



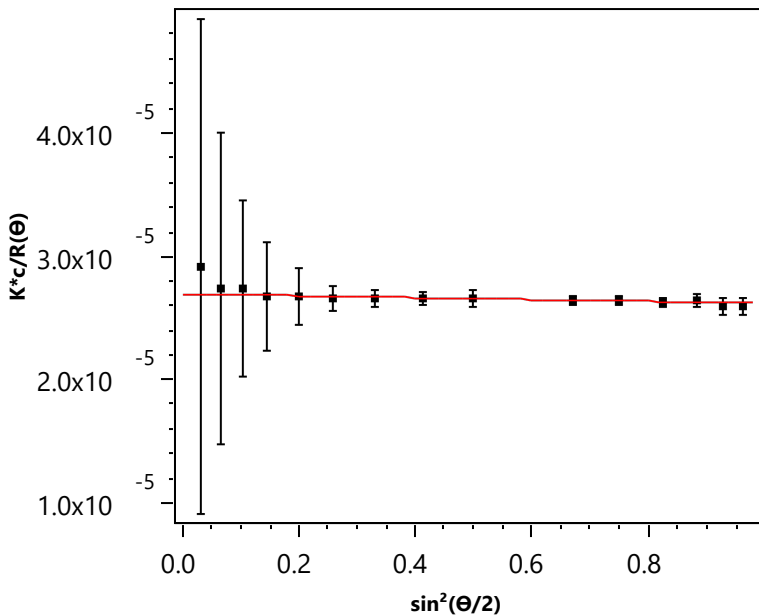
**File Properties**

**File Name:** D:\GoogleDrive\LBNL\SIBYLS\_Group\MALS and DLS Data\Sequences\Plate15-18\COVID4[063020\_COVID].afe7  
**Created:** June 30, 2020 21:17:20.199

**Sample:** COVID4

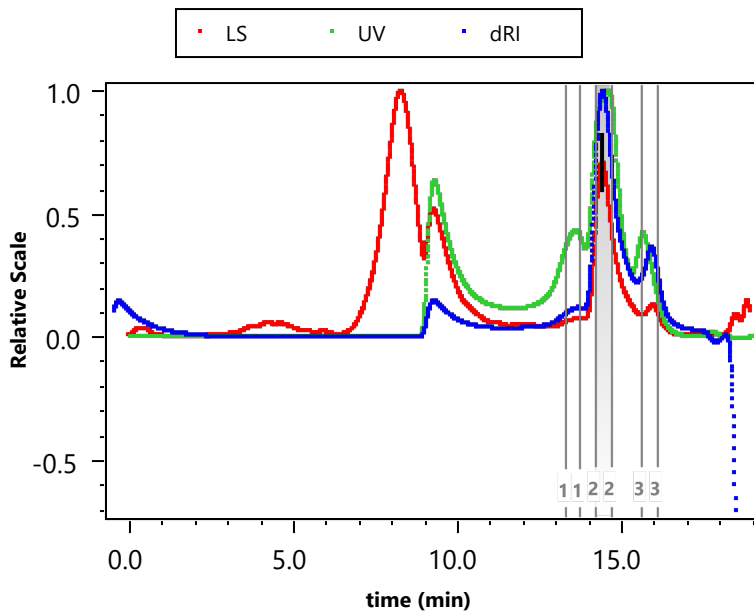
**dn/dc:** 0.1750 mL/g  
**Concentration:** 2.000 mg/mL

results graph



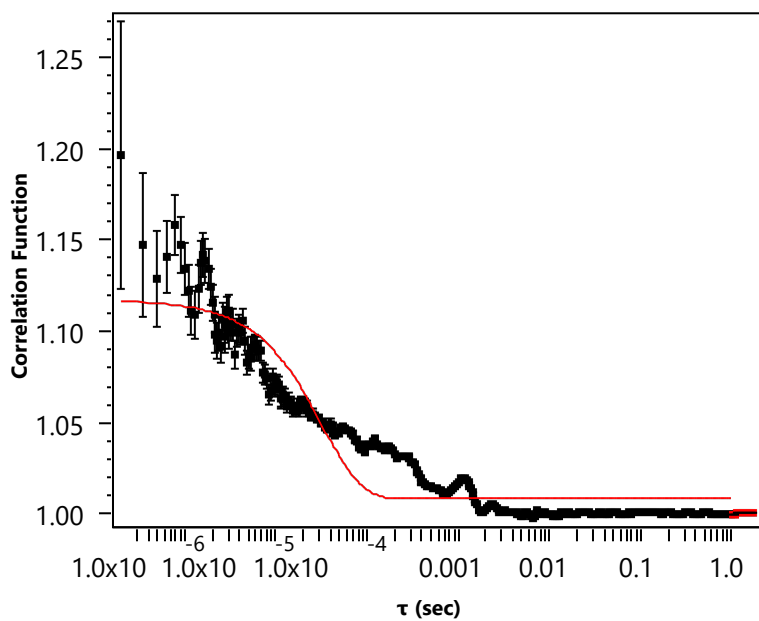
Fit  $R^2=0.4384$

control graph



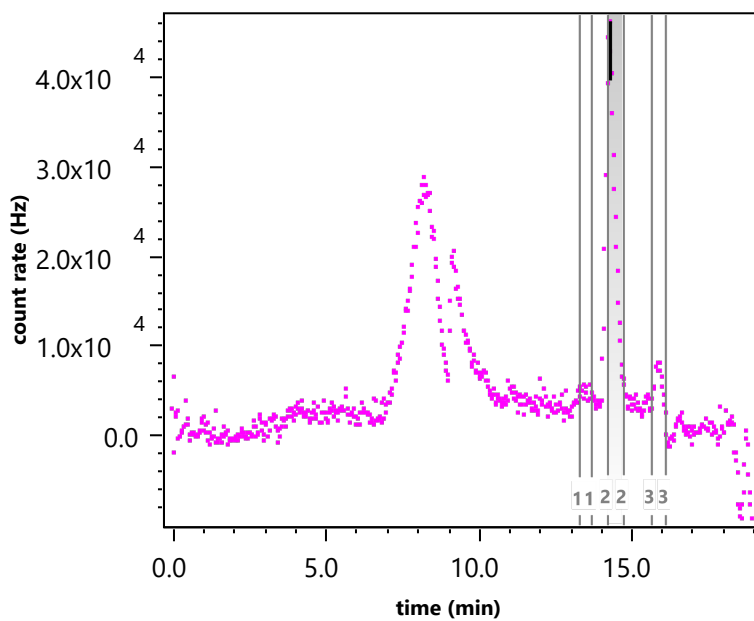
Index = 14.426 min

Correlation Function



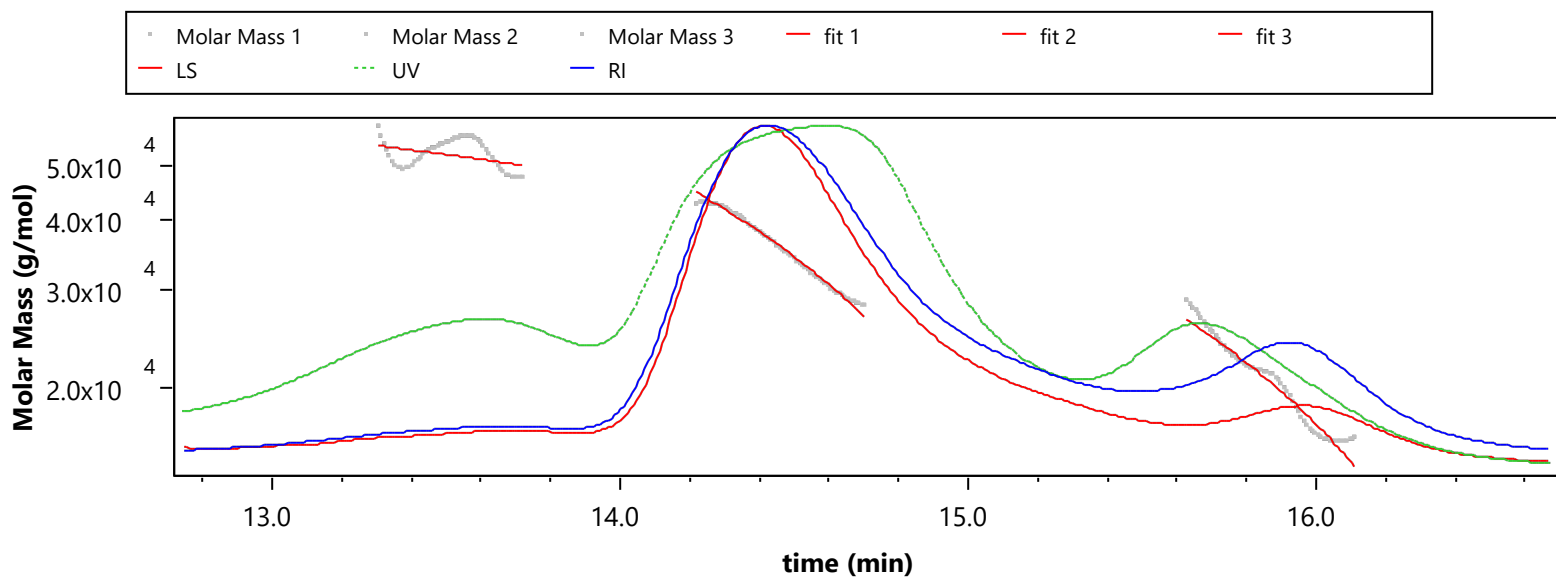
Fit  $R^2=0.8159$

control graph



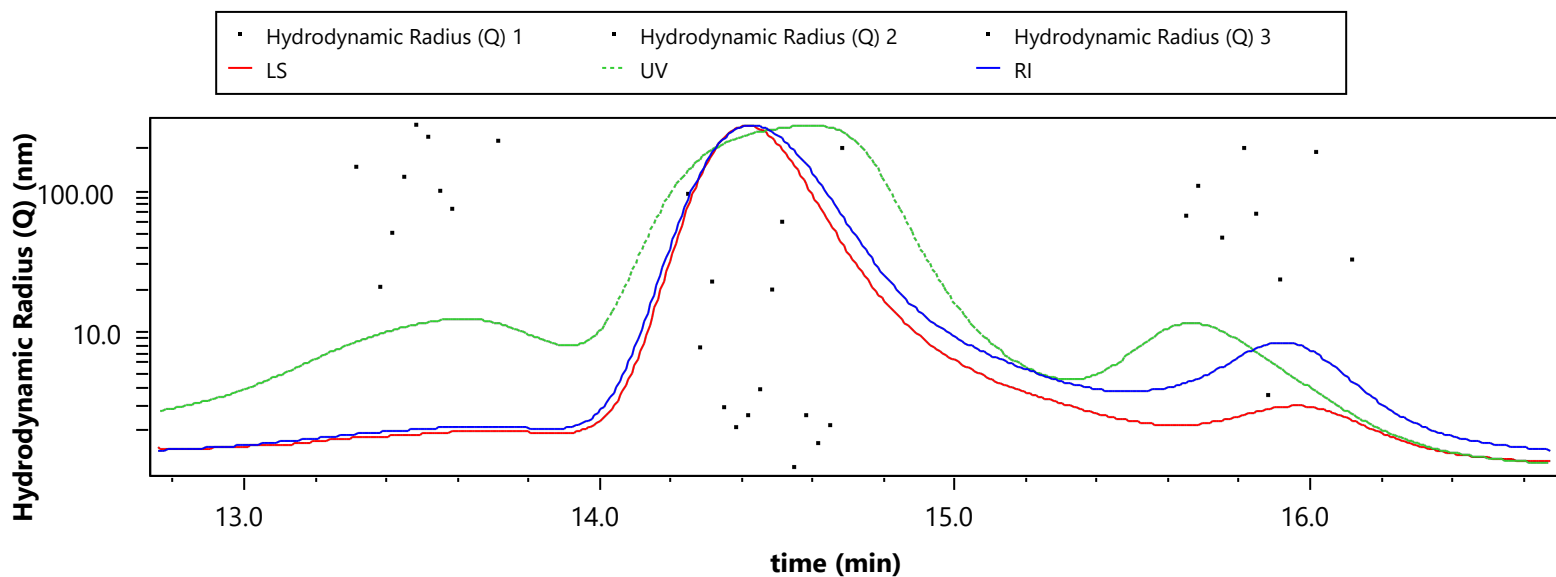
Index = 14.283 min

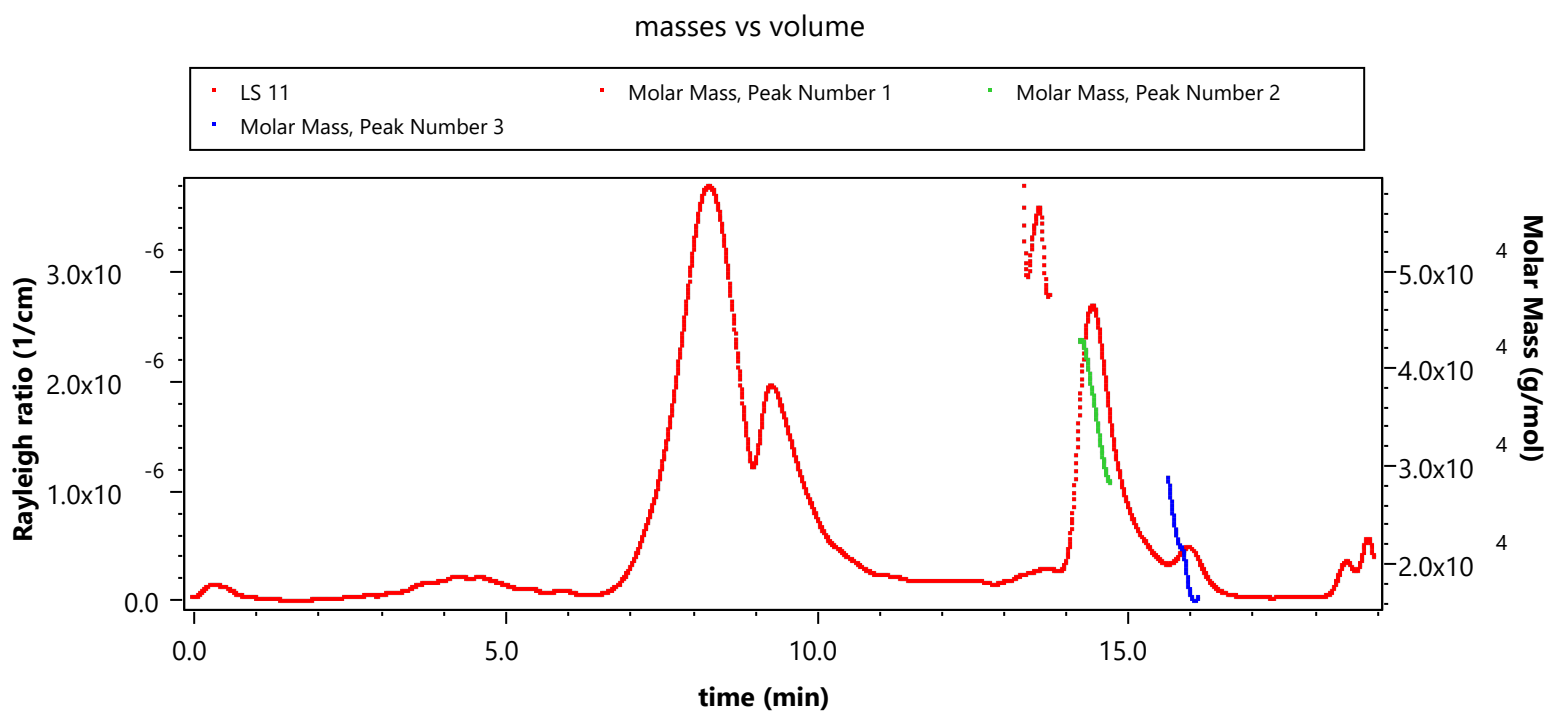
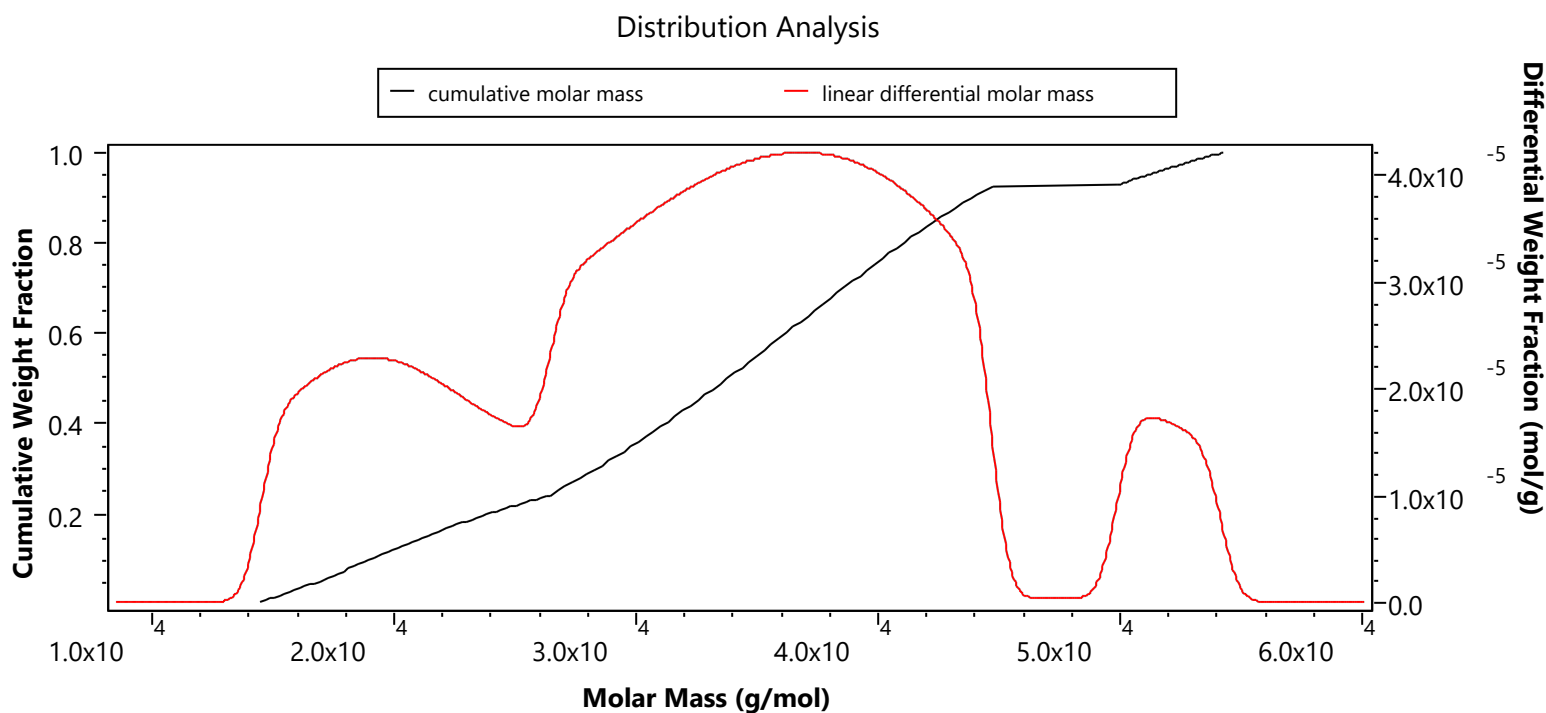
### Results Fitting



Peak 1 Fit Adjusted  $R^2=0.1485$ ; Peak 2 Fit Adjusted  $R^2=0.9916$ ; Peak 3 Fit Adjusted  $R^2=0.9198$

### 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:**  $3.3316 \times 10^{-5}$  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: Tuesday, June 30, 2020 16:27:03 PM

Collection Version: 7.1.4.8

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

Processing Time: Wednesday, July 01, 2020 13:23:54 PM

Despiking Level: Heavy

## Peak settings:

Peak Name	Peak 1	Peak 2	Peak 3
Peak Limits (min)	13.297 - 13.724	14.217 - 14.709	15.629 - 16.121
Light Scattering Model	Zimm	Zimm	Zimm
Fit Degree	1	1	1
dn/dc (mL/g)	0.1650	0.1650	0.1650
dn/dc Ref. Temp. (°C)	25.000	25.000	25.000
Modifier dn/dc (mL/g)	0.0000	0.0000	0.0000
Modifier dn/dc Ref. Temp. (°C)	25.000	25.000	25.000
A2 (mol mL/g <sup>2</sup> )	0.000	0.000	0.000
UV Ext. Coef. (mL/(mg cm))	0.667	0.667	0.667
UV Ext. Coef. Ref. Temp. (°C)	25.000	25.000	25.000
Modifier UV Ext. Coef. (mL/(mg cm))	0.000	0.000	0.000
Modifier UV Ext. Coef. Ref. Temp. (°C)	25.000	25.000	25.000
Real Refractive Index	0	0	0
Imaginary Refractive Index	0	0	0
Shell Thickness (nm)	0.000	0.000	0.000
Shell Real Refractive Index	0	0	0
Shell Imaginary Refractive Index	0	0	0
Rod radius (nm)	0.000	0.000	0.000
Molecular Standard	n/a	n/a	n/a
Concentration (mg/mL)	2.000	2.000	2.000
Concentration Ref. Temp. (°C)	25.000	25.000	25.000
Mn (g/mol)	0.000	0.000	0.000
Mw (g/mol)	0.000	0.000	0.000
Mp (g/mol)	0.000	0.000	0.000
Intrinsic Viscosity (mL/g)	0.000	0.000	0.000
Intrinsic Viscosity Ref. Temp. (°C)	25.000	25.000	25.000
Mark-Houwink-Sakurada K (mL/g)	0.000	0.000	0.000
Mark-Houwink-Sakurada a	0	0	0
Flory-Fox Equation Phi Parameter	0	0	0
Ptitsyn-Eizner Equation Epsilon Parameter	0	0	0
Viscometry Model	Huggins	Huggins	Huggins
Huggins Equation Parameter	0	0	0
Kraemers Equation Parameter	0	0	0
radius (nm)	3.480	3.480	3.480
Radius Type	rms	rms	rms

## Molar Mass &amp; Radius from LS:

**Peak Name:** Peak 2  
**Molar Mass:** (3.714 ± 0.078) e+4 g/mol  
**rms radius:** 0.0 ± 0.0 nm  
**Light Scattering Model:** Zimm  
**Fit Degree:** 1  
**Concentration:** (4.242 ± 0.016) e-1 mg/mL  
**dn/dc:** 0.166 mL/g  
**Slice Index:** 1768  
**Abscissa Position:** 14.426 min

Fit R<sup>2</sup>: 0.4384

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	0.148538	none

## Results

## Peak Results

	Peak 1	Peak 2	Peak 3
<b>Hydrodynamic radius (Q) moments (nm)</b>			
rh(Q)n	142.949 (±14.670%)	29.511 (±8.372%)	82.019 (±13.804%)
Std Dev rh(Q)n	86.751	55.205	70.625
rh(Q)w	142.271 (±14.706%)	27.535 (±8.601%)	82.309 (±14.229%)
Std Dev rh(Q)w	86.798	50.963	69.077
rh(Q)z	141.600 (±14.741%)	26.143 (±8.819%)	82.498 (±14.711%)
Std Dev rh(Q)z	86.801	50.982	69.077
rh(Q)(avg)	66.556 (±7.119%)	1.928 (±3.200%)	4.900 (±11.965%)
<b>General (mL/(mg cm))</b>			
UV Ext. Coef. (mL/(mg cm))	8.082	2.351	2.173
<b>Masses</b>			
Injected Mass (µg)	100.00	100.00	100.00
Calculated Mass (µg)	10.06	93.26	32.64
Mass Recovery (%)	10.1	93.3	32.6
Mass Fraction (%)	7.4	68.6	24.0
<b>Concentration (mg/mL)</b>			
Average concentration	0.047 (±0.000%)	0.380 (±0.000%)	0.133 (±0.000%)
<b>Molar mass moments (g/mol)</b>			
<b>Mn</b>	5.187×10 <sup>4</sup> (±5.772%)	3.510×10 <sup>4</sup> (±0.780%)	1.968×10 <sup>4</sup> (±2.835%)
<b>Mp</b>	5.025×10 <sup>4</sup> (±6.498%)	3.706×10 <sup>4</sup> (±0.479%)	1.912×10 <sup>4</sup> (±1.975%)
<b>Mv</b>	n/a	n/a	n/a
<b>Mw</b>	5.190×10 <sup>4</sup> (±5.790%)	3.582×10 <sup>4</sup> (±0.745%)	2.024×10 <sup>4</sup> (±2.992%)
<b>Mz</b>	5.193×10 <sup>4</sup> (±12.963%)	3.653×10 <sup>4</sup> (±1.650%)	2.078×10 <sup>4</sup> (±6.866%)
<b>Mz+1</b>	5.197×10 <sup>4</sup> (±20.922%)	3.720×10 <sup>4</sup> (±2.595%)	2.131×10 <sup>4</sup> (±11.123%)
<b>M(avg)</b>	5.181×10 <sup>4</sup> (±0.755%)	3.541×10 <sup>4</sup> (±0.085%)	1.867×10 <sup>4</sup> (±0.346%)
<b>Polydispersity</b>			
Mw/Mn	1.001 (±8.175%)	1.021 (±1.079%)	1.028 (±4.122%)
Mz/Mn	1.001 (±14.190%)	1.041 (±1.825%)	1.056 (±7.428%)
<b>rms radius moments (nm)</b>			
rn	70.9 (±22.4%)	n/a	26.9 (±74.5%)
Std Dev rn	28.336	n/a	46.950
rw	70.9 (±22.4%)	n/a	33.0 (±52.8%)
Std Dev rw	28.233	n/a	46.973
rz	71.0 (±22.4%)	n/a	38.0 (±42.2%)
Std Dev rz	28.129	n/a	46.598
r(avg)	70.2 (±3.1%)	20.2 (±6.7%)	45.7 (±5.2%)
<b>Light scattering peak statistics</b>			
Peak Area (1/cm min)	1.714×10 <sup>-7</sup>	2.184×10 <sup>-6</sup>	6.748×10 <sup>-7</sup>
Peak Height (1/cm)	4.634×10 <sup>-7</sup>	2.757×10 <sup>-6</sup>	5.381×10 <sup>-7</sup>
Retention Time (min)	13.571	14.353	15.873
Peak Width at Half-Height (min)	0.000	0.000	0.000
Peak Width at Quarter-Height (min)	0.000	0.000	0.000
Peak Width at Tenth-Height (min)	0.000	0.000	0.000
Peak Width at User-Specified-Height (4.4%, min)	0.000	0.000	0.000
Asymmetry Factor	0.000	0.000	0.000
Tailing Factor	0.000	0.000	0.000
Column Plate Count	0.000	0.000	0.000

	Peak 1	Peak 2	Peak 3	
Mean (min)	13.518	14.441	15.856	
Standard Deviation (min)	0.120	0.134	0.135	
Skew	-18.669	17.285	19.309	
Peak Area (%)	5.657	72.073	22.270	
Resolution Relative to Peak 2	0.000	n/a	0.000	
<b>Refractive index peak statistics</b>				
Peak Area (RIU min)	3.320×10 <sup>-6</sup>	3.077×10 <sup>-5</sup>	1.077×10 <sup>-5</sup>	
Peak Height (RIU)	8.310×10 <sup>-6</sup>	7.017×10 <sup>-5</sup>	2.552×10 <sup>-5</sup>	
Retention Time (min)	13.676	14.428	15.925	
Peak Width at Half-Height (min)	0.000	0.000	0.000	
Peak Width at Quarter-Height (min)	0.000	0.000	0.000	
Peak Width at Tenth-Height (min)	0.000	0.000	0.000	
Peak Width at User-Specified-Height (4.4%, min)	0.000	0.000	0.000	
Asymmetry Factor	0.000	0.000	0.000	
Tailing Factor	0.000	0.000	0.000	
Column Plate Count	0.000	0.000	0.000	
Mean (min)	13.520	14.460	15.883	
Standard Deviation (min)	0.123	0.135	0.134	
Skew	-4.222	0.699	-2.357	
Peak Area (%)	7.400	68.595	24.005	
Resolution Relative to Peak 2	0.000	n/a	0.000	
<b>UV peak statistics</b>				
Peak Area (channel 1) (AU min)	1.626×10 <sup>-1</sup>	4.385×10 <sup>-1</sup>	1.419×10 <sup>-1</sup>	
Peak Area (channel 2) (AU min)	0.000	0.000	0.000	
Peak Height (channel 1) (AU)	4.025×10 <sup>-1</sup>	9.267×10 <sup>-1</sup>	3.903×10 <sup>-1</sup>	
Peak Height (channel 2) (AU)	0.000	0.000	0.000	
Retention Time (channel 1) (min)	13.612	14.597	15.666	
Retention Time (channel 2) (min)	13.391	14.849	15.473	
Peak Width at Half-Height (channel 1) (min)	0.000	0.000	0.000	
Peak Width at Half-Height (channel 2) (min)	0.000	0.000	0.000	
Peak Width at Quarter-Height (channel 1) (min)	0.000	0.000	0.000	
Peak Width at Quarter-Height (channel 2) (min)	0.000	0.000	0.000	
Peak Width at Tenth-Height (channel 1) (min)	0.000	0.000	0.000	
Peak Width at Tenth-Height (channel 2) (min)	0.000	0.000	0.000	
Peak Width at User-Specified-Height (channel 1) (4.4%, min)	0.000	0.000	0.000	
Peak Width at User-Specified-Height (channel 2) (4.4%, min)	0.000	0.000	0.000	
Asymmetry Factor (channel 1)	0.000	0.000	0.000	
Asymmetry Factor (channel 2)	0.000	0.000	0.000	
Column Plate Count (channel 1)	0.000	0.000	0.000	
Column Plate Count (channel 2)	0.000	0.000	0.000	
Tailing Factor (channel 1)	0.000	0.000	0.000	
Tailing Factor (channel 2)	0.000	0.000	0.000	
Mean (channel 1) (min)	13.514	14.472	15.836	
Mean (channel 2) (min)	13.503	14.507	15.836	
Standard Deviation (channel 1) (min)	0.121	0.140	0.134	
Standard Deviation (channel 2) (min)	0.122	0.132	0.133	
Skew (channel 1)	-0.013	-0.006	0.080	
Skew (channel 2)	1.021	-9.255	12.178	
Peak Area % (channel 1) (%)	21.888	59.017	19.095	
Peak Area % (channel 2) (%)	44.998	34.195	20.807	
Resolution Relative to Peak 2	0.000	0.000	n/a	n/a 0.000 0.000

<b>Translational diffusion coefficient moments (cm<sup>2</sup>/sec)</b>						
Dt(n)	4.05×10 <sup>-8</sup>	(±25.60%)	9.81×10 <sup>-7</sup>	(±9.44%)	1.69×10 <sup>-7</sup>	(±19.10%)
Dt(w)	4.08×10 <sup>-8</sup>	(±25.65%)	9.47×10 <sup>-7</sup>	(±9.31%)	1.67×10 <sup>-7</sup>	(±19.04%)
Dt(z)	4.12×10 <sup>-8</sup>	(±25.70%)	9.10×10 <sup>-7</sup>	(±9.18%)	1.62×10 <sup>-7</sup>	(±19.05%)
Dt(avg)	1.25×10 <sup>-8</sup>	(±4.83%)	2.01×10 <sup>-8</sup>	(±4.78%)	1.78×10 <sup>-8</sup>	(±4.89%)

laser monitor average: 0.999 v  
 Forward Monitor Average: 0.931 v  
 laser current average: 0.156 amps  
 laser voltage average: -226709.620 v  
 rms conformation plot slope: 0.33 (±21.41%) log(nm) / log(g/mol)  
 rms Conformation Plot y-intercept: 0.253 (±126.884%) log(nm)  
 rh(Q) conformation plot slope: -0.481 (±12.495%) log(nm) / log(g/mol)  
 rh(Q) Conformation Plot y-intercept: 3.547 (±7.681%) log(nm)  
 rms radius vs. rh(Q) plot slope: 0.154 (±1.394%) rms radius vs. rh(Q) plot slope  
 rms radius vs. rh(Q) Plot y-intercept: 29.373 (±0.819%) log(nm)