



File Properties

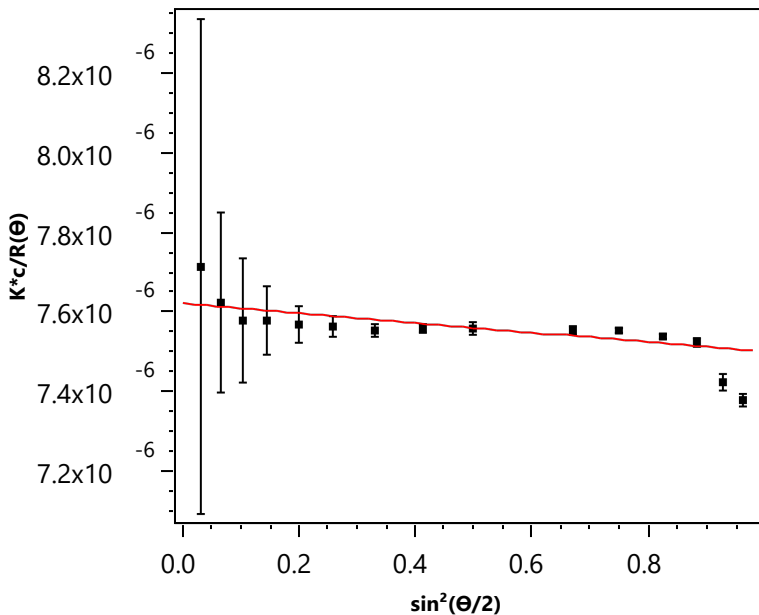
File Name: D:\GoogleDrive\LBNL\SIBYLS\_Group\MALS and DLS Data\Sequences\Covid\_poly1[071520\_Covid3].afe7  
 Created: July 15, 2020 22:16:35.720

Sample: Covid\_poly1

dn/dc: 0.1750 mL/g

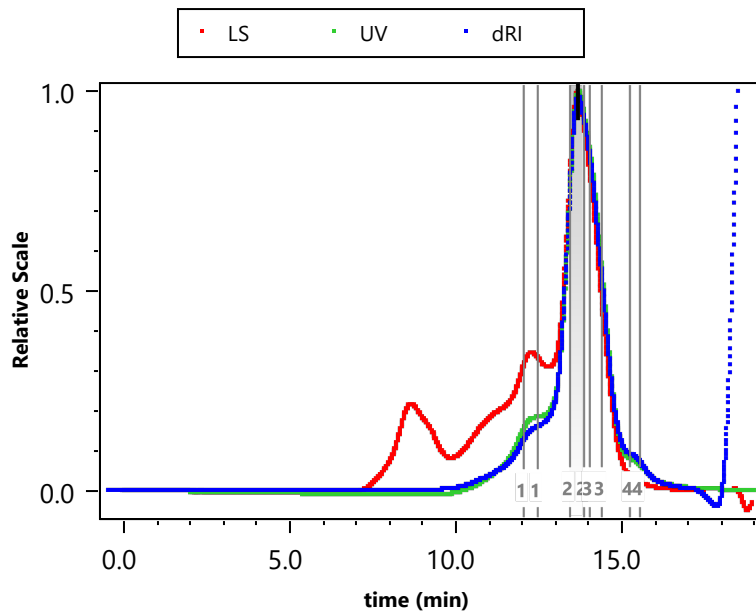
Concentration: 2.000 mg/mL

results graph



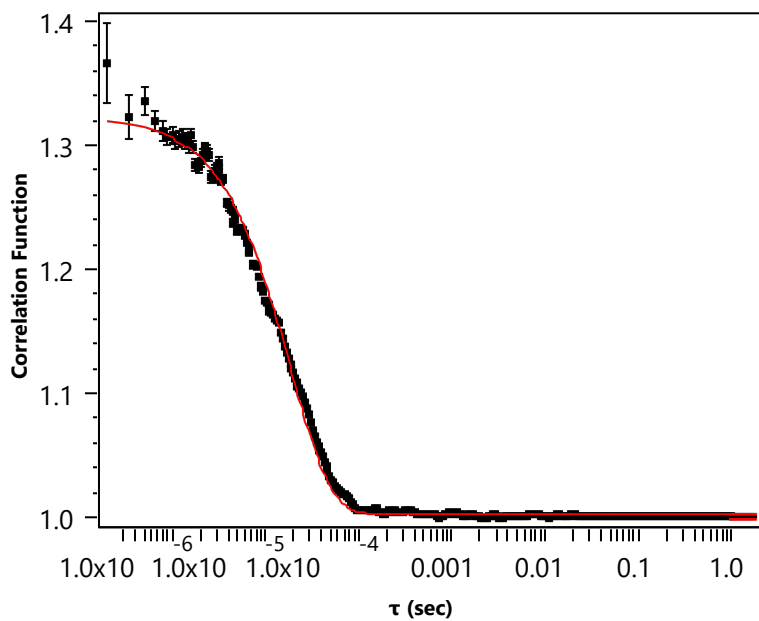
Fit  $R^2=0.5540$

control graph



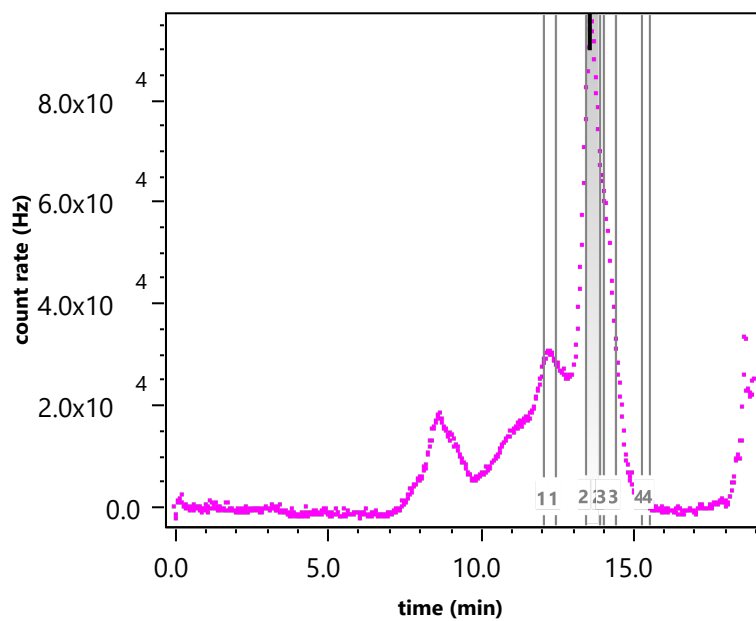
Index = 13.694 min

Correlation Function



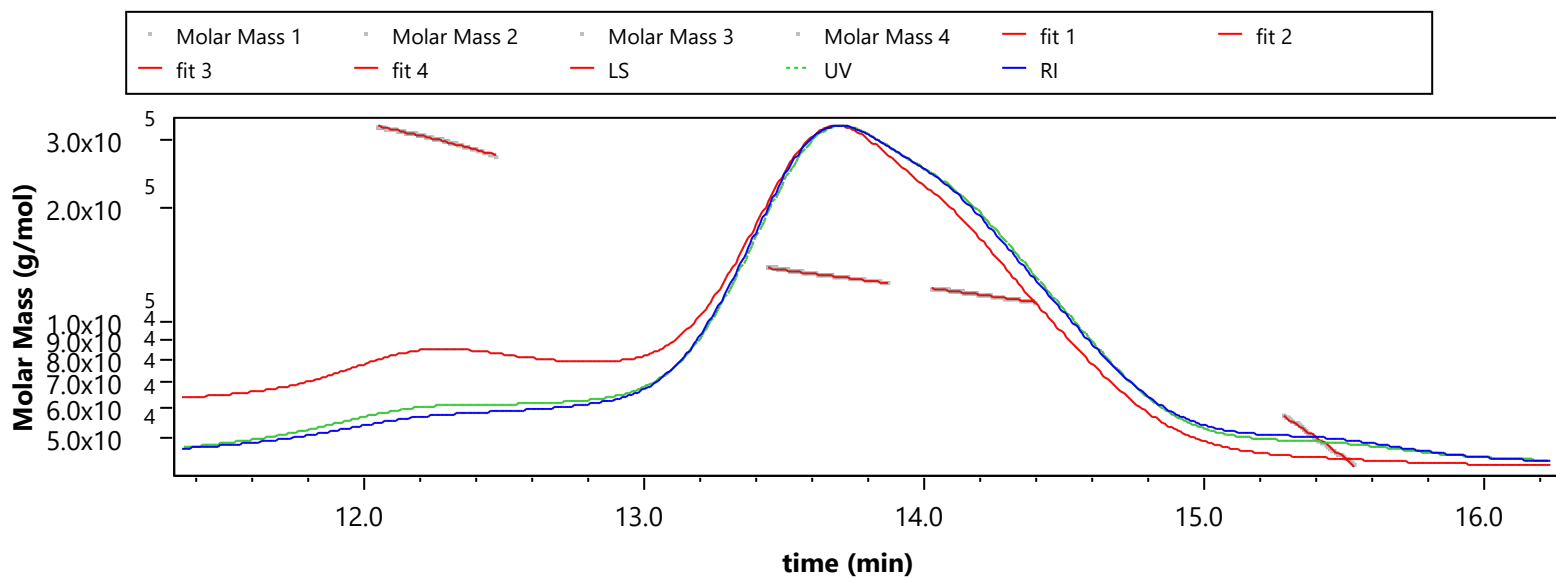
Fit  $R^2=0.9911$

control graph



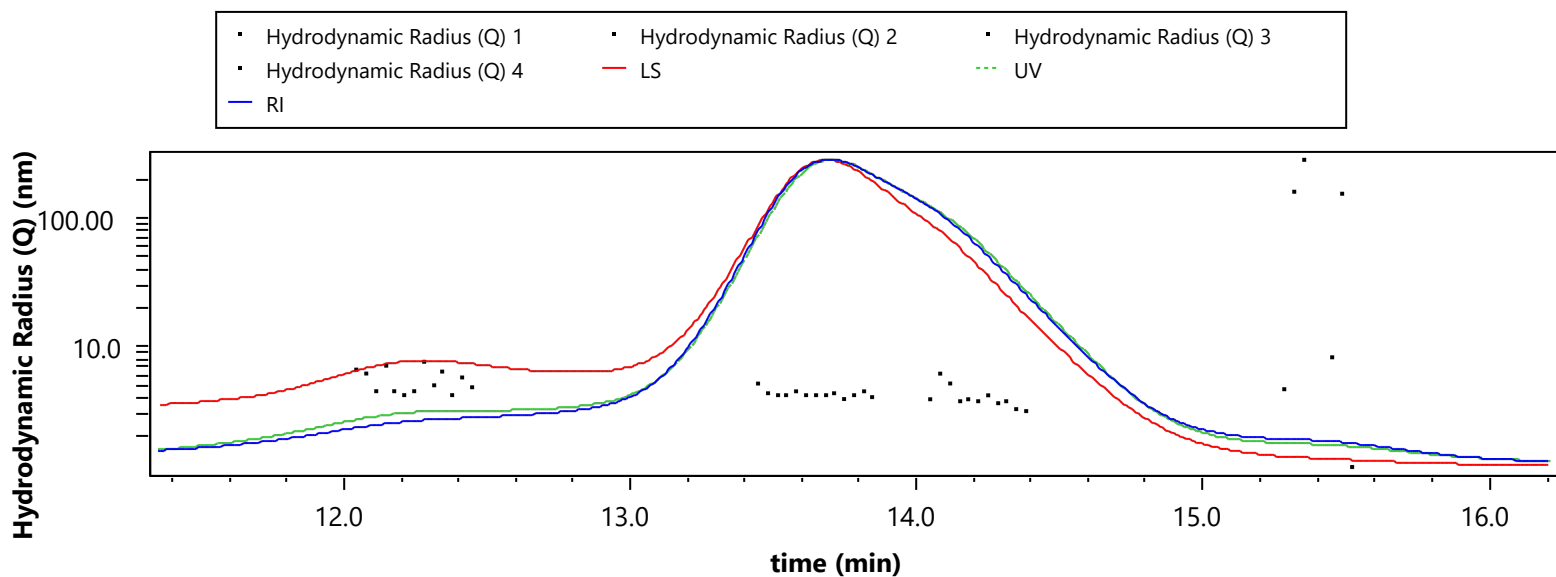
Index = 13.582 min

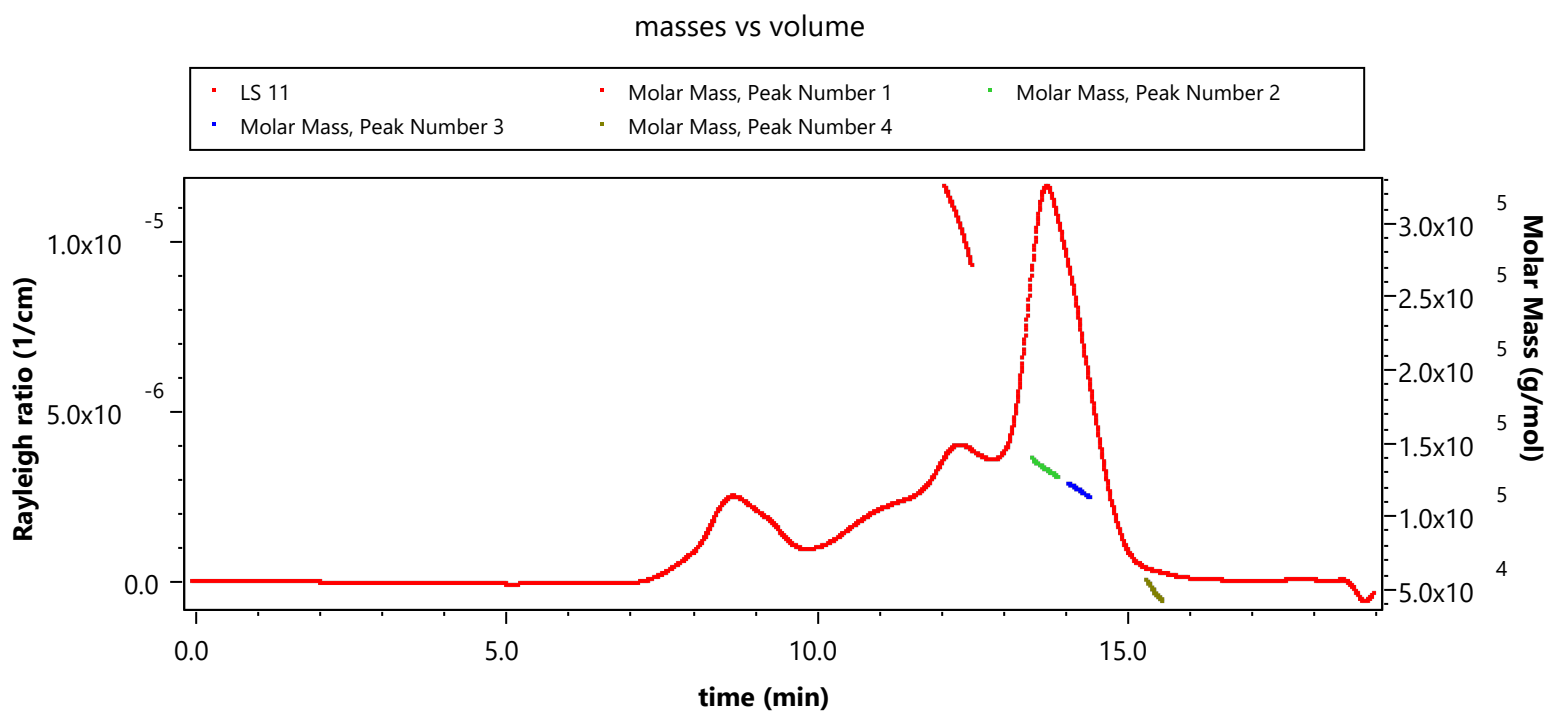
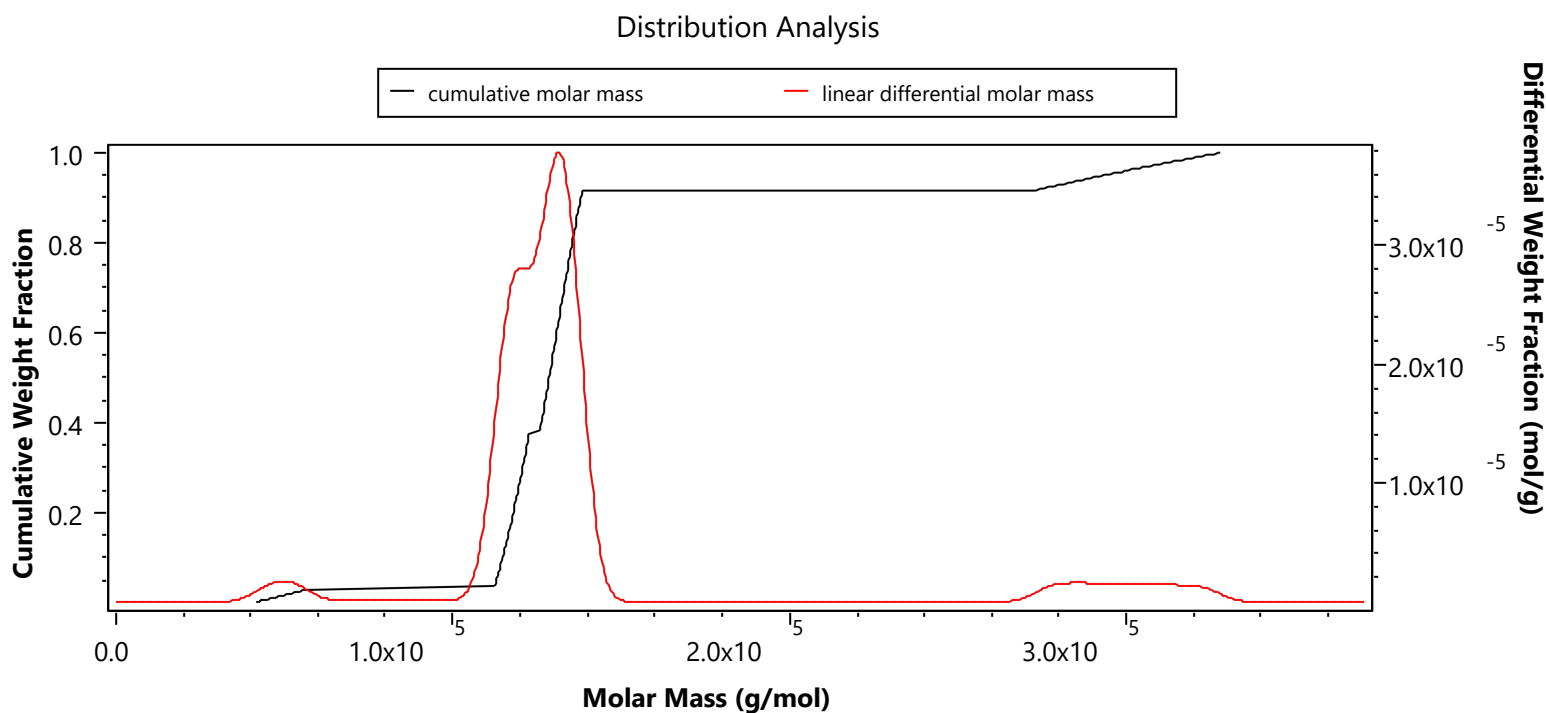
### Results Fitting



Peak 1 Fit Adjusted  $R^2=0.9946$ ; Peak 2 Fit Adjusted  $R^2=0.9913$ ; Peak 3 Fit Adjusted  $R^2=0.9979$ ; Peak 4 Fit Adjusted  $R^2=0.9930$

### Results Fitting





**Configuration**

**Abscissa Units:** min  
**Concentration Source:** RI  
**Flow Rate:** 0.500 mL/min  
**Pulse Correction Enabled:** yes  
**Light Scattering Instrument:** DAWN HELEOS  
**Cell Type:** Fused Silica  
**Wavelength:** 660.0 nm  
**Calibration Constant:** 3.3316x10<sup>-5</sup> 1/(V cm)  
**RI Instrument:** Optilab T-rEX  
**Wavelength:** 658.0 nm  
**UV Instrument:** Generic UV  
**Solvent:** PBS, Aqueous

Refractive Index: 1.331

## Fluid Connections

Source Instrument	Destination Instrument	Delay Volume (mL)
Generic Pump	Injector	0.000
Injector	Generic UV Instrument	0.000
Generic UV Instrument	DAWN HELEOS	0.026
DAWN HELEOS	Optilab rEX	0.222

## Aux Connections

Source Instrument	Destination Instrument	Source Aux Channel	Destination Aux Channel	Calibration Constant
Generic UV Instrument	DAWN HELEOS		2	1.000
Generic UV Instrument	DAWN HELEOS	2	3	1.000

## Autoinject Connections

Source Instrument	Destination Instrument
autoinject	DAWN HELEOS

## Processing

Collection Operator: MICHAELFARADAY\Michael Faraday (MICHAELFARADAY\Michael Faraday (Michael Faraday))

Collection Time: Wednesday, July 15, 2020 20:47:16 PM

Collection Version: 7.1.4.8

Processing Operator: ALAN-TURING\Alan Turing (Alan Turing)

Processing Time: Thursday, July 16, 2020 17:56:10 PM

Despiking Level: Heavy

## Peak settings:

Peak Name	Peak 1	Peak 2	Peak 3	Peak 4
Peak Limits (min)	12.043 - 12.478	13.434 - 13.881	14.025 - 14.396	15.277 - 15.537
Light Scattering Model	Zimm	Zimm	Zimm	Zimm
Fit Degree	1	1	1	1
dn/dc (mL/g)	0.1700	0.1700	0.1700	0.1700
dn/dc Ref. Temp. (°C)	25.000	25.000	25.000	25.000
Modifier dn/dc (mL/g)	0.0000	0.0000	0.0000	0.0000
Modifier dn/dc Ref. Temp. (°C)	25.000	25.000	25.000	25.000
A2 (mol mL/g <sup>2</sup> )	0.000	0.000	0.000	0.000
UV Ext. Coef. (mL/(mg cm))	0.667	0.667	0.667	0.667
UV Ext. Coef. Ref. Temp. (°C)	25.000	25.000	25.000	25.000
Modifier UV Ext. Coef. (mL/(mg cm))	0.000	0.000	0.000	0.000
Modifier UV Ext. Coef. Ref. Temp. (°C)	25.000	25.000	25.000	25.000
Real Refractive Index	0	0	0	0
Imaginary Refractive Index	0	0	0	0
Shell Thickness (nm)	0.000	0.000	0.000	0.000
Shell Real Refractive Index	0	0	0	0
Shell Imaginary Refractive Index	0	0	0	0
Rod radius (nm)	0.000	0.000	0.000	0.000
Molecular Standard	n/a	n/a	n/a	n/a
Concentration (mg/mL)	2.000	2.000	2.000	2.000
Concentration Ref. Temp. (°C)	25.000	25.000	25.000	25.000
Mn (g/mol)	0.000	0.000	0.000	0.000
Mw (g/mol)	0.000	0.000	0.000	0.000
Mp (g/mol)	0.000	0.000	0.000	0.000
Intrinsic Viscosity (mL/g)	0.000	0.000	0.000	0.000
Intrinsic Viscosity Ref. Temp. (°C)	25.000	25.000	25.000	25.000
Mark-Houwink-Sakurada K (mL/g)	0.000	0.000	0.000	0.000
Mark-Houwink-Sakurada a	0	0	0	0
Flory-Fox Equation Phi Parameter	0	0	0	0
Ptitsyn-Eizner Equation Epsilon Parameter	0	0	0	0
Viscometry Model	Huggins	Huggins	Huggins	Huggins
Huggins Equation Parameter	0	0	0	0
Kraemers Equation Parameter	0	0	0	0
radius (nm)	3.480	3.480	3.480	3.480
Radius Type	rms	rms	rms	rms

## Molar Mass &amp; Radius from LS:

**Peak Name:** Peak 2  
**Molar Mass:** (1.312 ± 0.006) e+5 g/mol  
**rms radius:** 0.0 ± 0.0 nm  
**Light Scattering Model:** Zimm  
**Fit Degree:** 1  
**Concentration:** (4.927 ± 0.001) e-1 mg/mL  
**dn/dc:** 0.171 mL/g  
**Slice Index:** 1679  
**Abscissa Position:** 13.694 min

Fit R<sup>2</sup>: 0.5540

Enabled Detectors: 3 4 5 6 7 8 9 10 11 13 14 15 16 17 18

## rh from QELS:

Use Disabled Slices: no

Prefilter Correlation Function before Averaging: yes

Minimum Delay for Fit: 2.000×10<sup>-7</sup> sec

Maximum Delay for Fit: 1.0 sec

Minimum Radius Threshold: 1.00 nm

Maximum Radius Threshold: 300.00 nm

Suppress Distribution Peaks Below: 0.50 nm

Suppress Distribution Peaks Above: 10000.000 nm

## Results Fitting Procedure:

Data	Fit Model	Degree	R <sup>2</sup>	Extrapolation
Molar Mass	Polynomial	1	0.994563	none

## Results

## Peak Results

	Peak 1	Peak 2	Peak 3	Peak 4
<b>Hydrodynamic radius (Q) moments (nm)</b>				
rh(Q)n	5.445 (±5.417%)	4.228 (±1.920%)	4.094 (±3.541%)	100.253 (±21.168%)
Std Dev rh(Q)n	1.136	0.279	0.887	104.939
rh(Q)w	5.457 (±5.424%)	4.232 (±1.922%)	4.108 (±3.539%)	103.381 (±20.685%)
Std Dev rh(Q)w	1.141	0.282	0.893	106.105
rh(Q)z	5.470 (±5.432%)	4.235 (±1.924%)	4.122 (±3.537%)	106.072 (±20.265%)
Std Dev rh(Q)z	1.141	0.282	0.893	106.139
rh(Q)(avg)	4.934 (±1.482%)	4.175 (±0.517%)	3.773 (±1.008%)	1.425 (±16.921%)
<b>General (mL/(mg cm))</b>				
UV Ext. Coef. (mL/(mg cm))	1.189	1.001	1.012	0.884
<b>Masses</b>				
Injected Mass (µg)	100.00	100.00	100.00	100.00
Calculated Mass (µg)	16.14	103.91	65.29	5.36
Mass Recovery (%)	16.1	103.9	65.3	5.4
Mass Fraction (%)	8.5	54.5	34.2	2.8
<b>Concentration (mg/mL)</b>				
Average concentration	0.074 (±0.000%)	0.465 (±0.000%)	0.354 (±0.000%)	0.042 (±0.000%)
<b>Molar mass moments (g/mol)</b>				
Mn	2.988×10 <sup>5</sup> (±0.145%)	1.320×10 <sup>5</sup> (±0.138%)	1.178×10 <sup>5</sup> (±0.283%)	4.894×10 <sup>4</sup> (±2.112%)
Mp	2.733×10 <sup>5</sup> (±0.206%)	1.312×10 <sup>5</sup> (±0.078%)	1.226×10 <sup>5</sup> (±0.330%)	5.664×10 <sup>4</sup> (±2.751%)
Mv	n/a	n/a	n/a	n/a
Mw	2.996×10 <sup>5</sup> (±0.146%)	1.321×10 <sup>5</sup> (±0.137%)	1.179×10 <sup>5</sup> (±0.281%)	4.935×10 <sup>4</sup> (±2.096%)
Mz	3.005×10 <sup>5</sup> (±0.326%)	1.322×10 <sup>5</sup> (±0.306%)	1.180×10 <sup>5</sup> (±0.626%)	4.975×10 <sup>4</sup> (±4.682%)
Mz+1	3.013×10 <sup>5</sup> (±0.526%)	1.323×10 <sup>5</sup> (±0.492%)	1.181×10 <sup>5</sup> (±1.005%)	5.015×10 <sup>4</sup> (±7.491%)
M(avg)	2.984×10 <sup>5</sup> (±0.019%)	1.324×10 <sup>5</sup> (±0.014%)	1.181×10 <sup>5</sup> (±0.039%)	4.872×10 <sup>4</sup> (±0.347%)
<b>Polydispersity</b>				
Mw/Mn	1.003 (±0.206%)	1.001 (±0.195%)	1.001 (±0.399%)	1.008 (±2.976%)
Mz/Mn	1.006 (±0.357%)	1.001 (±0.336%)	1.001 (±0.687%)	1.017 (±5.137%)
<b>rms radius moments (nm)</b>				
rn	4.5 (±121.9%)	1.6 (±1080.3%)	n/a	35.5 (±22.7%)
Std Dev rn	4.296	11.983	n/a	14.882
rw	4.6 (±117.1%)	2.5 (±433.9%)	n/a	35.8 (±22.4%)
Std Dev rw	4.335	12.022	n/a	14.732
rz	4.7 (±112.6%)	3.2 (±271.5%)	n/a	36.1 (±22.0%)
Std Dev rz	4.371	12.059	n/a	14.541
r(avg)	4.4 (±17.2%)	7.0 (±6.5%)	n/a	35.7 (±4.0%)
<b>Light scattering peak statistics</b>				
Peak Area (1/cm min)	1.669×10 <sup>-6</sup>	1.375×10 <sup>-5</sup>	4.089×10 <sup>-6</sup>	5.007×10 <sup>-7</sup>
Peak Height (1/cm)	4.007×10 <sup>-6</sup>	1.154×10 <sup>-5</sup>	3.179×10 <sup>-5</sup>	4.335×10 <sup>-7</sup>
Retention Time (min)	12.279	13.666	8.308	15.347
Peak Width at Half-Height (min)	0.000	0.000	0.000	0.000

	Peak 1	Peak 2	Peak 3	Peak 4				
Peak Width at Quarter-Height (min)	0.000	0.000	0.000	0.000				
Peak Width at Tenth-Height (min)	0.000	0.000	0.000	0.000				
Peak Width at User-Specified-Height (4.4%, min)	0.000	0.000	0.000	0.000				
Asymmetry Factor	0.000	0.000	0.000	0.000				
Tailing Factor	0.000	0.000	0.000	0.000				
Column Plate Count	0.000	0.000	0.000	0.000				
Mean (min)	12.262	13.660	14.193	15.398				
Standard Deviation (min)	0.124	0.125	0.105	0.075				
Skew	-0.882	-0.921	10.046	51.240				
Peak Area (%)	8.343	68.721	20.434	2.502				
Resolution Relative to Peak 2	0.000	n/a	0.000	0.000				
<b>Refractive index peak statistics</b>								
Peak Area (RIU min)	5.487×10 <sup>-6</sup>	3.533×10 <sup>-5</sup>	2.220×10 <sup>-5</sup>	1.822×10 <sup>-6</sup>				
Peak Height (RIU)	1.187×10 <sup>-5</sup>	8.397×10 <sup>-5</sup>	8.142×10 <sup>-5</sup>	6.975×10 <sup>-6</sup>				
Retention Time (min)	11.518	13.694	13.640	15.736				
Peak Width at Half-Height (min)	0.000	0.000	0.000	0.000				
Peak Width at Quarter-Height (min)	0.000	0.000	0.000	0.000				
Peak Width at Tenth-Height (min)	0.000	0.000	0.000	0.000				
Peak Width at User-Specified-Height (4.4%, min)	0.000	0.000	0.000	0.000				
Asymmetry Factor	0.000	0.000	0.000	0.000				
Tailing Factor	0.000	0.000	0.000	0.000				
Column Plate Count	0.000	0.000	0.000	0.000				
Mean (min)	12.270	13.667	14.195	15.402				
Standard Deviation (min)	0.126	0.126	0.105	0.073				
Skew	-3.009	-0.812	3.028	4.245				
Peak Area (%)	8.463	54.489	34.238	2.810				
Resolution Relative to Peak 2	0.000	n/a	0.000	0.000				
<b>UV peak statistics</b>								
Peak Area (channel 1) (AU min)	3.837×10 <sup>-2</sup>	2.080×10 <sup>-1</sup>	1.321×10 <sup>-1</sup>	9.473×10 <sup>-3</sup>				
Peak Area (channel 2) (AU min)	0.000	0.000	0.000	0.000				
Peak Height (channel 1) (AU)	9.058×10 <sup>-2</sup>	4.953×10 <sup>-1</sup>	4.886×10 <sup>-1</sup>	3.686×10 <sup>-2</sup>				
Peak Height (channel 2) (AU)	0.001	0.000	0.000	0.000				
Retention Time (channel 1) (min)	12.368	13.705	13.545	15.477				
Retention Time (channel 2) (min)	12.611	13.344	13.801	15.399				
Peak Width at Half-Height (channel 1) (min)	0.000	0.000	0.000	0.000				
Peak Width at Half-Height (channel 2) (min)	0.000	0.000	0.000	0.000				
Peak Width at Quarter-Height (channel 1) (min)	0.000	0.000	0.000	0.000				
Peak Width at Quarter-Height (channel 2) (min)	0.000	0.000	0.000	0.000				
Peak Width at Tenth-Height (channel 1) (min)	0.000	0.000	0.000	0.000				
Peak Width at Tenth-Height (channel 2) (min)	0.000	0.000	0.000	0.000				
Peak Width at User-Specified-Height (channel 1) (4.4%, min)	0.000	0.000	0.000	0.000				
Peak Width at User-Specified-Height (channel 2) (4.4%, min)	0.000	0.000	0.000	0.000				
Asymmetry Factor (channel 1)	0.000	0.000	0.000	0.000				
Asymmetry Factor (channel 2)	0.000	0.000	0.000	0.000				
Column Plate Count (channel 1)	0.000	0.000	0.000	0.000				
Column Plate Count (channel 2)	0.000	0.000	0.000	0.000				
Tailing Factor (channel 1)	0.000	0.000	0.000	0.000				
Tailing Factor (channel 2)	0.000	0.000	0.000	0.000				
Mean (channel 1) (min)	12.266	13.664	14.200	15.401				
Mean (channel 2) (min)	12.257	13.652	14.210	15.404				
Standard Deviation (channel 1) (min)	0.126	0.127	0.105	0.075				
Standard Deviation (channel 2) (min)	0.128	0.131	0.106	0.076				
Skew (channel 1)	-0.024	-0.013	0.037	0.053				
Skew (channel 2)	0.142	0.232	0.340	0.115				
Peak Area % (channel 1) (%)	9.891	53.612	34.055	2.442				
Peak Area % (channel 2) (%)	42.171	28.127	20.104	9.598				
Resolution Relative to Peak 2	0.000	0.000	n/a	n/a	0.000	0.000	0.000	0.000
<b>Translational diffusion coefficient moments (cm<sup>2</sup>/sec)</b>								
Dt(n)	6.03×10 <sup>-7</sup> (±5.27%)	7.49×10 <sup>-7</sup> (±1.89%)	8.00×10 <sup>-7</sup> (±3.44%)	6.65×10 <sup>-7</sup> (±22.71%)				
Dt(w)	6.02×10 <sup>-7</sup> (±5.27%)	7.48×10 <sup>-7</sup> (±1.89%)	7.98×10 <sup>-7</sup> (±3.43%)	6.12×10 <sup>-7</sup> (±22.92%)				

	Peak 1	Peak 2	Peak 3	Peak 4
Dt(z)	6.01×10 <sup>-7</sup> (±5.27%)	7.48×10 <sup>-7</sup> (±1.89%)	7.95×10 <sup>-7</sup> (±3.43%)	5.64×10 <sup>-7</sup> (±23.16%)
Dt(avg)	5.68×10 <sup>-7</sup> (±1.49%)	7.49×10 <sup>-7</sup> (±0.52%)	7.80×10 <sup>-7</sup> (±1.01%)	1.17×10 <sup>-8</sup> (±8.43%)

laser monitor average: 0.999 v

Forward Monitor Average: 0.938 v

laser current average: 0.156 amps

laser voltage average: -226454.722 v

rms conformation plot slope: -1.03 (±5.51%) log(nm)/log(g/mol)

rms Conformation Plot y-intercept: 6.374 (±4.350%) log(nm)

rh(Q) conformation plot slope: 0.121 (±14.153%) log(nm)/log(g/mol)

rh(Q) Conformation Plot y-intercept: 0.008 (±1122.795%) log(nm)

rms radius vs. rh(Q) plot slope: 0.122 (±2.416%) rms radius vs. rh(Q) plot slope

rms radius vs. rh(Q) Plot y-intercept: 10.705 (±1.509%) log(nm)