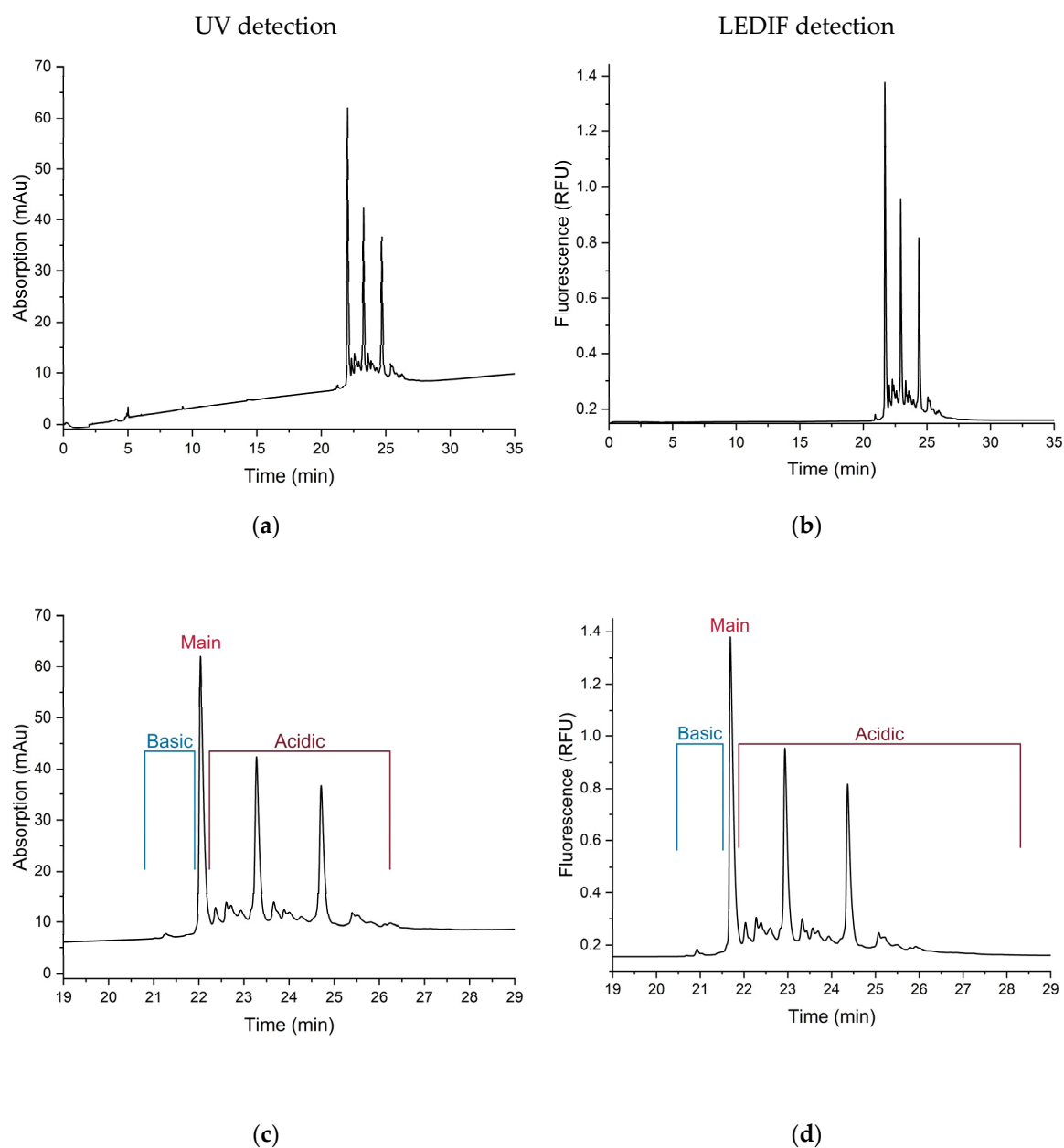


Figure S5. Exemplary electropherograms of matuzumab at a concentration level of 1.00 mg/mL obtained with: (a) and (c) UV detection (left side); (b) and (d) LEDIF detection (right side). The electropherograms in the lower row show a magnified portion of the electropherograms above. Additionally, the main peak and basic/acidic peak group is indicated.

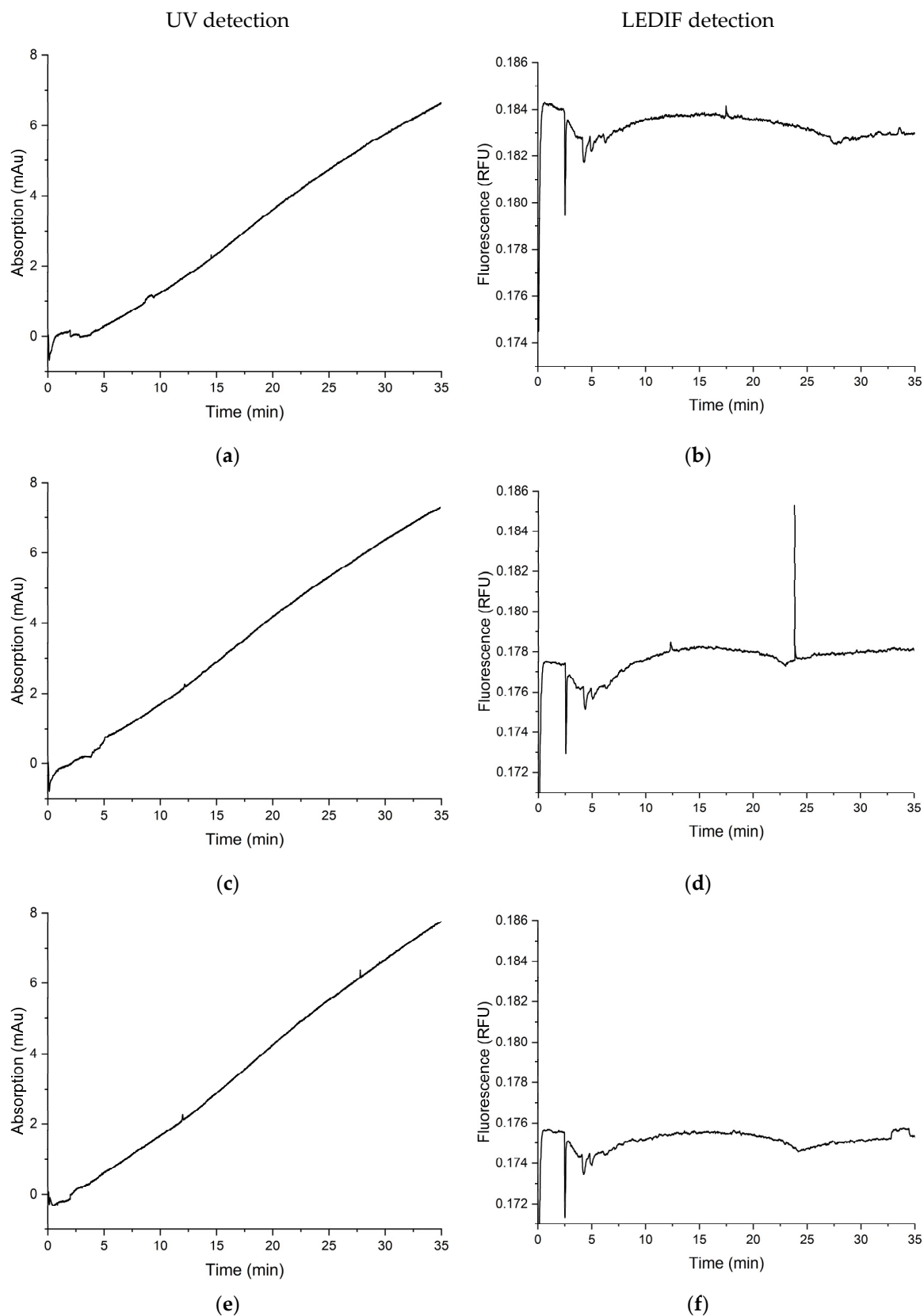


Figure S6. Exemplary electropherograms of NISTmAb at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) blank run; (c) and (d) 0.001 mg/mL; (e) and (f) 0.002 mg/mL.

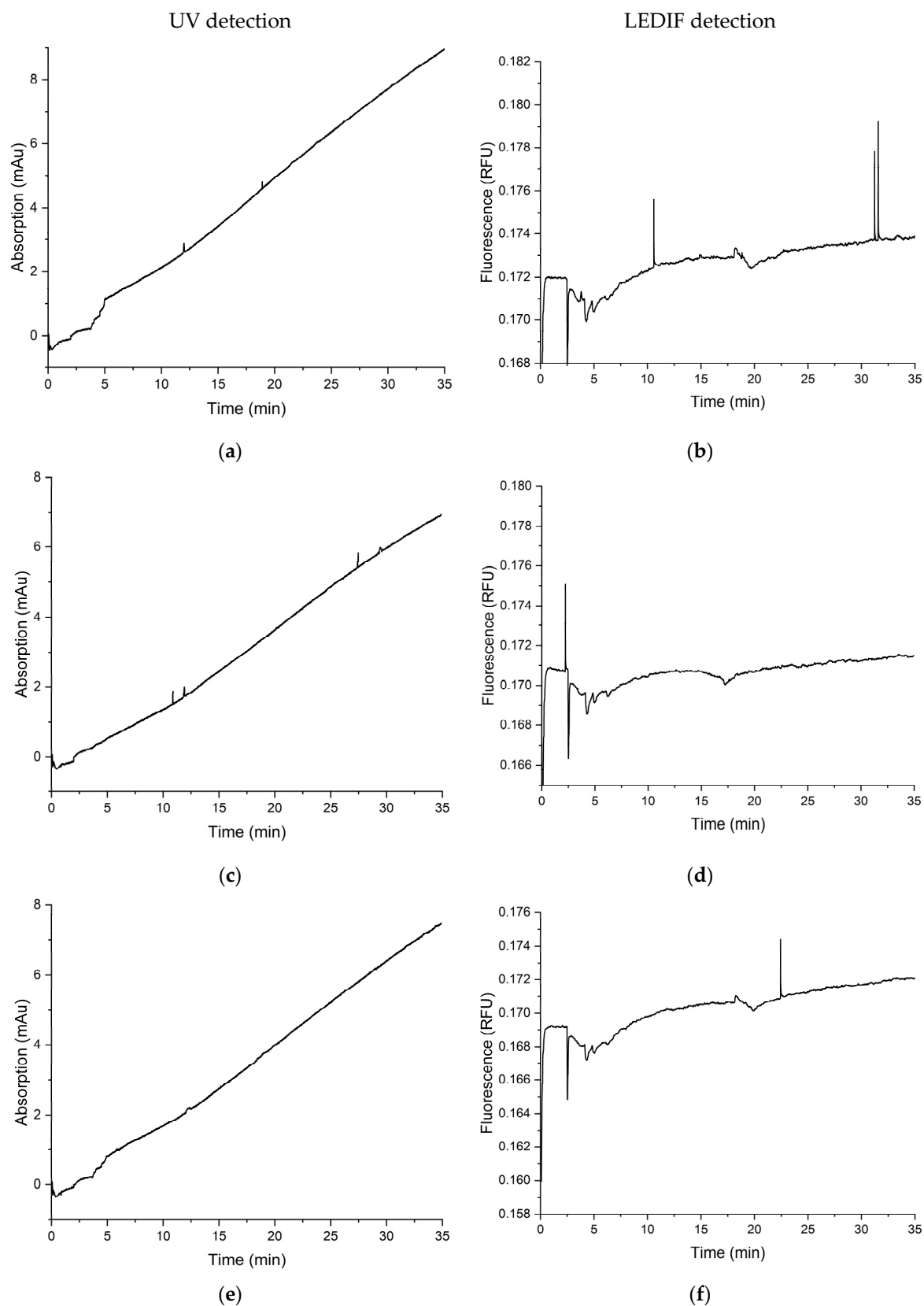


Figure S7. Exemplary electropherograms of NISTmAb at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) 0.003 mg/mL; (c) and (d) 0.004 mg/mL; (e) and (f) 0.005 mg/mL.

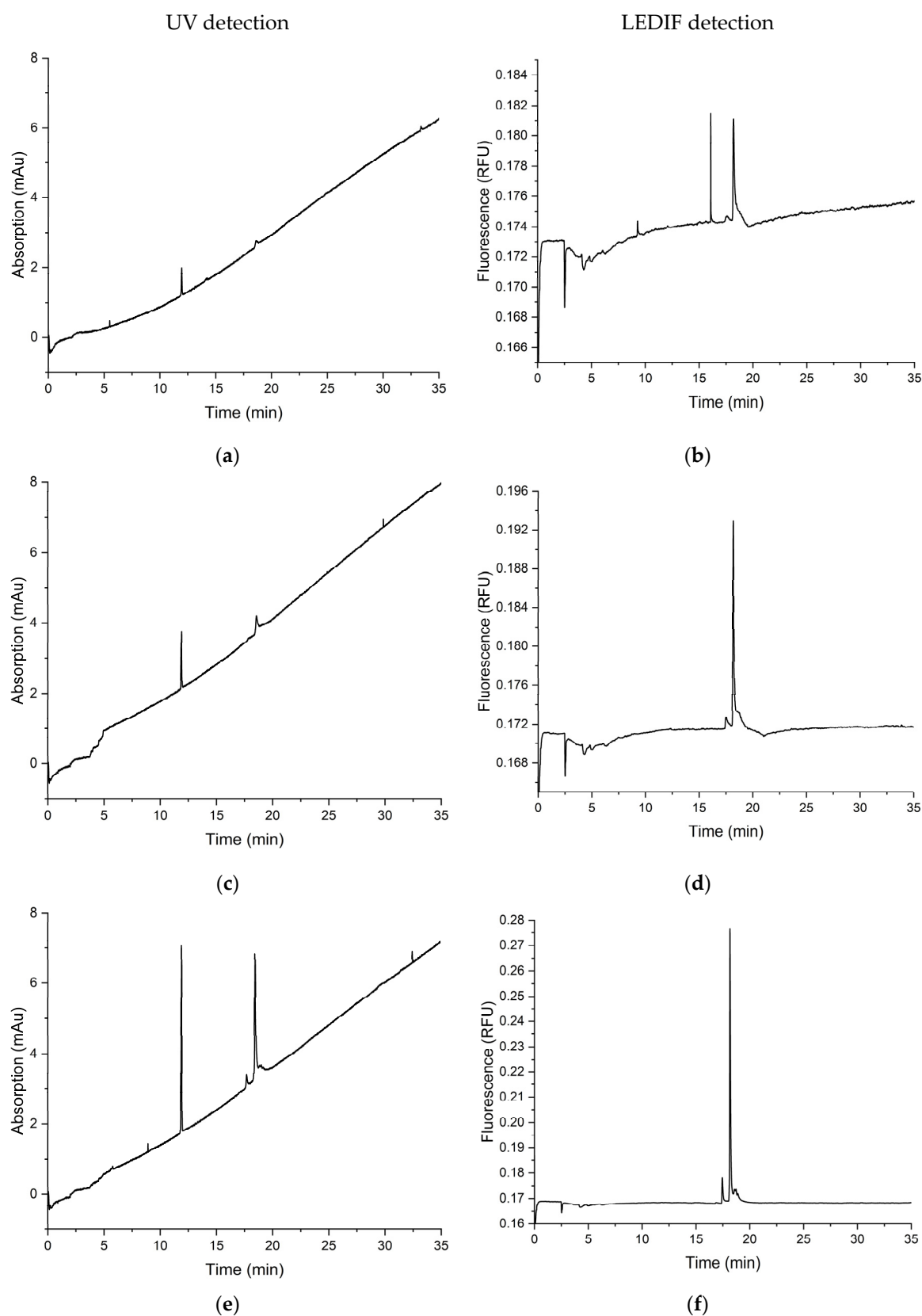


Figure S8. Exemplary electropherograms of NISTmAb at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) 0.01 mg/mL; (c) and (d) 0.02 mg/mL; (e) and (f) 0.05 mg/mL.

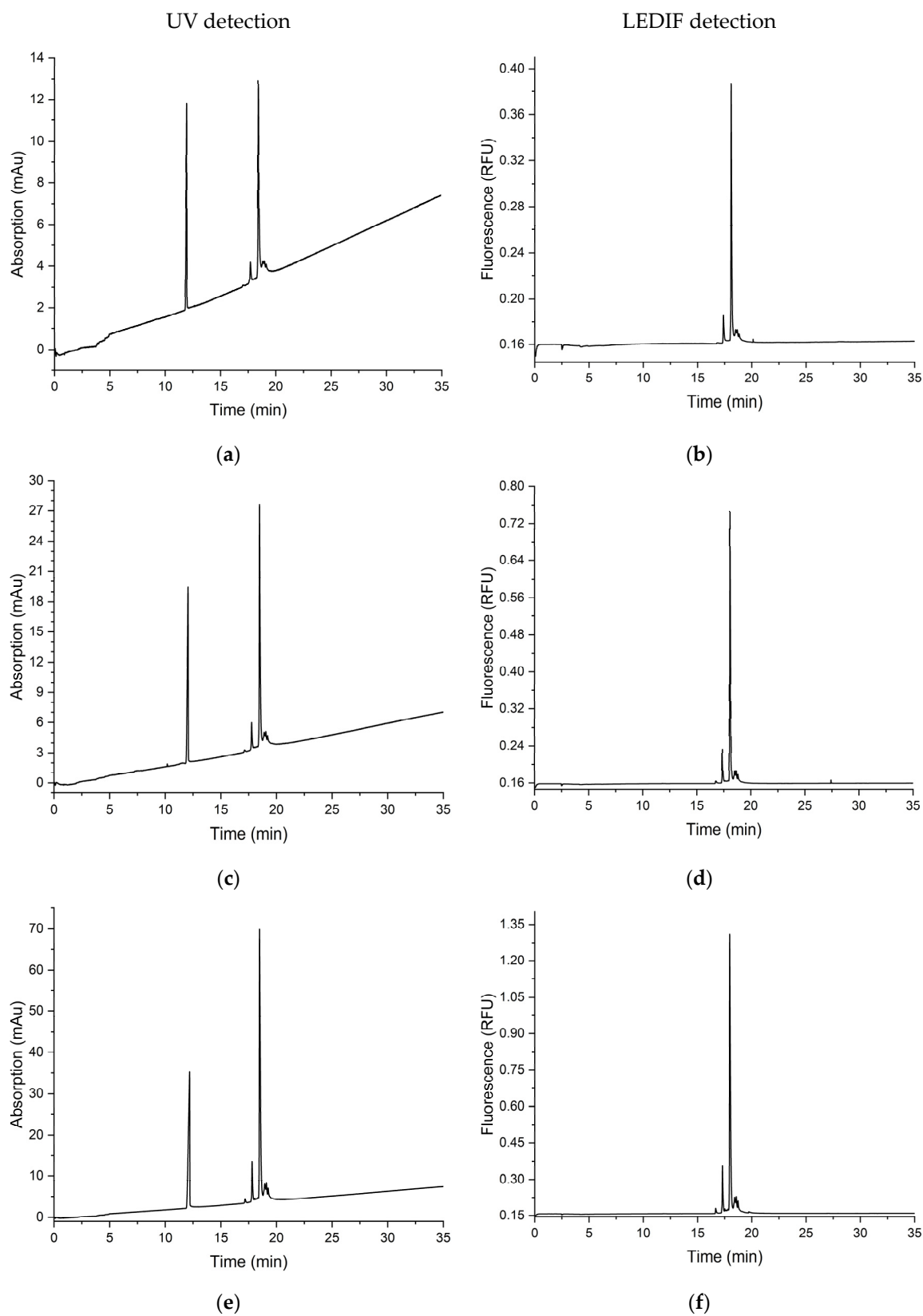


Figure S9. Exemplary electropherograms of NISTmAb at different concentration levels obtained with UV detection (left side) or LEDIF detection (right side): (a) and (b) 0.10 mg/mL; (c) and (d) 0.20 mg/mL; (e) and (f) 0.50 mg/mL.

2.3. Linearity

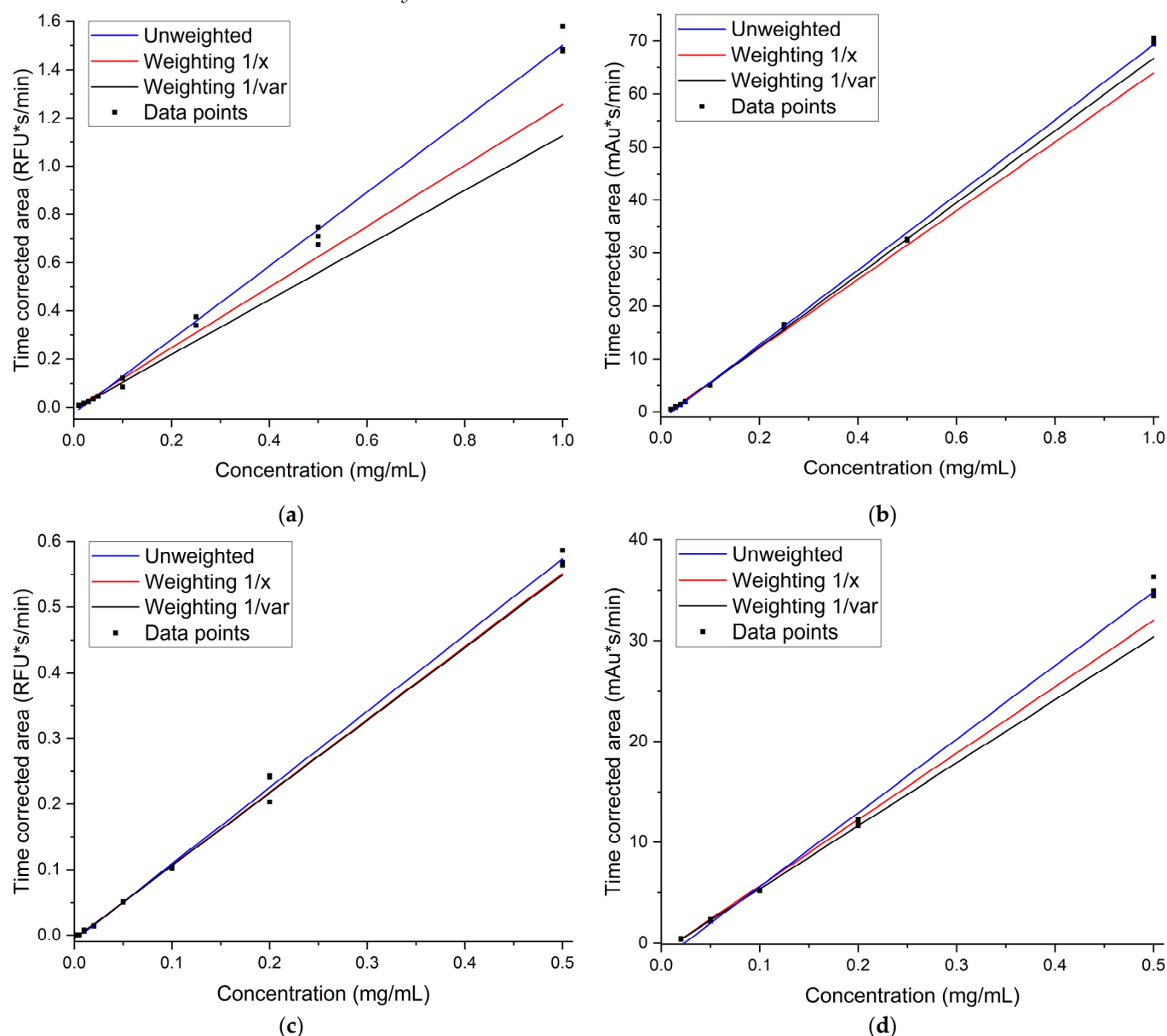
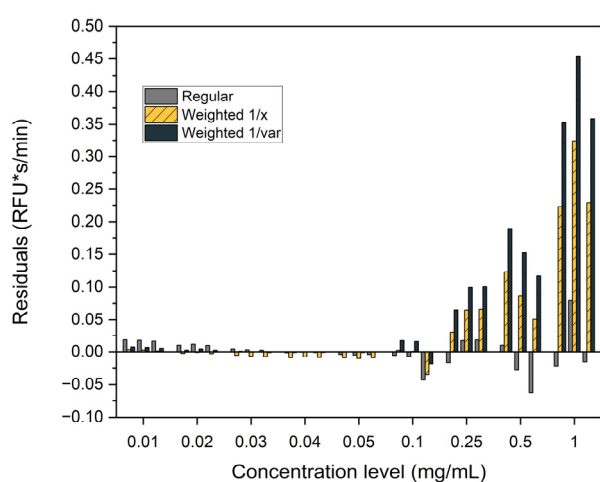
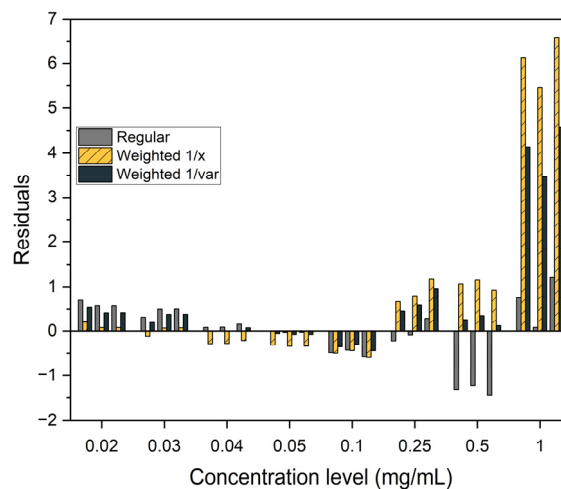


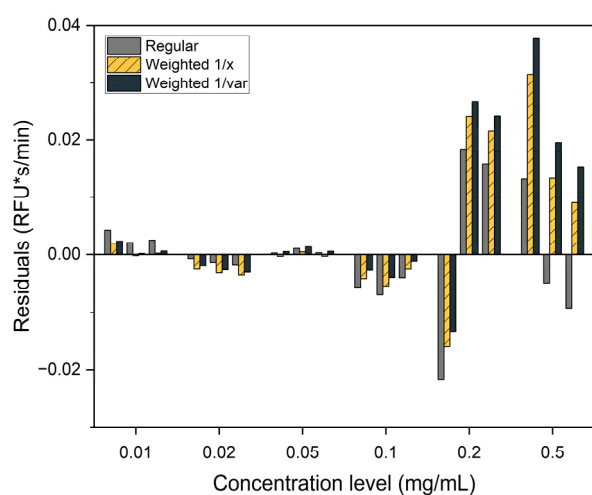
Figure S10. Obtained calibration curves using linear regression without weighting (blue, see Figure 4 for details), with $1/x_i$ as weight (red) and with $1/\text{var}(y_i)$ as weight (black) for: (a) matuzumab with LEDIF detection, linear function of the red curve: $y = 1.261 * x - 0.005659$ $R^2: 0.9605$, linear function of the black curve: $y = 1.134 * x - 0.00852$, $R^2: 0.9097$; (b) matuzumab with UV detection, linear function of the red curve: $y = 64.94 * x - 0.9716$ $R^2: 0.9906$, linear function of the black curve: $y = 68.2 * x - 1.448$, $R^2: 0.9972$; (c) NISTmAb with LEDIF detection, linear function of the red curve: $y = 1.112 * x - 0.004698$ $R^2: 0.9955$, linear function of the black curve: $y = 1.108 * x - 0.004959$, $R^2: 0.9910$; (d) NISTmAb with UV detection, linear function of the red curve: $y = 65.83 * x - 0.9191$ $R^2: 0.9856$, linear function of the black curve: $y = 62.47 * x - 0.8689$, $R^2: 0.9694$.



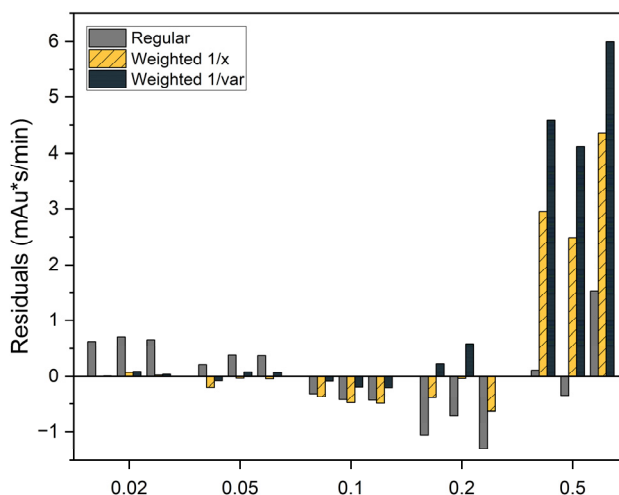
(a)



(b)



(c)



(d)

Figure S11. Residuals determined for three different regression functions of data from (a) matuzumab and LEDIF detection; (b) matuzumab and UV detection; (c) NISTmAb and LEDIF detection; (d) NISTmAb and UV detection. The following coloring scheme is used: unweighted linear regression, grey bar and no pattern; linear regression with weighting of $1/x_i$, yellow bar and diagonal stripes; linear regression with weighting of $1/\text{var}(y_i)$, blue bar and checkered.

2.4. Repeatability

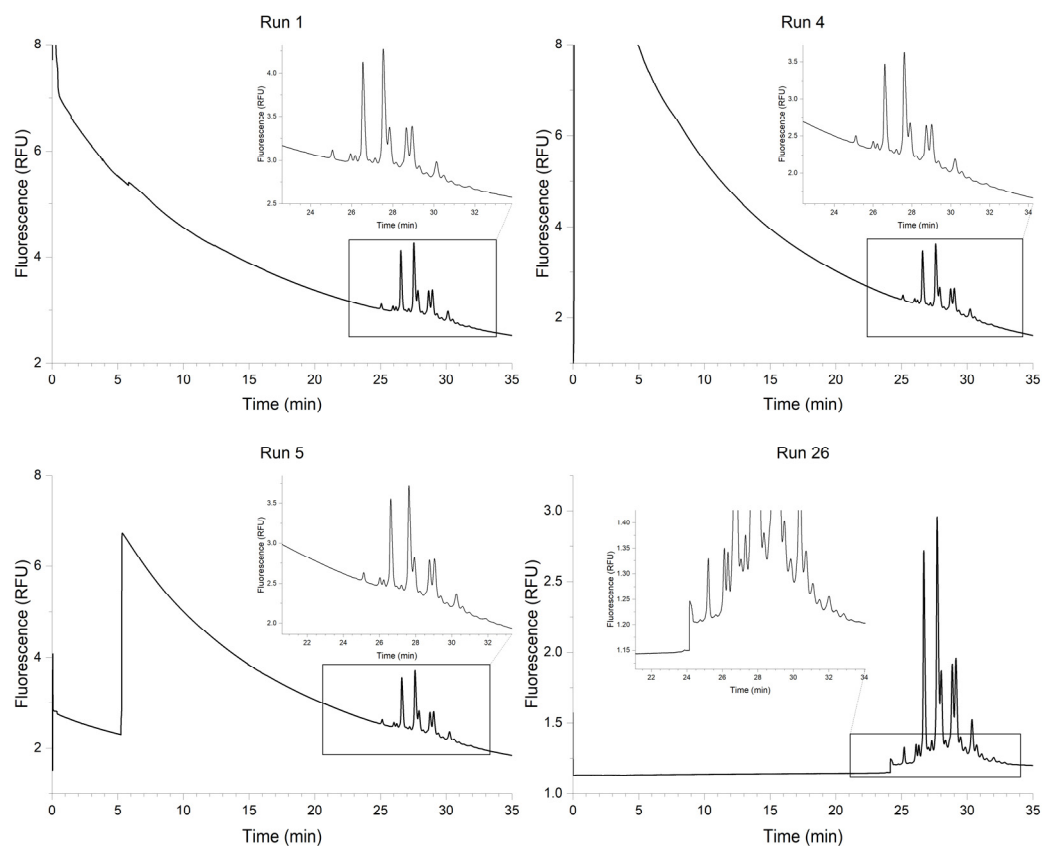


Figure S12. Electropherograms of the four Waters mAb runs which were excluded for the evaluation. In the top right (or left) corner of each electropherogram, the boxed section is magnified. Runs 1, 4, and 5 display an anomalous baseline, run 26 has a sudden increase in fluorescence at approximately 24 min.

Table S6. Obtained values for Waters mAb over different time intervals of the measurement series with both detection modes and all 30 runs included.

Parameter	Time interval	Mean		95% CI		SDV		RSD	
		UV	LEDIF	UV	LEDIF	UV	LEDIF	UV	LEDIF
Migration time	Week 1, day 1	27.86 min	27.65 min	27.78 min - 27.93 min	27.60 min - 27.70 min	0.1025 min	0.07222 min	0.3681%	0.2612%
	Week 1, day 2	27.67 min	27.60 min	27.57 min - 27.77 min	27.53 min - 27.67 min	0.1405 min	0.09533 min	0.5079%	0.3454%
	Week 2	28.44 min	27.67 min	28.38 min - 28.50 min	27.57 min - 27.78 min	0.08552 min	0.1490 min	0.3007%	0.5384%
	Week 1&2	27.99 min	27.64 min	27.86 min - 28.12 min	27.60 min - 27.68 min	0.3509 min	0.1161 min	1.254%	0.3993%
%area basic	Week 1, day 1	7.473%	6.502%	7.215% - 7.732%	5.442% - 7.561%	0.3618%	1.481%	4.841%	22.77%
	Week 1, day 2	7.278%	6.521%	7.152% - 7.404%	6.465% - 6.577%	0.1762%	0.07832%	2.421%	1.201%
	Week 2	7.296%	6.741%	7.143% - 7.450%	5.549% - 7.934%	0.2146%	1.667%	2.941%	24.73%
	Week 1&2	7.349%	6.588%	7.249% - 7.450%	6.122% - 7.054%	0.2694%	1.248%	3.666%	18.94%
%area main 1	Week 1, day 1	18.26%	17.91%	18.20% - 18.32%	16.81% - 19.01%	0.08628%	1.539%	0.4726%	8.596%
	Week 1, day 2	18.25%	17.78%	18.19% - 18.32%	17.75% - 17.82%	0.09175%	0.04757%	0.5026%	0.2676%
	Week 2	17.96%	17.34%	17.86% - 18.05%	17.00% - 17.68%	0.1334%	0.4748%	0.7427%	2.738%
	Week 1&2	18.16%	17.68%	18.09% - 18.22%	17.33% - 18.02%	0.1762%	0.9317%	0.9702%	5.271%
%area mid	Week 1, day 1	3.615%	3.780%	3.591% - 3.639%	3.501% - 4.060%	0.03346%	0.3907%	0.9254%	10.34%
	Week 1, day 2	3.559%	3.945%	3.542% - 3.575%	3.903% - 3.987%	0.02317%	0.05898%	0.6510%	1.495%
	Week 2	3.602%	4.027%	3.576% - 3.628%	3.964% - 4.089%	0.03644%	0.08794%	1.012%	2.184%
	Week 1&2	3.592%	3.917%	3.577% - 3.607%	3.825% - 4.010%	0.03918%	0.2484%	1.091%	6.341%
%area main 2	Week 1, day 1	22.61%	23.26%	22.52% - 22.71%	21.92% - 24.60%	0.1363%	1.874%	0.6027%	8.055%
	Week 1, day 2	22.77%	21.84%	22.66% - 22.88%	21.74% - 21.95%	0.1509%	0.04445%	0.6626%	0.6435%
	Week 2	22.45%	21.49%	22.33% - 22.57%	21.01% - 21.97%	0.1644%	0.6752%	0.7323%	3.142%
	Week 1&2	22.61%	22.20%	22.54% - 22.68%	21.69% - 22.71%	0.1972%	1.358%	0.8722%	6.116%
%area acidic	Week 1, day 1	48.04%	48.55%	47.89% - 48.18%	47.42% - 49.67%	0.2054%	1.571%	0.4277%	3.236%
	Week 1, day 2	48.14%	49.91%	47.96% - 48.31%	49.85% - 49.96%	0.2443%	0.07524%	0.5075%	0.1508%
	Week 2	48.67%	50.40%	48.52% - 48.82%	49.94% - 50.87%	0.2116%	0.6488%	0.4347%	1.287%
	Week 1&2	48.28%	49.62%	48.15% - 48.41%	49.16% - 50.08%*	0.3526%	1.239%	0.7303%	2.497%
P/V acidic	Week 1, day 1	1.784	2.160	1.754 - 1.814	2.068 - 2.252	0.04204	0.1286	2.356%	5.953%
	Week 1, day 2	1.746	2.115	1.717 - 1.775	2.072 - 2.158	0.04083	0.06051	2.338%	2.861%
	Week 2	1.907	2.142	1.880 - 1.933	2.082 - 2.203	0.03727	0.08414	1.955%	3.927%
	Week 1&2	1.812	2.139	1.783 - 1.842	2.104 - 2.174	0.07970	0.09391	4.397%	4.390%

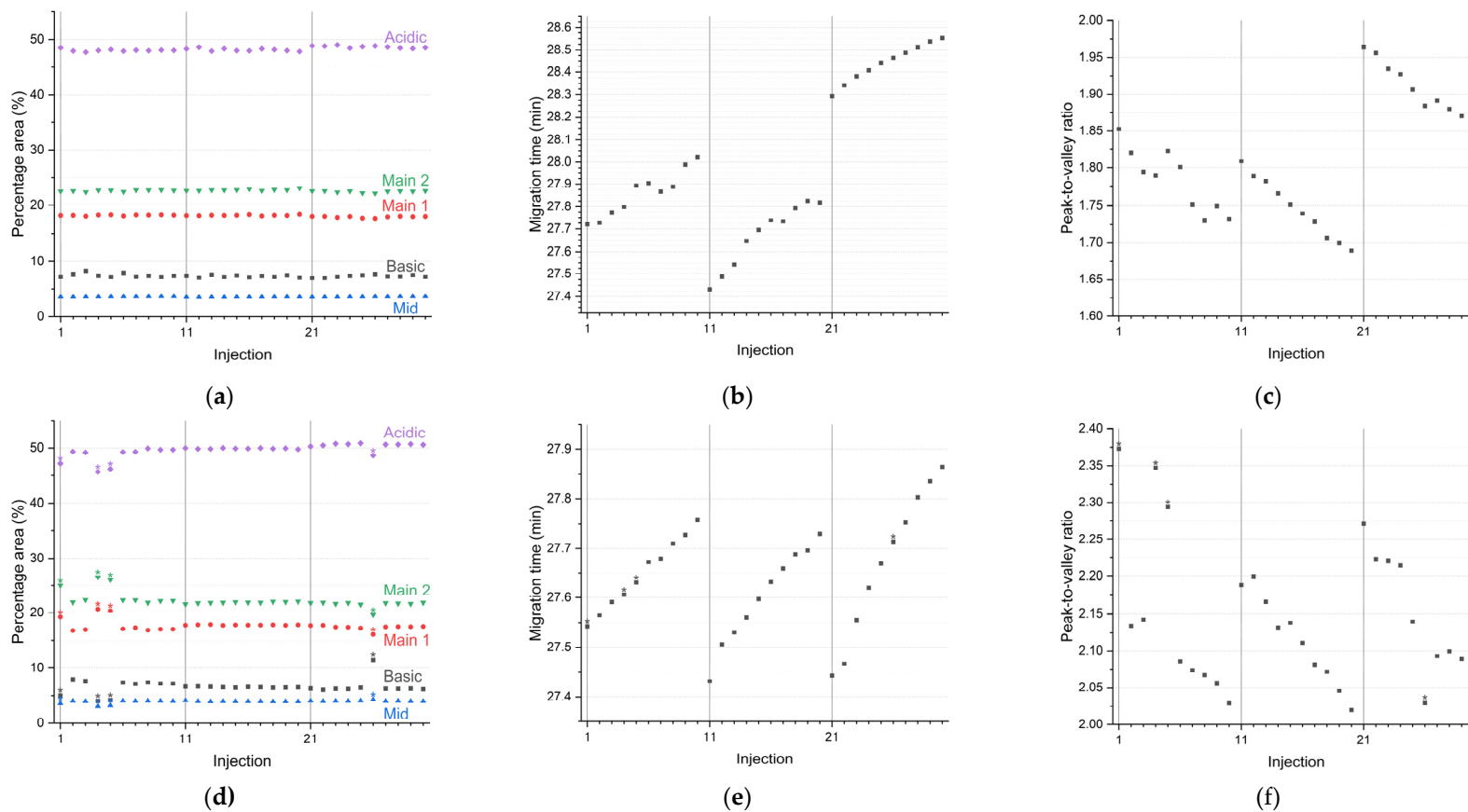


Figure S13. Course of the individual measured values over the injection series for Waters mAb. Vertical black line indicates the start of the new measurement day. Data points marked with an asterisk were excluded for the evaluation presented in REFTABLE. Top row UV detection: (a) %areas for the five peak groups; (b) migration time of the “main 2” peak; (c) P/V of the selected acidic peak; bottom row LEDIF detection: (d) %areas for the five peak groups; (e) migration time of the “main 2” peak; (f) P/V of the selected acidic peak.

Table S7. Individual determined values for each injection of Waters mAb with both detection modes over the course of the measurement series.

Injection	UV detection							LEDIF detection						
	%Area basic [%]	%Area main 1 [%]	%Area mid [%]	%Area main 2 [%]	%Area acidic [%]	Migration time [min]	P/V acidic	%Area basic [%]	%Area main 1 [%]	%Area mid [%]	%Area main 2 [%]	%Area acidic [%]	Migration time [min]	P/V acidic
1	7.202	18.23	3.570	22.50	48.49	27.72	1.853	5.040	19.19	3.547	25.04	47.19	27.54	2.373
2	7.684	18.25	3.563	22.57	47.94	27.73	1.820	7.948	16.77	4.021	21.91	49.36	27.57	2.133
3	8.251	18.09	3.591	22.37	47.69	27.77	1.794	7.626	16.92	3.961	22.32	49.18	27.59	2.142
4	7.386	18.31	3.602	22.69	48.01	27.80	1.790	4.038	20.66	3.012	26.61	45.68	27.61	2.347
5	7.183	18.34	3.610	22.68	48.18	27.89	1.823	4.177	20.34	3.181	26.09	46.21	27.63	2.294
6	7.903	18.13	3.631	22.44	47.90	27.90	1.801	7.348	17.07	4.047	22.28	49.26	27.67	2.085
7	7.219	18.33	3.634	22.75	48.07	27.87	1.752	7.112	17.30	4.005	22.28	49.31	27.68	2.074
8	7.367	18.30	3.643	22.72	47.97	27.89	1.730	7.372	16.84	4.034	21.83	49.93	27.71	2.067
9	7.170	18.33	3.651	22.76	48.09	27.99	1.750	7.174	17.00	4.012	22.12	49.70	27.73	2.056
10	7.368	18.28	3.658	22.67	48.03	28.02	1.731	7.183	17.00	3.983	22.15	49.69	27.76	2.030
11	7.368	18.20	3.535	22.62	48.28	27.43	1.809	6.612	17.75	4.106	21.54	49.99	27.43	2.188
12	7.060	18.18	3.521	22.64	48.59	27.49	1.789	6.648	17.82	3.948	21.74	49.85	27.51	2.199
13	7.562	18.26	3.549	22.74	47.89	27.54	1.782	6.587	17.87	3.902	21.79	49.85	27.53	2.167
14	7.170	18.23	3.539	22.72	48.34	27.65	1.767	6.511	17.71	3.948	21.82	50.01	27.56	2.131
15	7.431	18.26	3.563	22.76	47.99	27.70	1.752	6.433	17.79	3.936	21.92	49.91	27.60	2.138
16	7.136	18.39	3.562	22.95	47.96	27.74	1.739	6.559	17.77	3.933	21.85	49.89	27.63	2.110
17	7.344	18.13	3.563	22.63	48.33	27.73	1.728	6.502	17.75	3.939	21.82	49.99	27.66	2.081
18	7.197	18.26	3.574	22.80	48.17	27.79	1.706	6.417	17.81	3.912	21.99	49.87	27.69	2.072
19	7.450	18.21	3.599	22.74	48.00	27.83	1.700	6.448	17.73	3.927	21.95	49.95	27.7	2.046
20	7.061	18.44	3.581	23.10	47.83	27.82	1.689	6.495	17.81	3.902	22.02	49.77	27.73	2.020
21	7.001	18.05	3.542	22.55	48.85	28.29	1.964	6.268	17.68	4.030	21.76	50.26	27.44	2.271
22	7.006	18.06	3.559	22.57	48.81	28.34	1.956	6.017	17.73	3.965	21.83	50.45	27.47	2.223
23	7.206	17.88	3.569	22.35	49.00	28.38	1.935	6.221	17.41	4.009	21.61	50.75	27.56	2.221
24	7.371	18.04	3.592	22.54	48.45	28.41	1.927	6.178	17.37	3.998	21.78	50.68	27.62	2.215
25	7.459	17.75	3.592	22.20	48.72	28.44	1.907	6.411	17.21	4.065	21.48	50.83	27.67	2.140
26	7.688	17.71	3.632	22.13	48.84	28.46	1.884	11.48	16.05	4.260	19.59	48.61	27.71	2.030
27	7.269	17.98	3.616	22.49	48.65	28.49	1.891	6.225	17.44	3.983	21.74	50.61	27.75	2.093
28	7.261	18.07	3.636	22.56	48.47	28.51	1.880	6.219	17.48	4.014	21.67	50.61	27.80	2.100
29	7.495	18.01	3.639	22.50	48.36	28.54	1.870	6.261	17.47	3.977	21.61	50.68	27.84	2.089

30 7.206 18.04 3.643 22.59 48.53 28.55 1.854 6.136 17.52 3.964 21.82 50.56 27.86 2.045

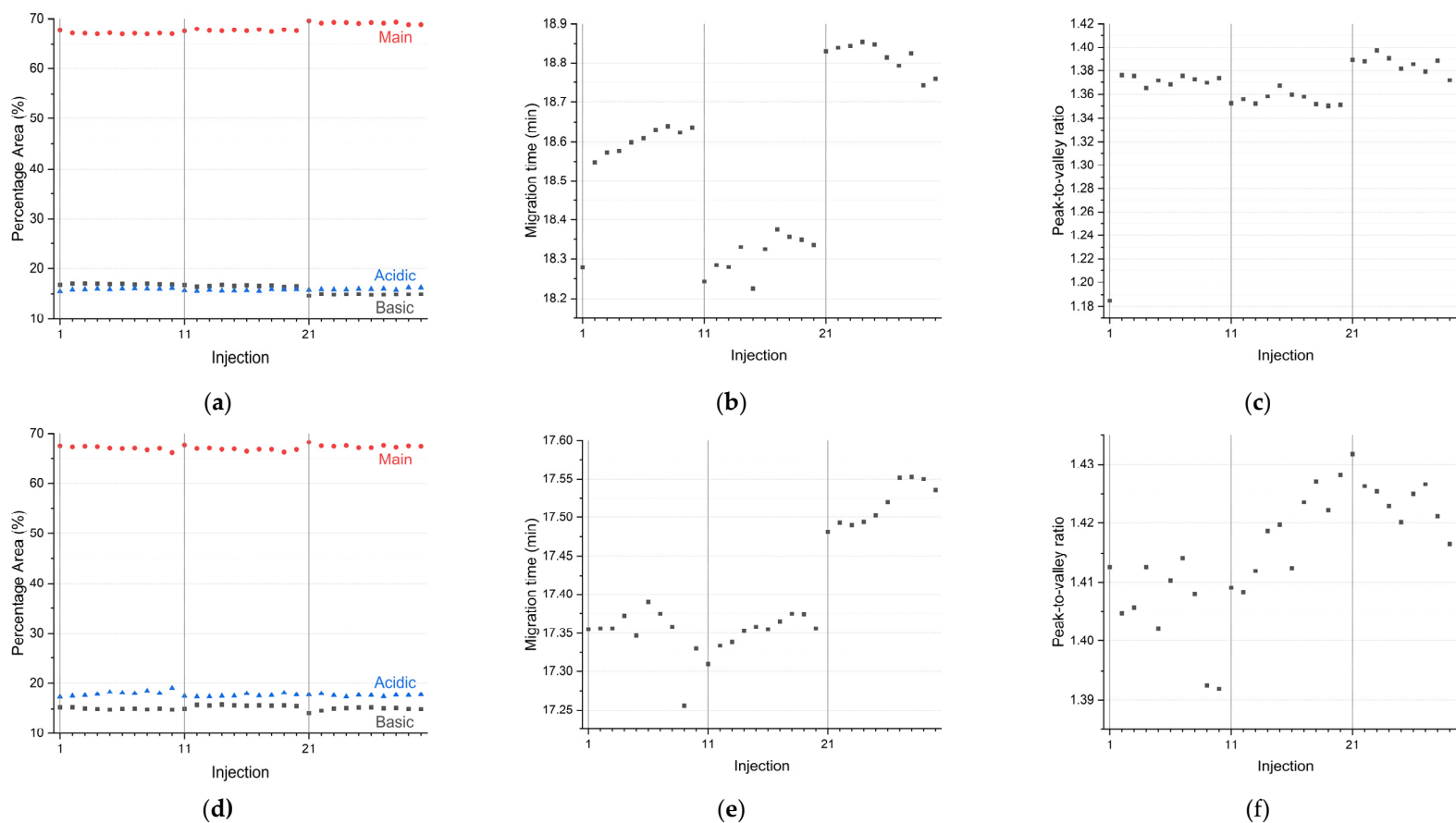


Figure S14. Course of the individual measured values over the injection series for NISTmAb. Vertical black line indicates the start of the new measurement day. Top row UV detection: (a) %areas for the five peak groups; (b) migration time of the “main 2” peak; (c) P/V of the selected acidic peak; bottom row LEDIF detection: (d) %areas for the five peak groups; (e) migration time of the “main 2” peak; (f) P/V of the selected acidic peak.

Table S8. Individual determined values for each injection of NISTmAb with both detection modes over the course of the measurement series.

Injection	UV detection					LEDIF detection				
	%Area basic [%]	%Area main [%]	%Area acidic [%]	Migration time [min]	P/V acidic	%Area basic [%]	%Area main [%]	%Area acidic [%]	Migration time [min]	P/V acidic
1	16.75	67.77	15.48	18.28	1.185	15.31	67.43	17.25	17.36	1.413
2	16.99	67.20	15.81	18.55	1.376	15.33	67.25	17.42	17.36	1.405
3	17.01	67.14	15.85	18.57	1.376	15.07	67.37	17.56	17.36	1.406
4	16.98	67.03	15.99	18.58	1.365	14.93	67.28	17.80	17.37	1.413
5	16.89	67.24	15.87	18.60	1.372	14.78	67.00	18.21	17.35	1.402
6	16.97	67.01	16.02	18.61	1.368	15.00	66.93	18.07	17.39	1.410
7	16.81	67.13	16.06	18.63	1.376	15.04	67.02	17.94	17.38	1.414
8	16.98	67.02	16.01	18.64	1.373	14.83	66.69	18.48	17.36	1.408
9	16.86	67.18	15.96	18.62	1.370	15.04	66.98	17.97	17.26	1.393
10	16.83	67.04	16.13	18.64	1.374	14.80	66.14	19.06	17.33	1.392
11	16.70	67.61	15.69	18.24	1.352	14.99	67.61	17.40	17.31	1.409
12	16.40	68.05	15.55	18.28	1.356	15.76	66.95	17.29	17.33	1.408
13	16.52	67.70	15.78	18.28	1.352	15.66	67.03	17.31	17.34	1.412
14	16.74	67.64	15.62	18.33	1.358	15.82	66.78	17.40	17.35	1.419
15	16.55	67.82	15.63	18.22	1.367	15.69	66.87	17.44	17.36	1.420
16	16.67	67.65	15.69	18.33	1.360	15.63	66.44	17.93	17.36	1.412
17	16.53	67.91	15.56	18.38	1.358	15.70	66.81	17.49	17.37	1.424
18	16.61	67.48	15.90	18.36	1.352	15.64	66.79	17.57	17.38	1.427
19	16.32	67.86	15.82	18.35	1.350	15.69	66.24	18.06	17.37	1.422
20	16.45	67.66	15.89	18.34	1.351	15.56	66.75	17.69	17.36	1.428
21	14.58	69.66	15.76	18.83	1.390	14.07	68.24	17.69	17.48	1.432
22	14.91	69.22	15.87	18.84	1.388	14.60	67.48	17.91	17.49	1.426
23	14.79	69.38	15.83	18.84	1.397	15.06	67.38	17.56	17.49	1.425
24	14.84	69.34	15.82	18.85	1.391	15.17	67.55	17.28	17.49	1.423
25	14.88	69.16	15.96	18.85	1.382	15.27	67.10	17.63	17.50	1.420
26	14.76	69.33	15.91	18.81	1.386	15.31	67.09	17.60	17.52	1.425
27	14.79	69.21	16.00	18.79	1.379	15.12	67.55	17.32	17.55	1.427
28	14.82	69.43	15.76	18.82	1.389	15.20	67.18	17.62	17.55	1.421
29	14.84	68.92	16.24	18.74	1.372	14.98	67.43	17.59	17.55	1.417
30	14.86	68.94	16.19	18.76	1.375	14.91	67.37	17.71	17.54	1.421

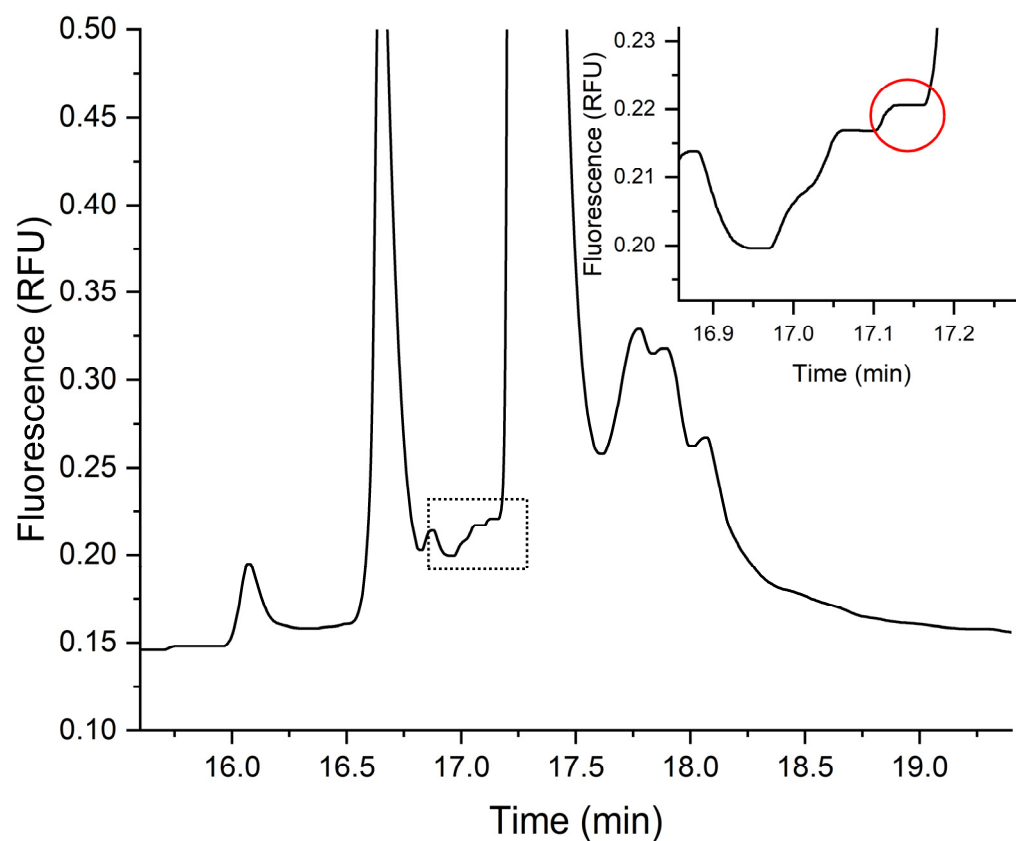


Figure S15. Electropherogram of NISTmAb obtained with 460 V PMHV and 1 s RiT, frequency 20 Hz. The dotted section is magnified in the top right corner. The red circle indicates the last basic peak, a distinction between peak and valley is not possible.