Electronic Supplementary Material (ESI) for Biomaterials Science.
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Supplementary Information

A Novel Injectable pH-Temperature Sensitive Hydrogel Contained Chitosan-Insulin Electrosprayed Nanospheres Composites As Insulin Delivery System In Type I Diabetes Treatment

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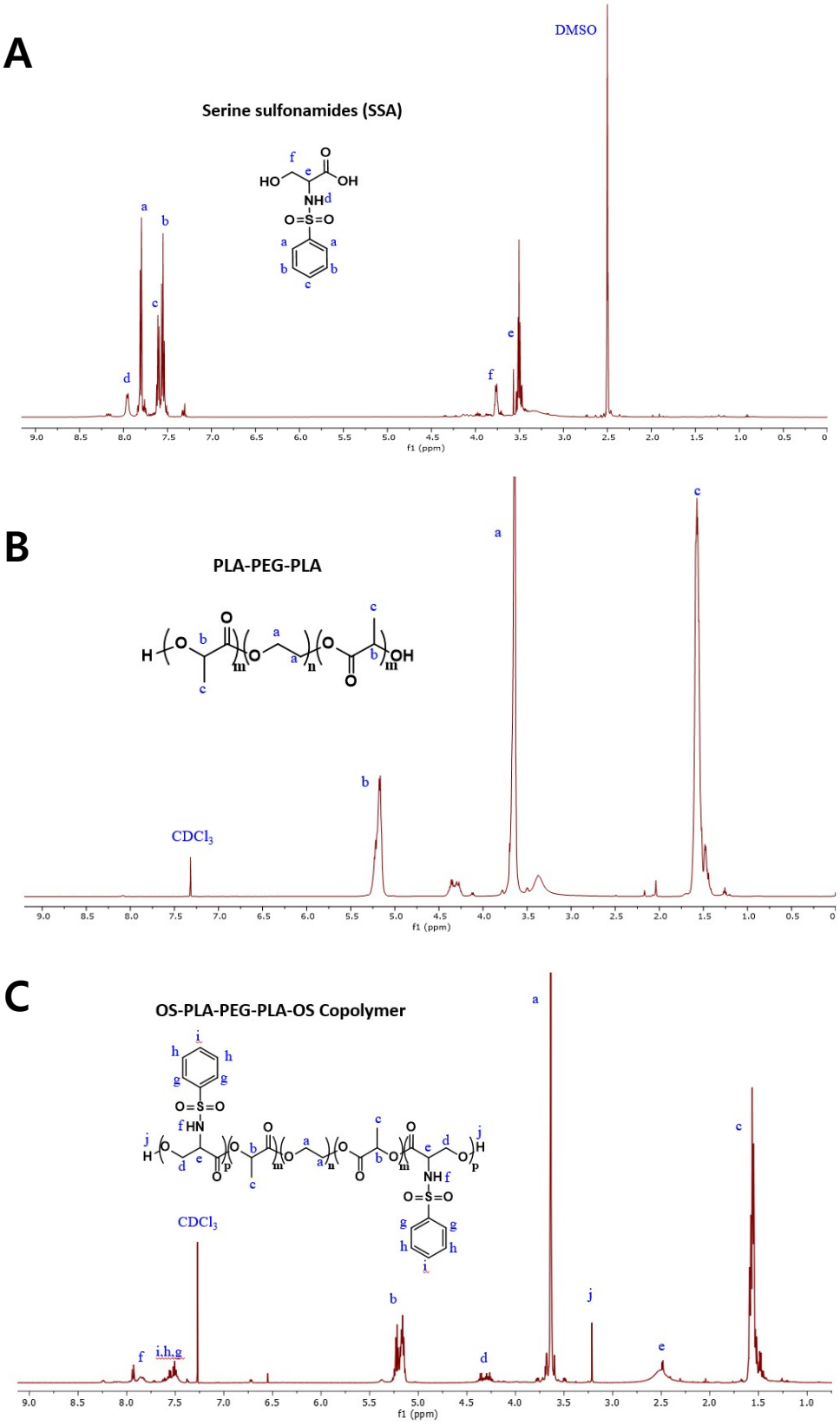


Figure S1. ^{1}H NMR spectra of (A) SSA, (B) PLA-PEG-PLA, and (C) PeCo1 copolymers.

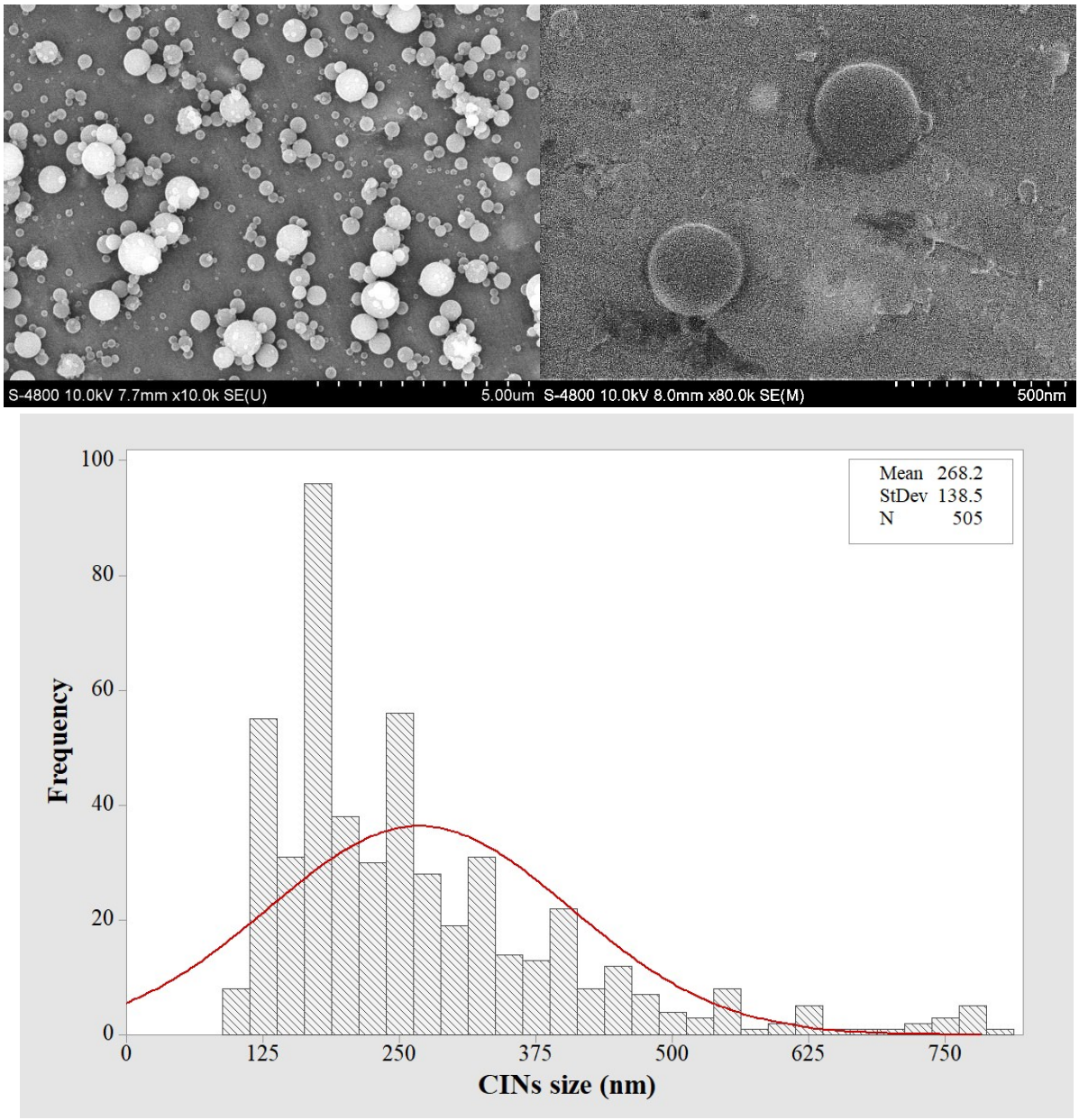


Figure S2. SEM images of electrosprayed CINs and the CINs size distribution

$C_{Chitosan}$=3,25%; U=12kV; Q=0,2ml/h; L=12,5cm; Insulin=20% wt.

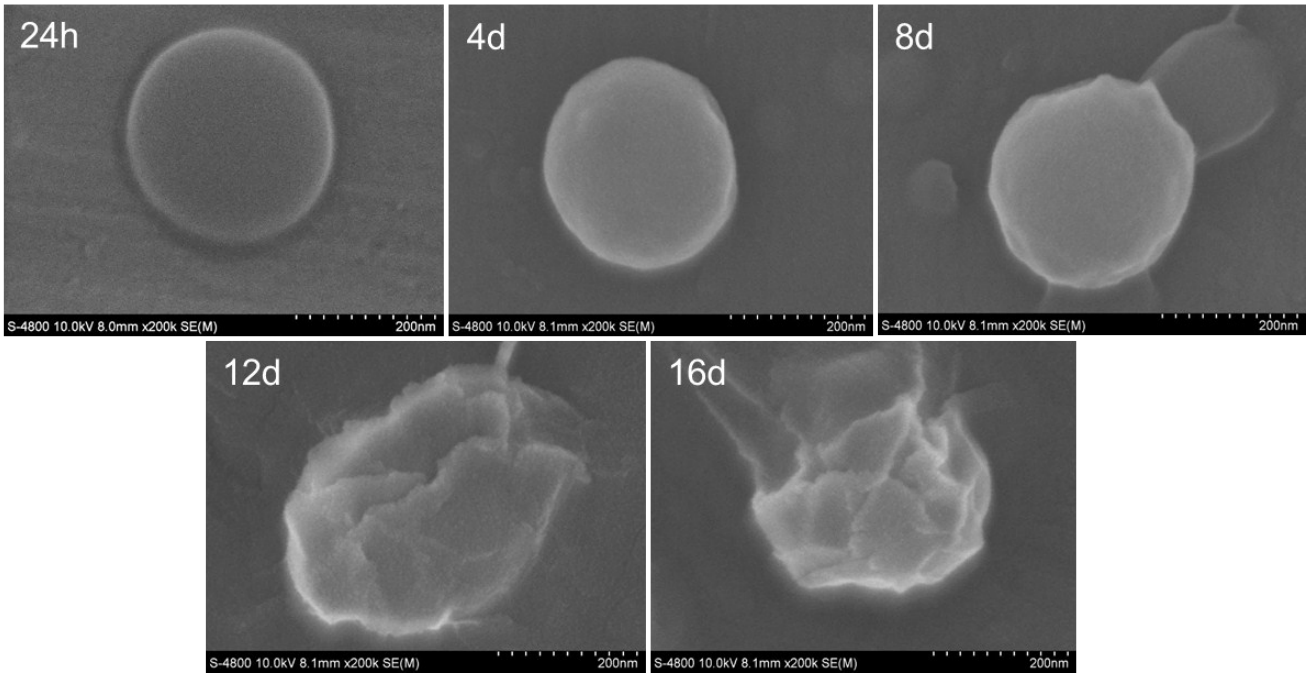


Figure S3. SEM images of electrosprayed CINs incubated in PBS pH 7.4 (0.5 wt% tween 20) at 37 °C for 24h, 4d, 8d, 12d, 16d.

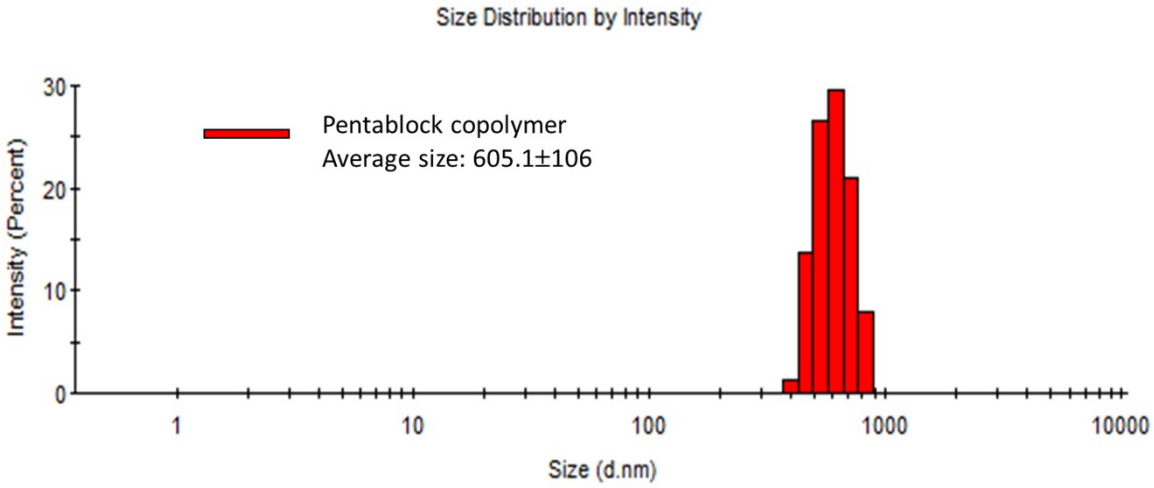


Figure S4. Size distribution of pentablock copolymer micelles in PBS pH 7.4

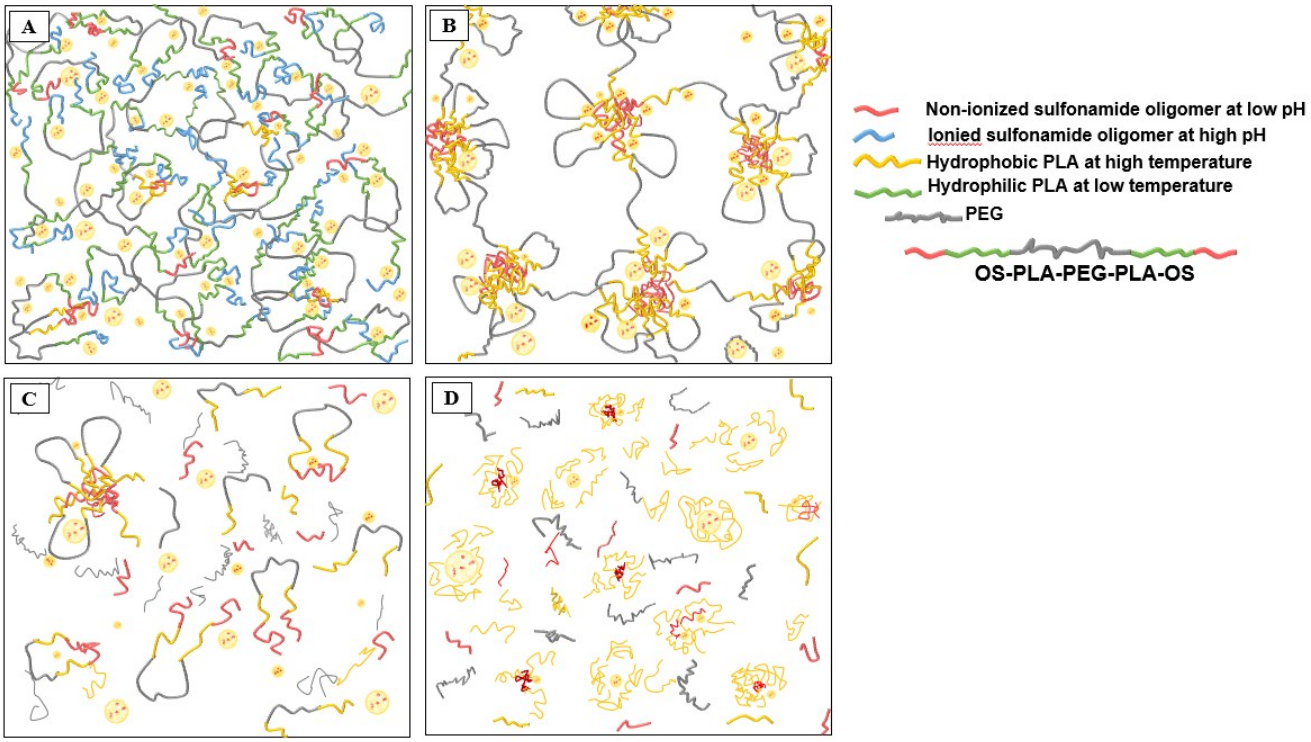


Figure S5. Schematic concept of hydrogels-CINs composite injection and the release of insulin in molecular scale (A) Copolymer solution containing CINs. (B) Hydrogel-CINs composite matrix. (C) Degradation of matrix and the release of CINs. (D) The release of insulin

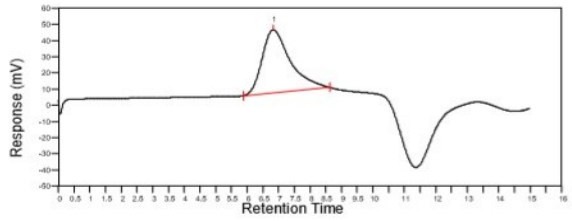
A

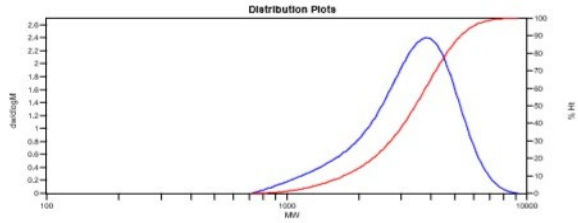
Cirrus GPC Sample Injection Report

Generated by: LAMDONGANH Wednesday, February 13, 2019 7:24 AM
Workbook: C:\Cirrus Workbooks\MESOPORE-035-6\MESOPORE-035-6.plw

Sample Details

Sample Name: PEG2050-PLA2 Batch Name: LINH25102018
Chloroform 1.000000 Concentration: 0.10 mg/ml
Injection Volume: 20.0 ul K of Sample: 14.1000 Alpha of Sample: 0.7000
Analysis Using Method: PEG





MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	3807	2877	3477	4006	4464	3395	1.20855

Peak No	Name	Start RT (mins)	Max RT (mins)	End RT (mins)	Pk Height (mV)	% Height	Area (mV.secs)	% Area
1		5.88	6.83	8.63	39.0477	100	2429.59	100

B

Cirrus GPC Sample Injection Report

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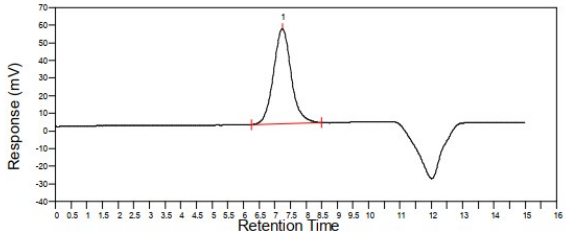
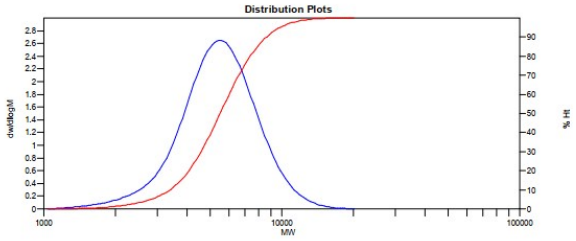
Workbook: C:\Cirrus Workbooks\MESOPORE-34-72-CHLOROFORM\MESOPORE-34-72-CHLOROFORM.plw

Sample Details

Sample Name: PEG2050-2.4PLA Batch Name: NVVLINH_-_FEB2019
Chloroform 1.000000 Concentration: 0.10 mg/ml
Injection Volume: 40.0 ul K of Sample: 14.1000 Alpha of Sample: 0.7000
Analysis Using Method: PEG-13022019





MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	5446	4971	5747	6547	7409	5632	1.15611

Peak No	Name	Start RT (mins)	Max RT (mins)	End RT (mins)	Pk Height (mV)	% Height	Area (mV.secs)	% Area
1		6.27	7.25	8.50	53.978	100	2120.47	100

C

Cirrus GPC Sample Injection Report

Generated by: LAMDONGANH Wednesday, February 13, 2019 9:03 AM
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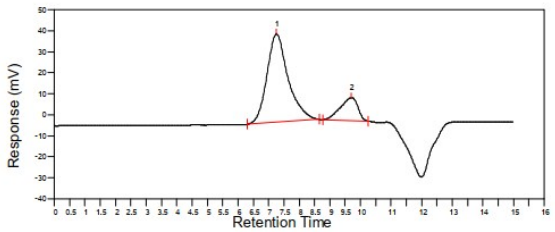
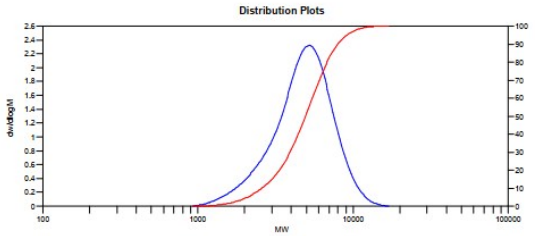
Sample Details

Sample Name: PEG2050-2 PLA-OS12 Batch Name: NVVLINH_-_FEB2019
Chloroform 1.000000 Concentration: 0.10 mg/ml
Injection Volume: 40.0 ul K of Sample: 14.1000 Alpha of Sample: 0.7000
Analysis Using Method: PS





MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	5232	4218	5122	6007	6879	4992	1.21432
2	247	274	303	339	379	298	1.10584

Peak No	Name	Start RT (mins)	Max RT (mins)	End RT (mins)	Pk Height (mV)	% Height	Area (mV.secs)	% Area
1		6.30	7.25	8.65	42.0778	79.3526	2024.61	82.3676
2		8.77	9.70	10.25	10.9486	20.6474	433.407	17.6324

D

Cirrus GPC Sample Injection Report

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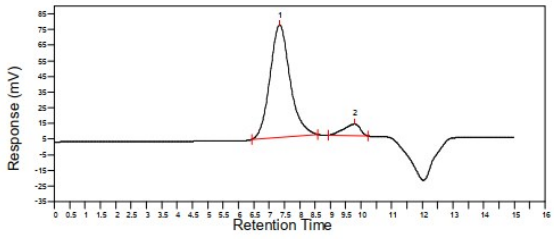
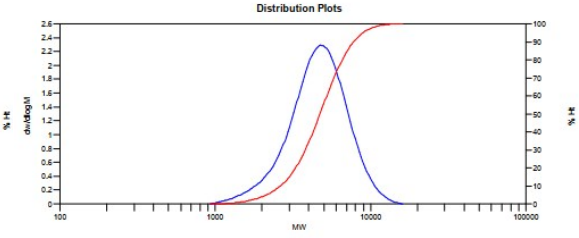
Workbook: C:\Cirrus Workbooks\MESOPORE-34-72-CHLOROFORM\MESOPORE-34-72-CHLOROFORM.plw

Sample Details

Sample Name: PEG 2050-2PLA-OS6 Batch Name: NVVLINH_-_FEB2019
Chloroform 1.000000 Concentration: 0.10 mg/ml
Injection Volume: 40.0 ul K of Sample: 14.1000 Alpha of Sample: 0.7000
Analysis Using Method: PEG-13022019





MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	4769	4130	4968	5828	6714	4843	1.20291
2	189	210	233	261	292	230	1.10952

Peak No	Name	Start RT (mins)	Max RT (mins)	End RT (mins)	Pk Height (mV)	% Height	Area (mV.secs)	% Area
1		6.43	7.35	8.58	71.6953	90.699	3261.79	92.2121
2		8.93	9.78	10.22	7.35218	9.30096	275.481	7.78795

E

Cirrus GPC Sample Injection Report

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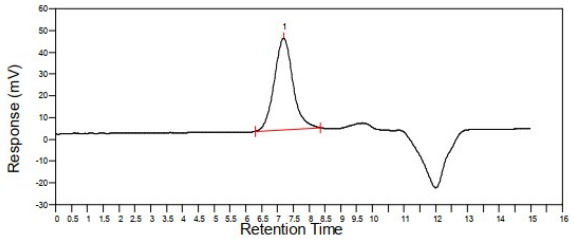
Sample Details

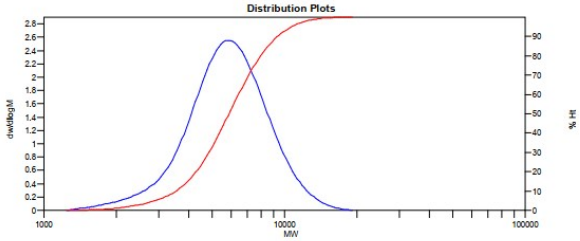
Sample Name: PEG2050-2.4PLA-OS6 Batch Name: NVVLINH_-_FEB2019

Chloroform 1.000000 Concentration: 0.10 mg/ml

Injection Volume: 40.0 ul K of Sample: 14.1000 Alpha of Sample: 0.7000

Analysis Using Method: PEG-13022019





MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	5820	5272	6148	7045	7987	6018	1.16616

Peak No	Name	Start RT (mins)	Max RT (mins)	End RT (mins)	Pk Height (mV)	% Height	Area (mV.secs)	% Area
1		6.30	7.20	8.37	42.0874	100	1717.78	100

Figure S6. GPC results of (A) Triblock copolymer PLA-PEG-PLA (PEG/LA=1/2) (B) Triblock copolymer PLA-PEG-PLA (PEG/LA=1/2.4) (C) Pentablock copolymer PeCo1 (D) Pentablock copolymer PeCo2 (E) Pentablock copolymer PeCo3