SUPPORTING INFORMATION

Bio-based Thermoplastic Poly(Butylene Succinate-*co*-Propylene Succinate) Copolyesters: Effect of Glycerol on Thermal and Mechanical Properties

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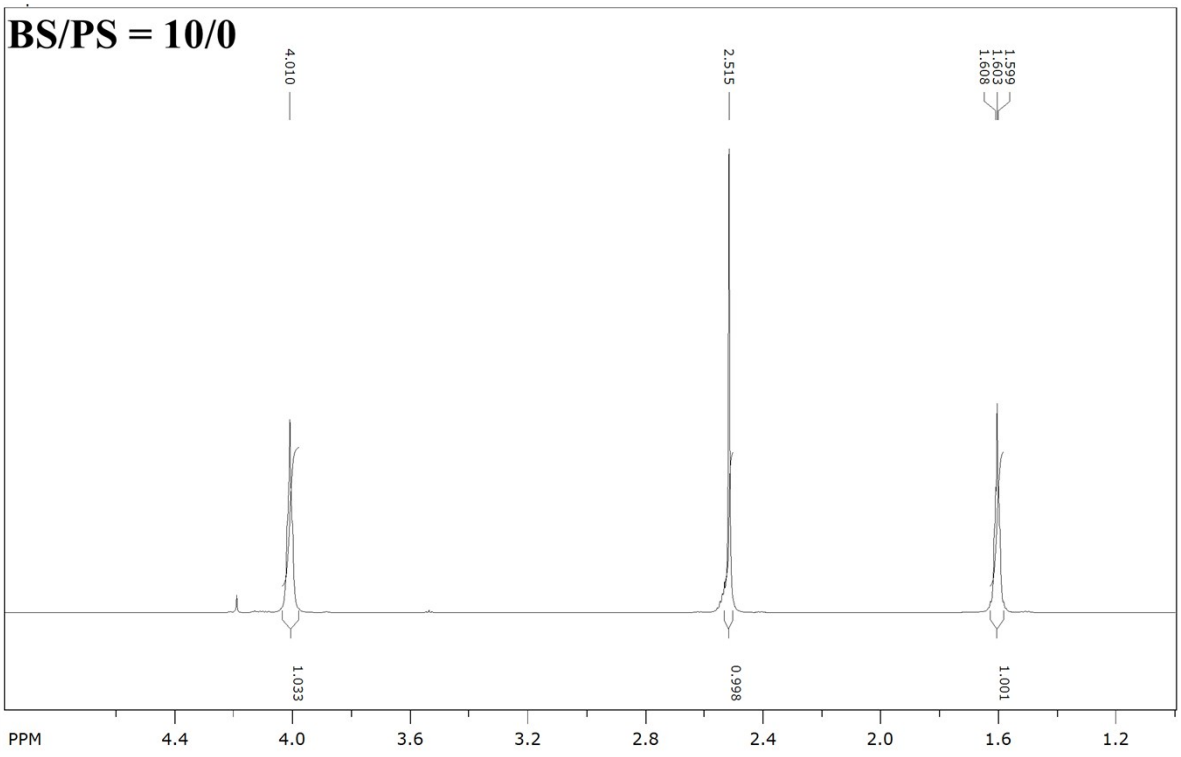
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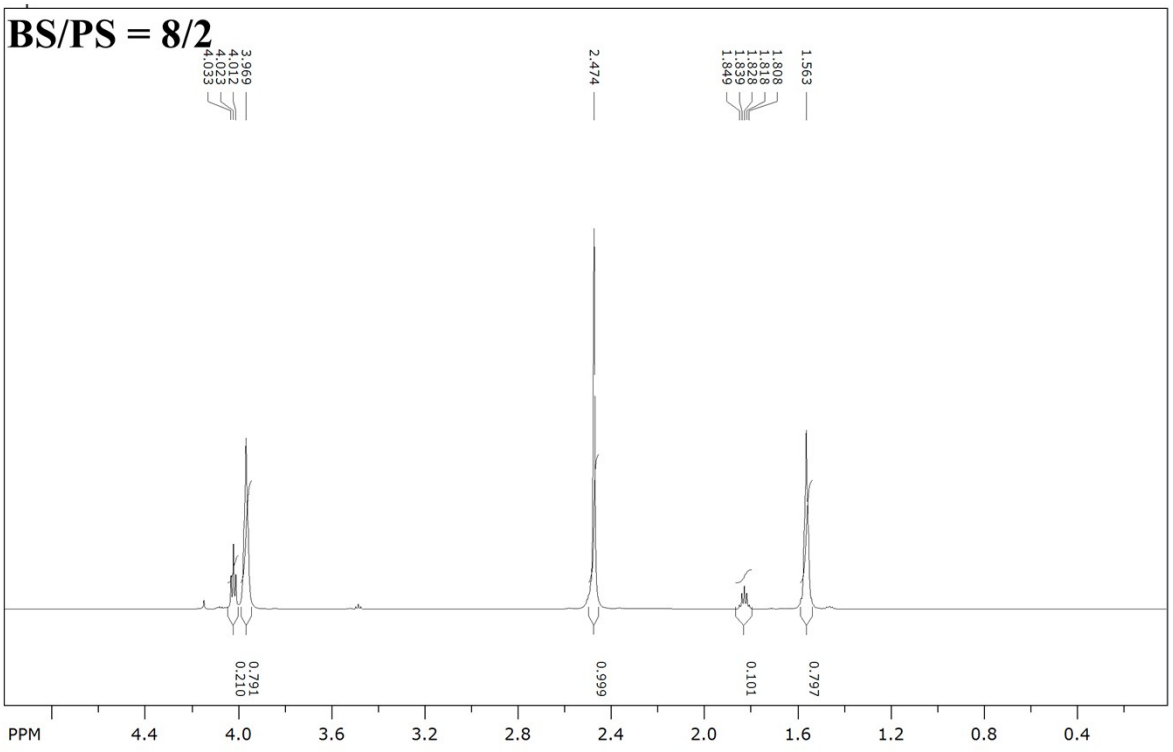
3.2
2.8
2.4
2.0
1.6
1.2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0.999
0.101
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2.4
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1.2
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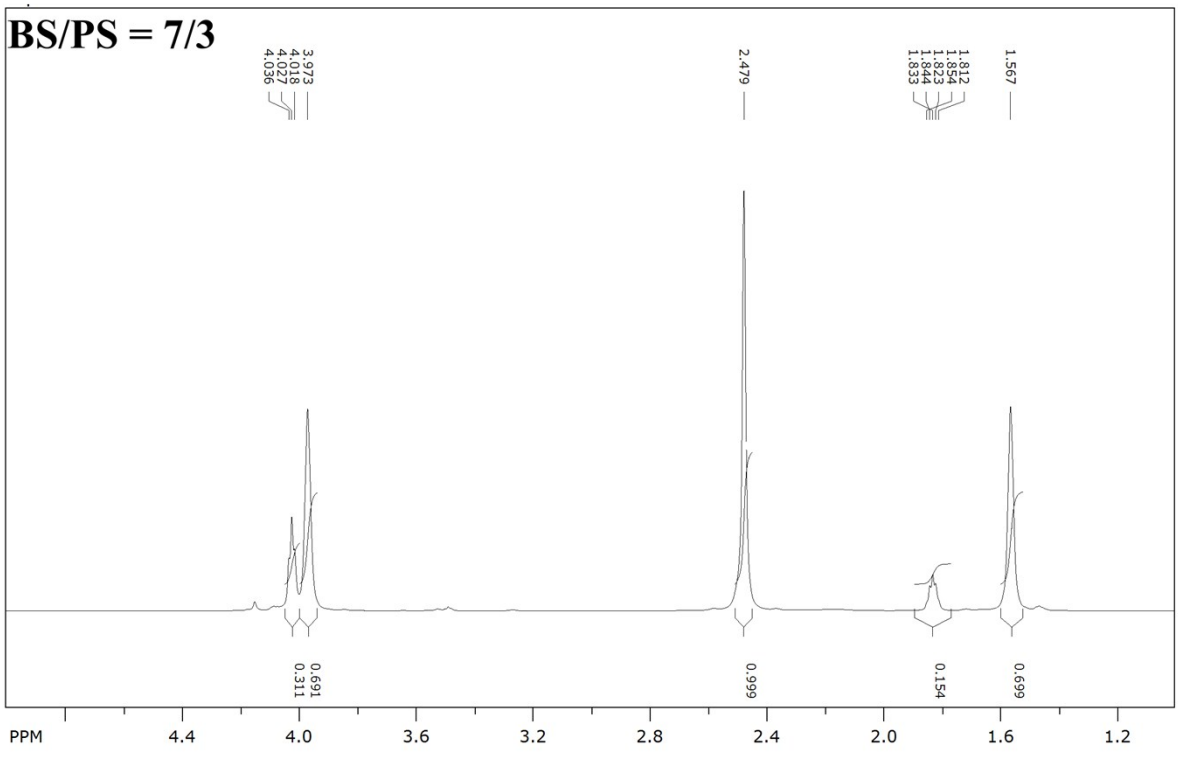
0.4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1.567
0.311
0.691
0.999
0.154
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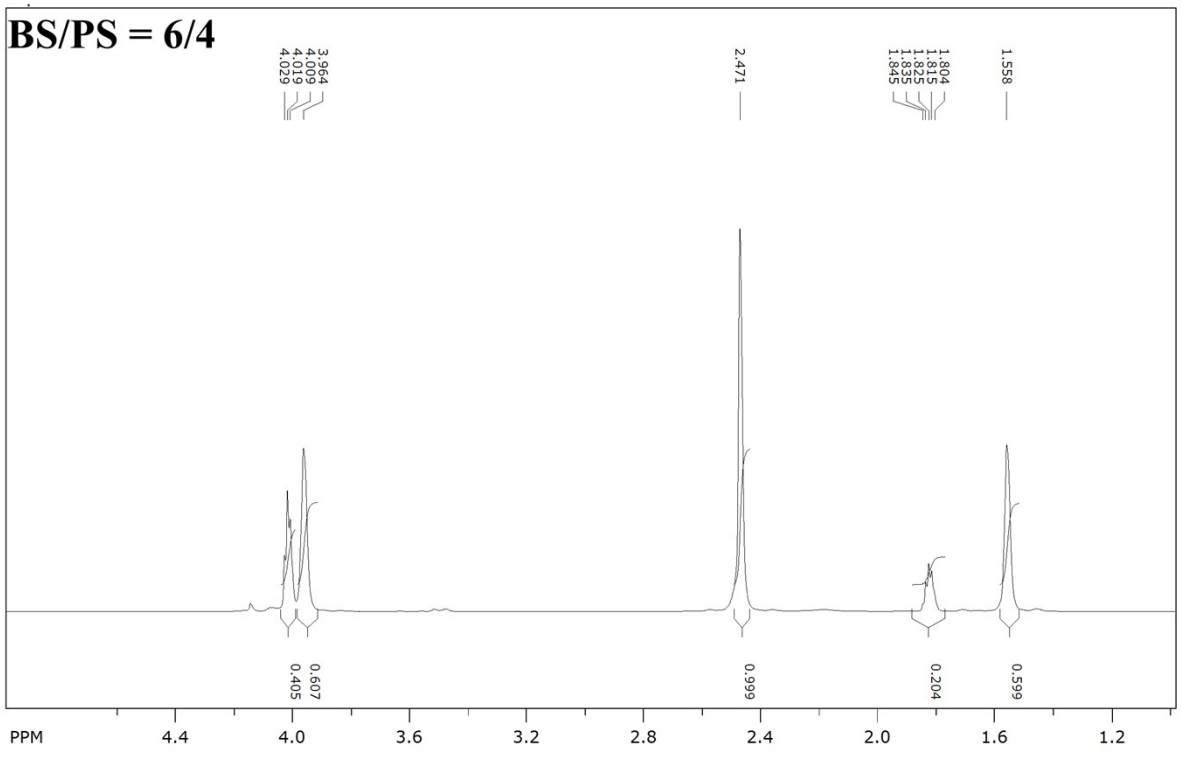
2.4
2.0
1.6
1.2

32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1.815
1.804
1.558
0.405
0.607
0.999
0.204
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PPM
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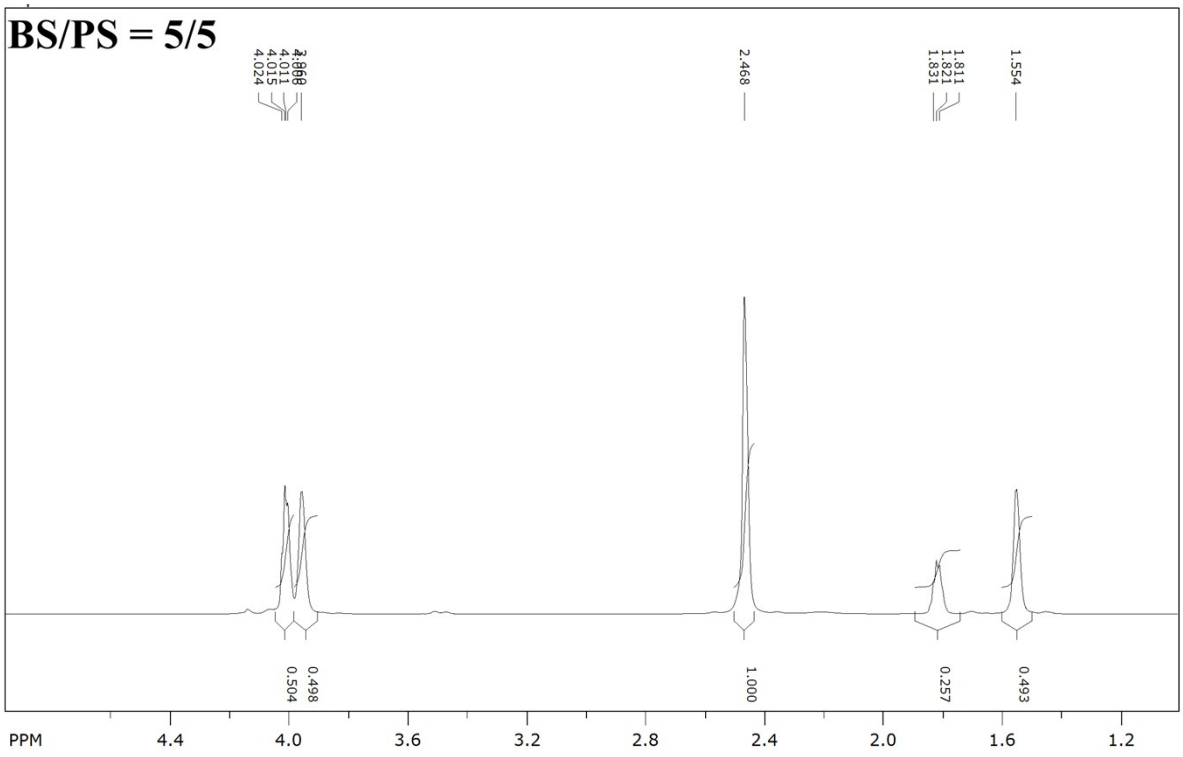
3.6
3.2
2.8
2.4
2.0
1.6
1.2

33



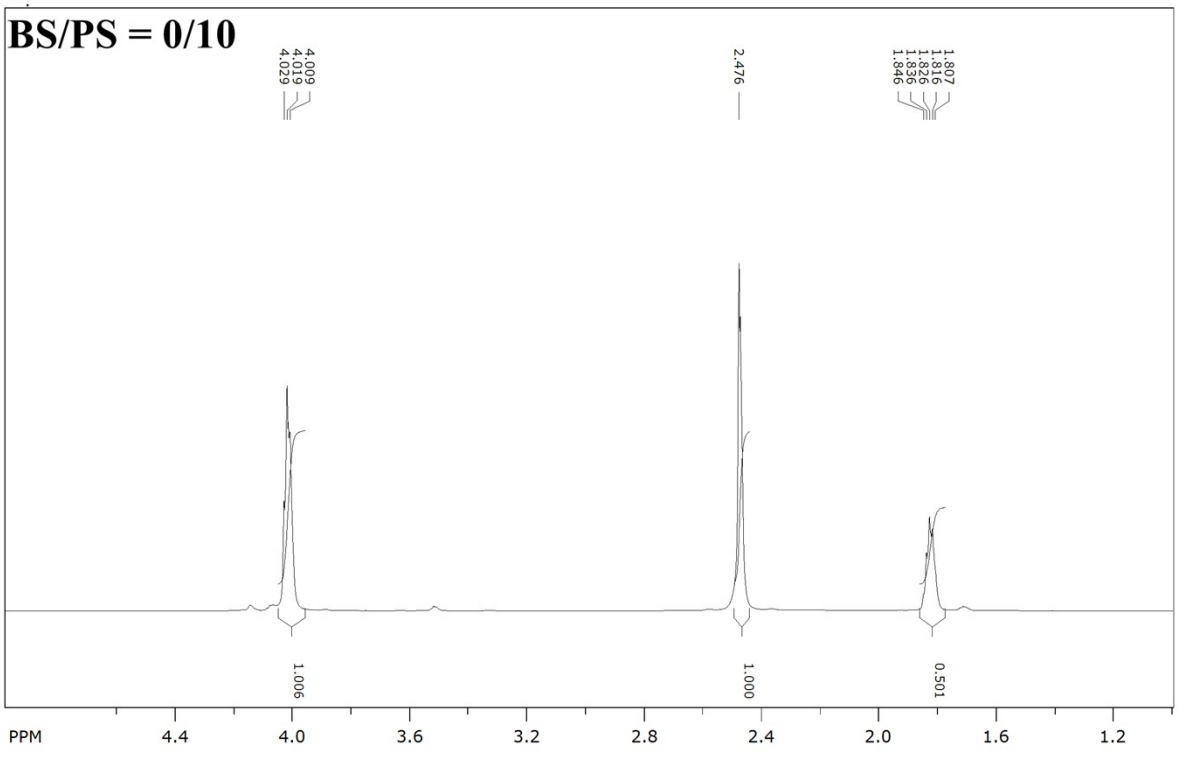
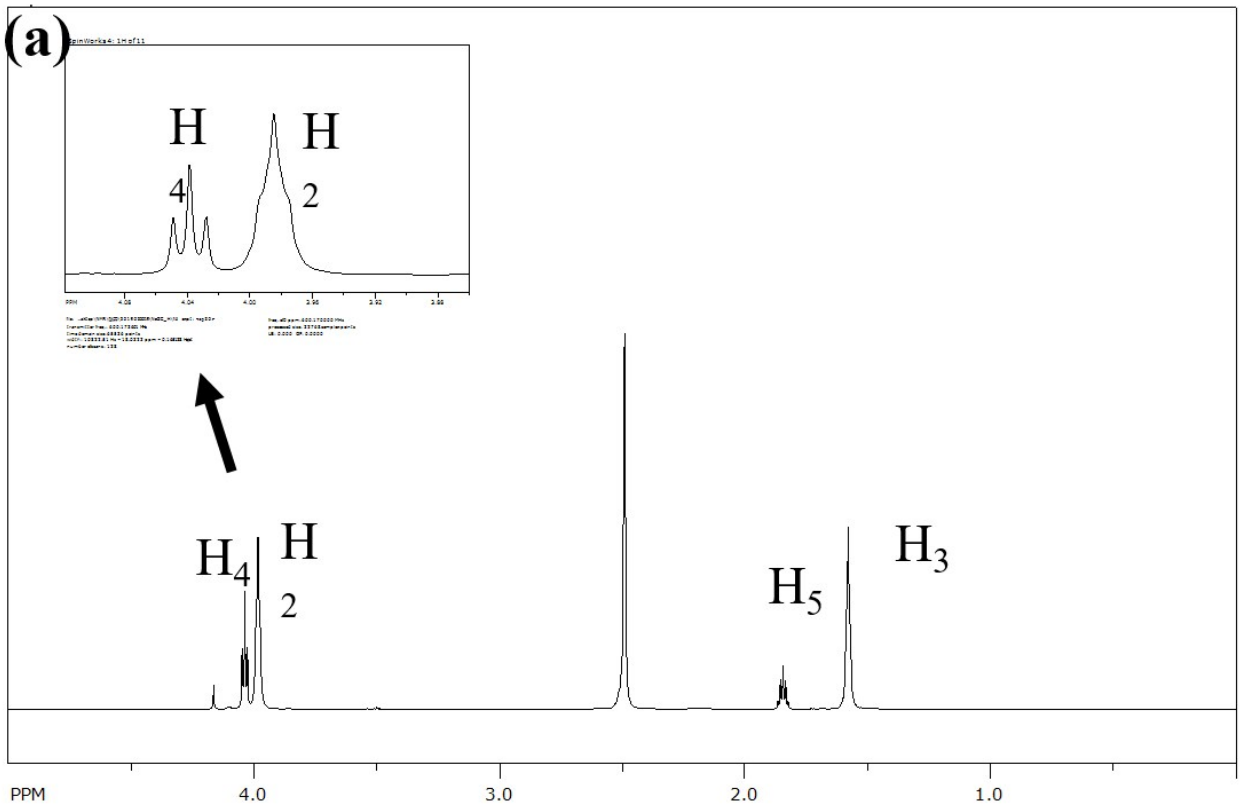
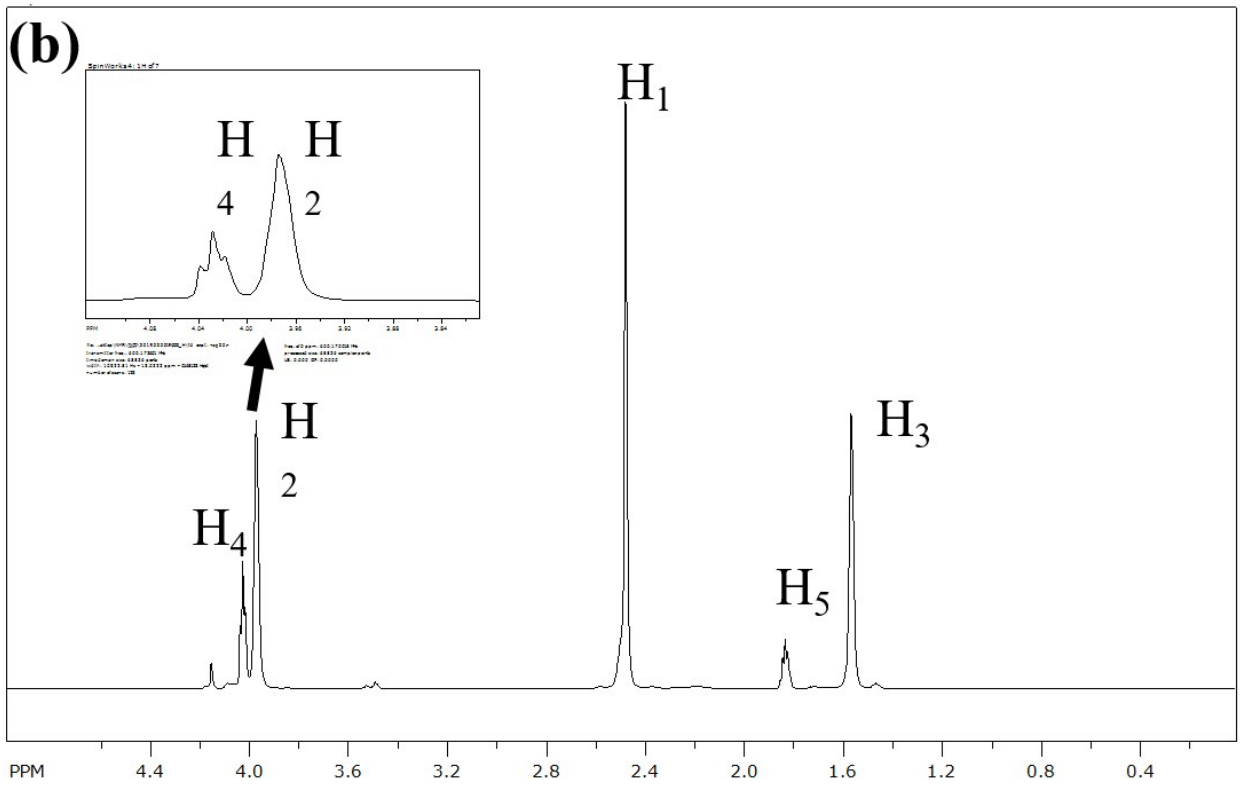


Fig. S1 ^{1}H NMR spectra for the poly(butylene succinate-co-propylene succinate)PBSPS copolyesters at BS/PS = 10/0, 8/2, 7/3, 6/4, 5/5, and 0/10.


(a)
H
4
H
2
H4
H
2
H5
H3
PPM
4.0
3.0
2.0
1.0


(b)
H
4
H
2
H1
H
2
H4
H3
H5
PPM
4.4
4.0
3.6
3.2
2.8
2.4
2.0
1.6
1.2
0.8
0.4

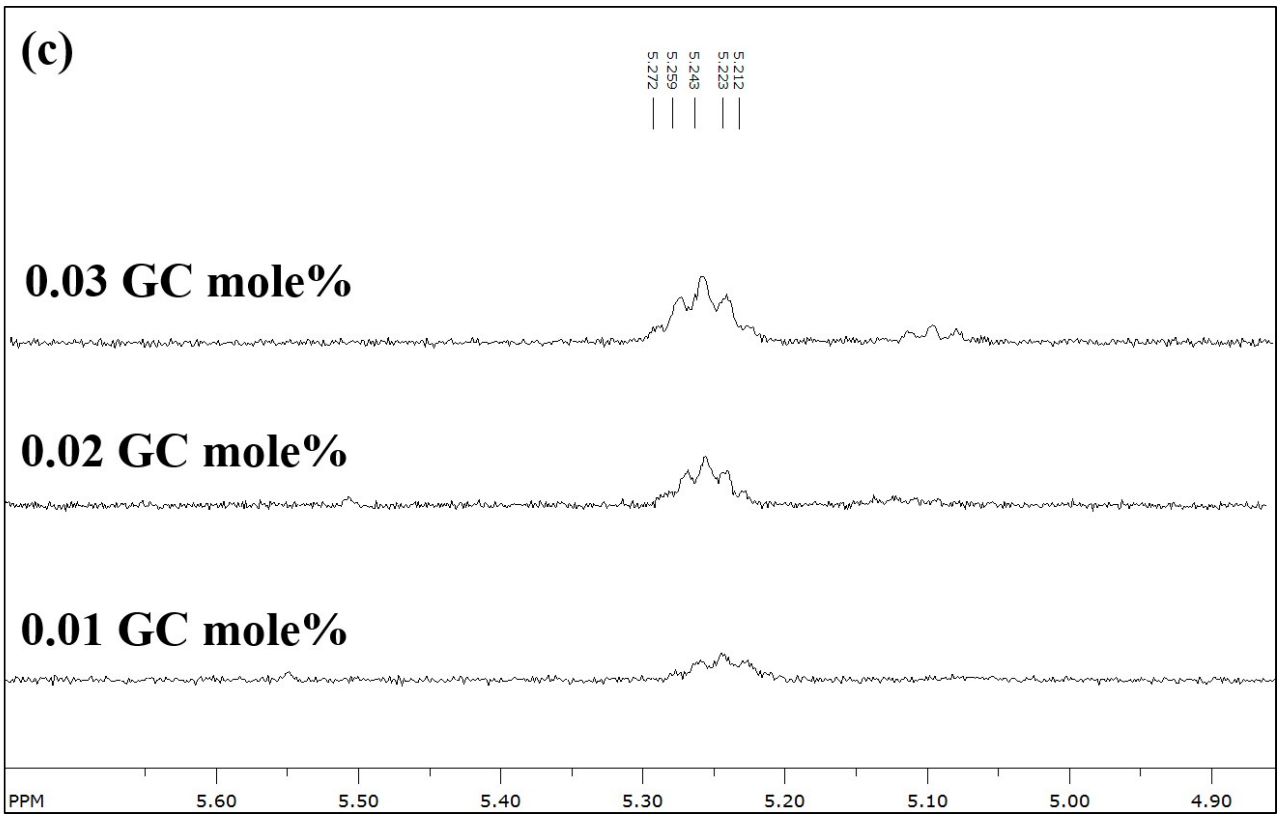
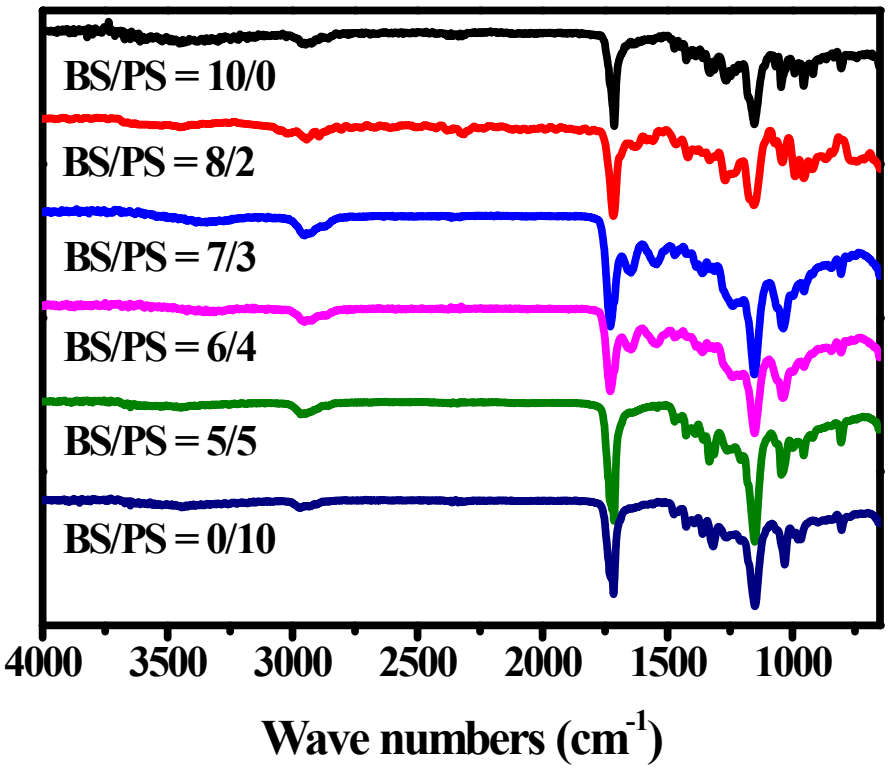


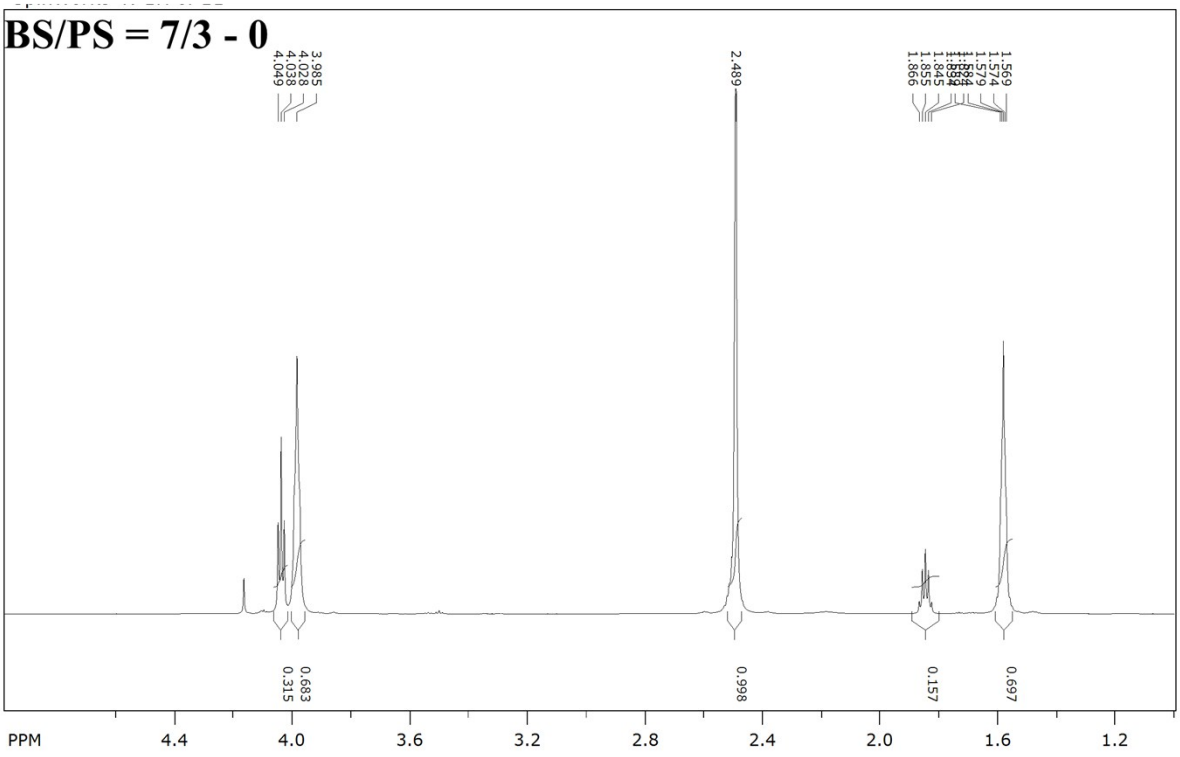
Fig. S2 ^{1}H NMR spectra (a) without GC and (b) with GC at 0.02 mol% (c) with GC at 0.01, 0.02, and 0.03 moel% for the poly(butylene succinate-co-propylene succinate) PBSPS copolyesters at a BS/PS ratio of 7/3.



45

46 **Fig. S3** FTIR spectra of the poly(butylene succinate-co-propylene succinate) PBSPS copolyesters

47 with different BS/PS ratios with 0.02 mole% GC.



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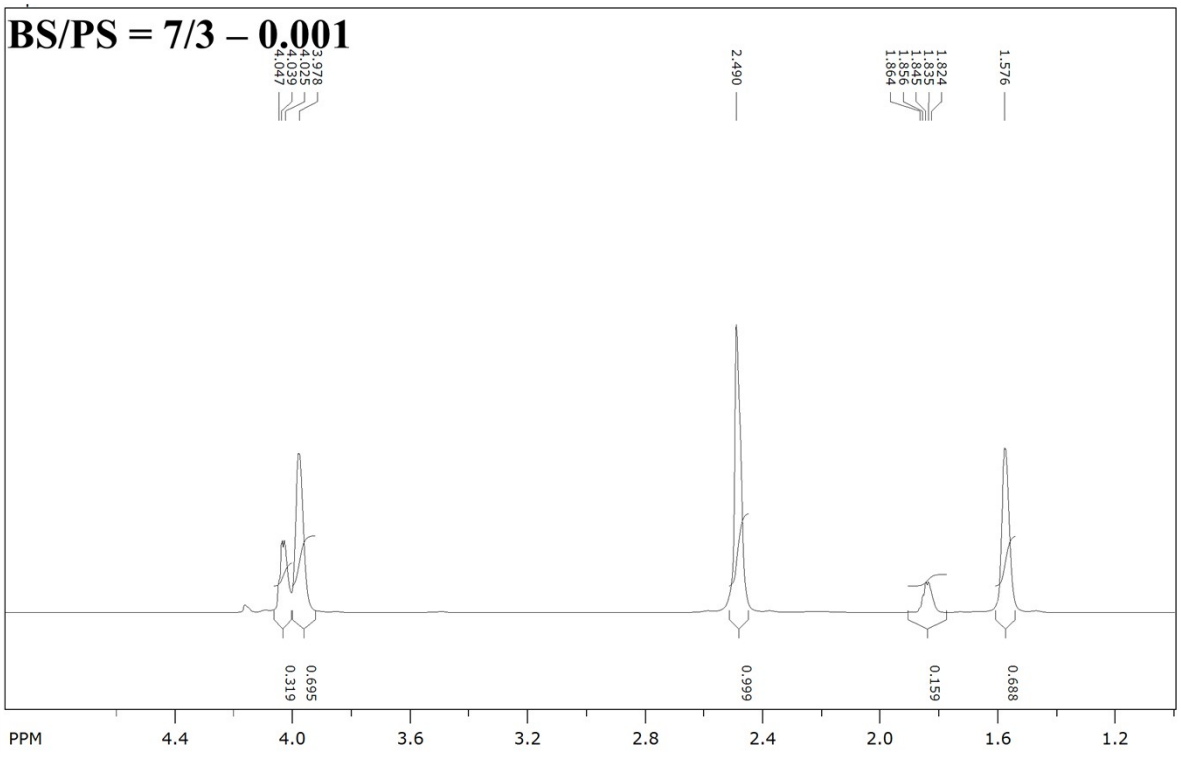
BS/PS = 7/3 – 0.001
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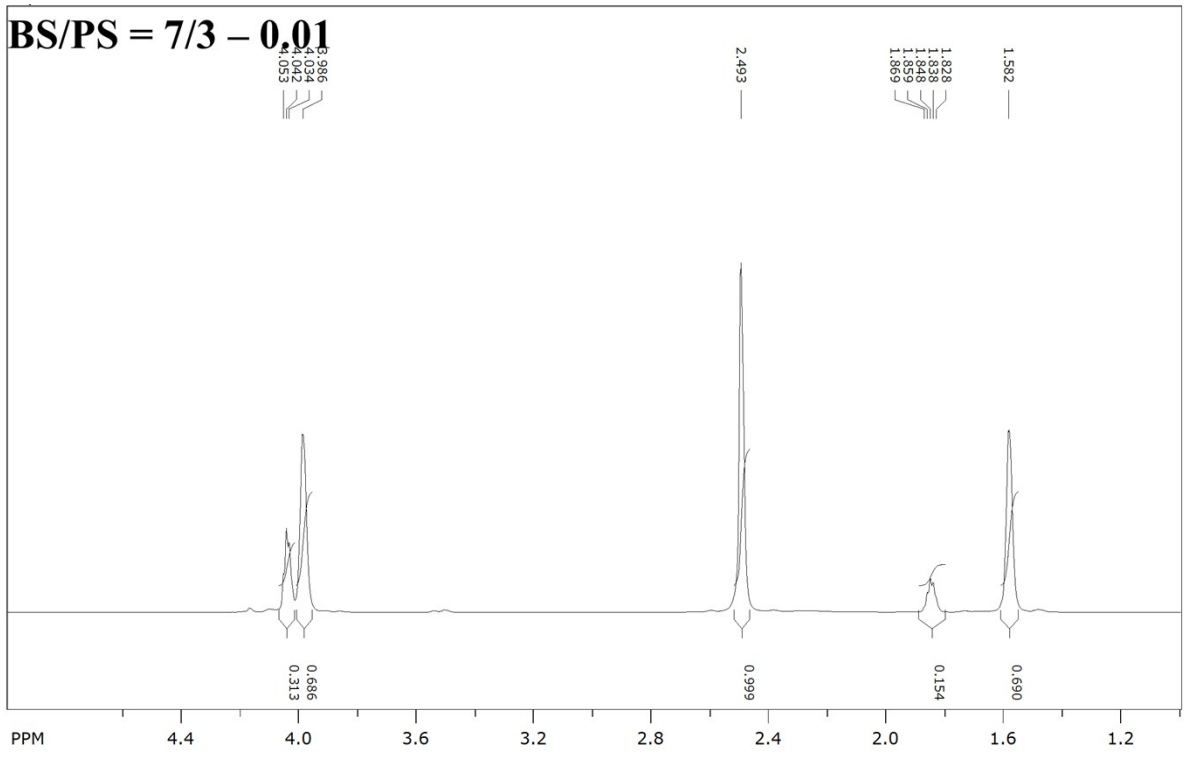
4.039
4.025
3.978
2.490
1.864
1.856
1.845
1.835
1.824
1.576
0.319
0.695
0.999
0.159
0.688
PPM
4.4
4.0
3.6
3.2
2.8
2.4
2.0
1.6
1.2

49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4.034
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2.493
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1.859
1.848
1.838
1.828
1.582
0.313
0.686
0.999
0.154
0.690
PPM
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3.6
3.2
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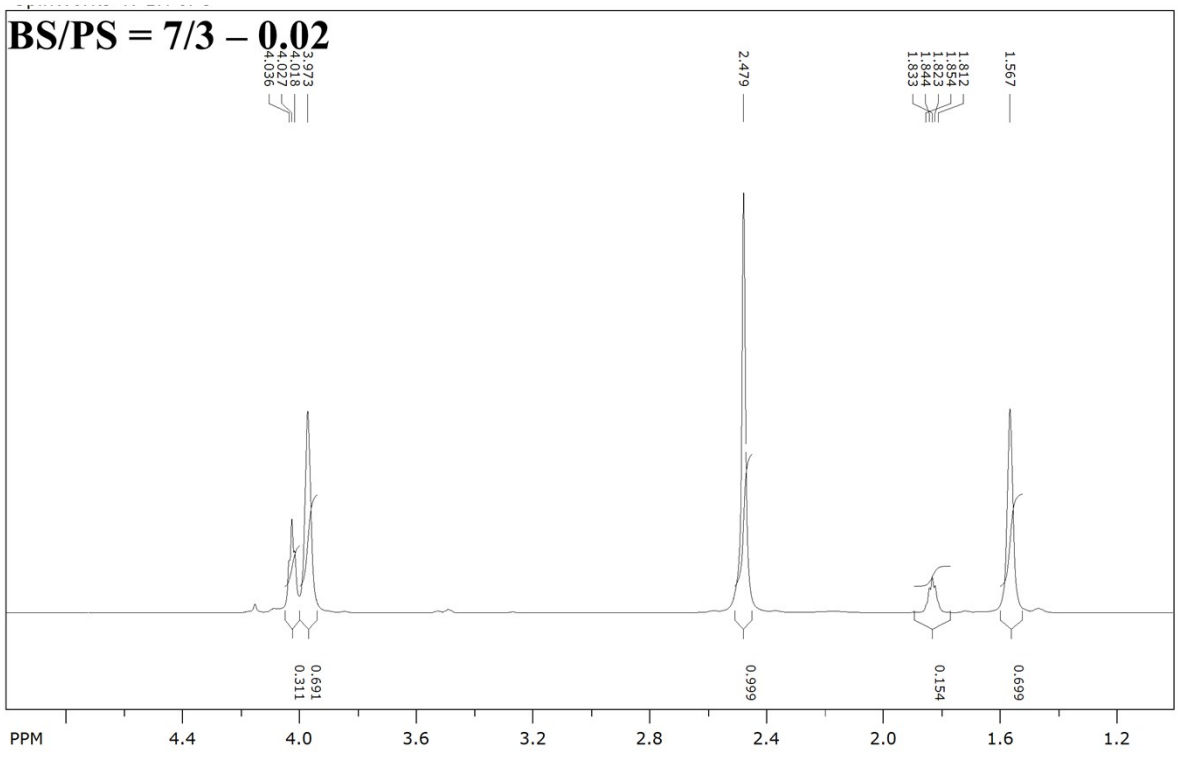
2.4
2.0
1.6
1.2

50



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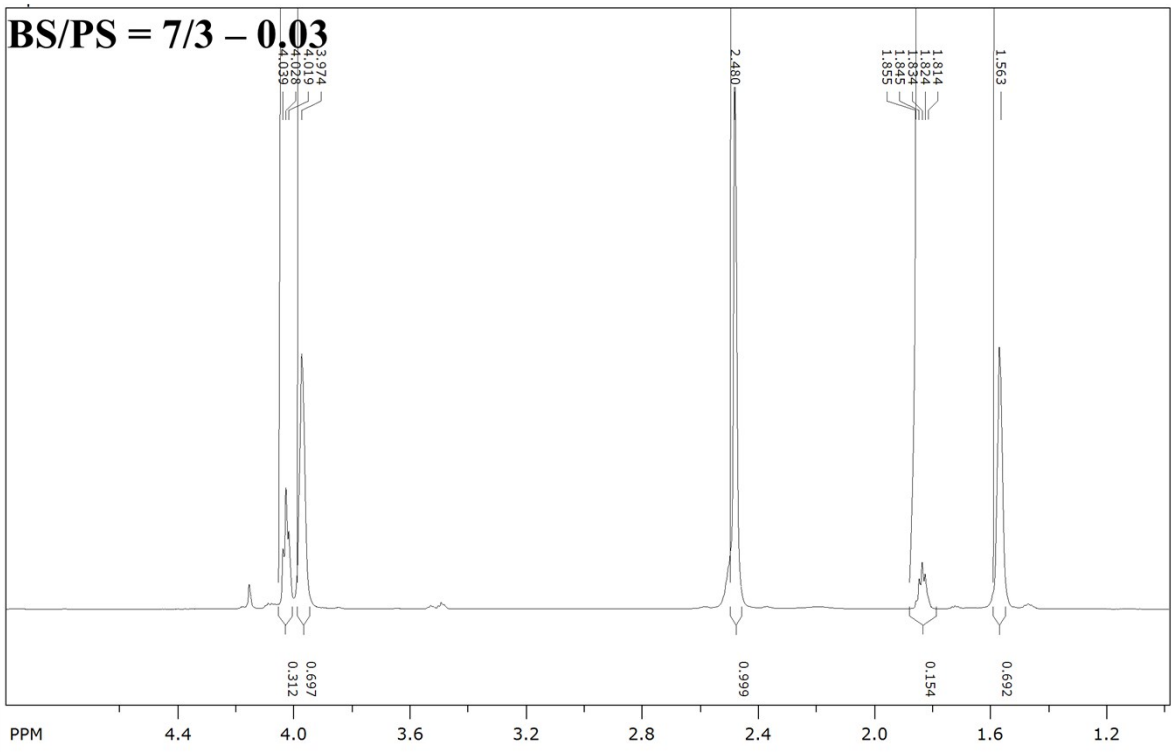

52

53 **Fig. S4** ^{1}H NMR spectra for the poly(butylene succinate-co-propylene succinate) copolyesters with

54 BS/PS = 7/3 and glycerol contents 0, 0.001, 0.01, 0.02, and 0.03 mol%

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56

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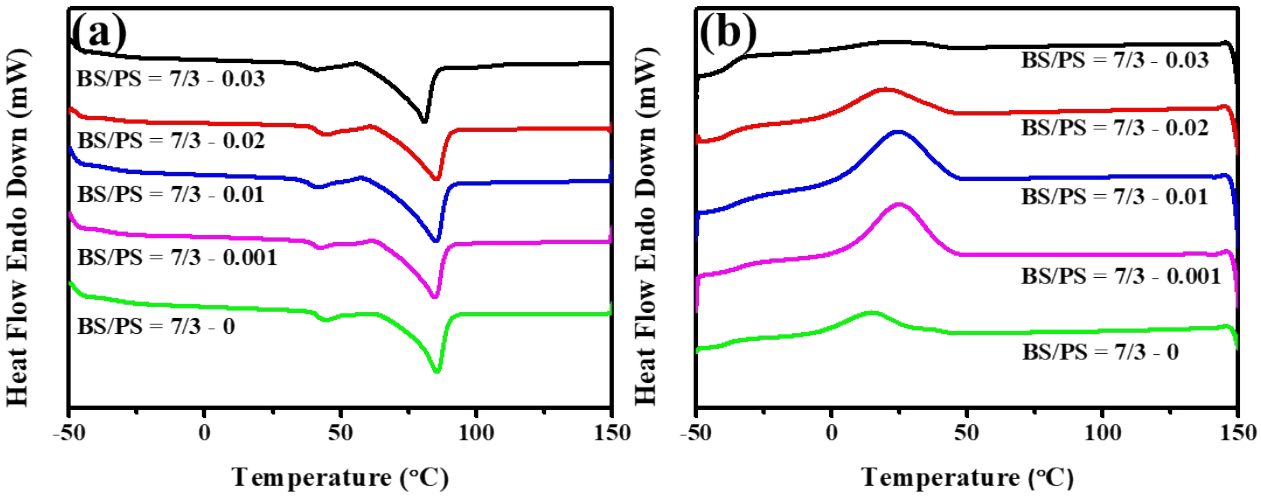

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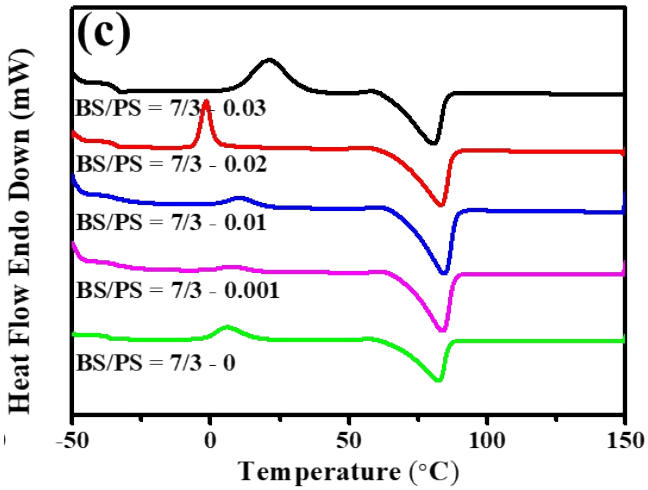
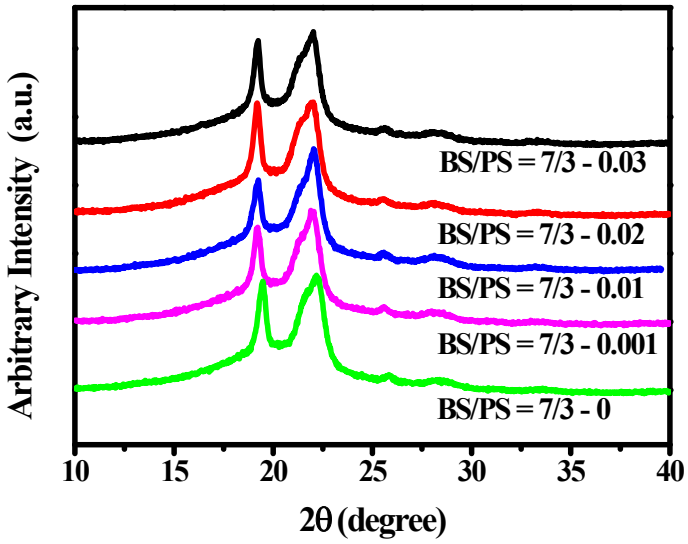


59

60 **Fig. S5** DSC traces of the poly(butylene succinate-co-propylene succinate)PBSPS copolyesters at
61 fixed BS/PS = 7/3 with various GC content at a heating rate of 10 ℃/min: (a) heating curves in the
62 first cycle, (b) cooling curves in the first cycle, and (c) heating curves in the second cycle.

63

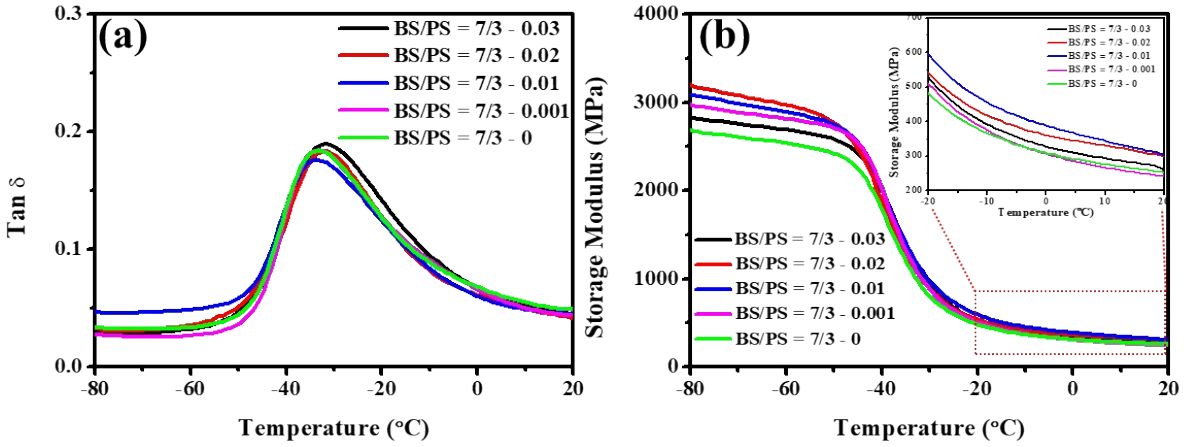


64

65 **Fig. S6**. WAXD patterns of the poly(butylene succinate-co-propylene succinate) PBSPS

66 copolyesters at fixed BS/PS = 7/3 with different GC contents.

67



68

69 **Fig. S7** (a) Tan δ curves and (b) storage moduli of copolyesters at fixed BS/PS = 7/3 with different

70 GC content at a heating rate of 5 ℃/min and a frequency of 1 Hz.

71

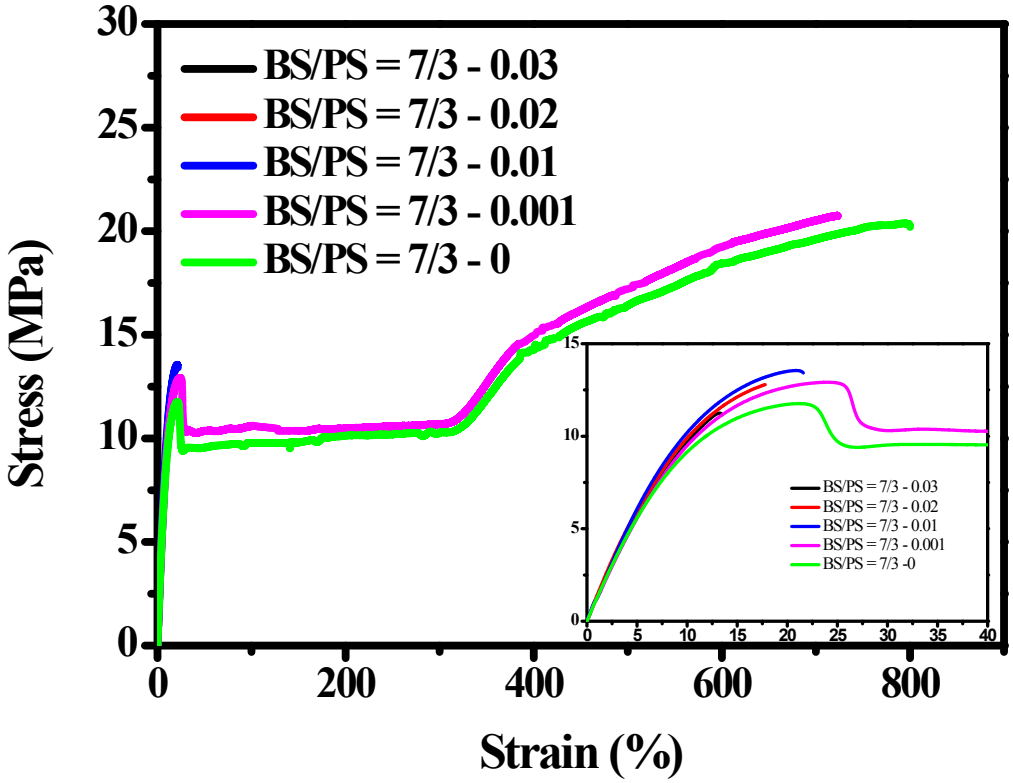


Fig. S8 Stress-strain curves of copolyesters at fixed BS/PS = 7/3 with different GC contents at a testing speed of 50 mm/min.

Table S1 Feed and calculated ratios of BS in poly(butylene succinate-co-propylene succinate) PBSPS

copolyesters; chemical shifts of H_1 to H_5 (ppm) and their integral ratios (value in brackets) of ^1H NMR spectra for PBSPS copolyesters with 0.02 mole% GC.

Item BS/PS	**Feed ratio**	**Calculated ratio**	**H_1 (ppm)**	**H_2 (ppm)**	**H_3 (ppm)**	**H_4 (ppm)**	**H_5 (ppm)**	**H_7 (ppm)**
10/0	100	100	2.515	4.010	1.603			
			(1.000)	(1.003)	(1.001)			
8/2	80	79.7	2.474	3.969	1.563	4.023	1.828	5.245
			(1.000)	(0.791)	(0.797)	(0.210)	(0.101)	(0.006)
7/3	70	69.9	2.479	3.973	1.567	4.027	1.823	5.244
			(1.000)	(0.691)	(0.699)	(0.311)	(0.154)	(0.006)
6/4	60	59.9	2.471	3.964	1.558	4.019	1.825	5.246
			(1.000)	(0.607)	(0.599)	(0.405)	(0.599)	(0.006)
5/5	50	49.3	2.468	3.968	1.554	4.015	1.821	5.245
			(1.000)	(0.498)	(0.493)	(0.493)	(0.257)	(0.006)
0/10	0	0	2.476			4.019	1.826	5.246
			(1.000)			(1.006)	(0.501)	(0.006)

Table S2 Molar fractions, probabilities of triad sequences, randomness factors (*B*), and average sequence lengths (Ln_{BS} and Ln_{PS}) at a fixed ratio of BS/PS = 7/3 with different GC contents.

BS/PS = 7/3 GC mole%	**Normalized peak areas of carbonyl carbons (%)**				**Triad sequence probabilities (%)**		
	BSB	**BSP-B**	**BSP-P**	**PSP**	**P(BSB)**	**P(BSP)**	**P(PSP)**
GC = 0.03	45.9	19.2	16.8	18.1	45.9	36.0	18.1
GC = 0.02	46.3	17.4	19.9	16.4	46.3	37.3	16.4
GC = 0.01	43.8	22.2	18.0	16.0	43.8	40.2	16.0
GC = 0.001	44.7	20.0	20.6	14.7	44.7	40.6	14.7
GC = 0	44.5	22.7	19.3	13.5	44.5	42.0	13.5

BS/PS 7/3 GC mole%	**^{1}H NMR**			**^{13}C NMR**				
	BS(%)	**PS(%)**	**GC(%)**	**BS(%)**	**PS(%)**	**B**	**Ln_{BS}**	**Ln_{PS}**
GC = 0.03	69.2	30.8	0.002	63.9	36.1	0.78	3.55	2.01
GC = 0.02	69.9	30.1	0.0015	64.9	35.1	0.82	3.48	1.88
GC = 0.01	69.0	31.0	0.00125	63.9	36.1	0.87	3.18	1.79
GC = 0.001	69.8	30.2	*	65.0	35.0	0.89	3.20	1.62
GC = 0	69.7	30.2	--	65.5	34.5	0.93	3.11	1.64

*GC can not be observed in ^{1}H NMR.