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APPENDICES

Appendix A Polymer Solution Properties: the viscosity and conductivity of PHB and PHBV solution

In electrospinning, the viscosity of the solution plays an important role in determining the range of concentration from which continuous fiber can be obtained. The change in solution viscosity with increasing the concentration of PHB and PHBV were measured in Table A1 (PHB, MW = 300,000 and PHBV, MW = 680,000)

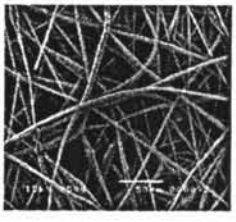
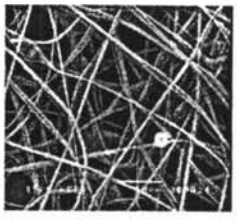
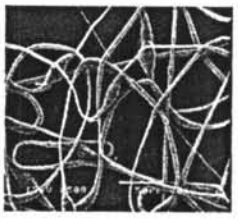
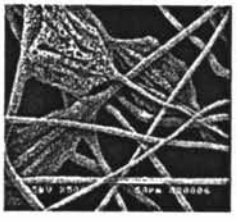
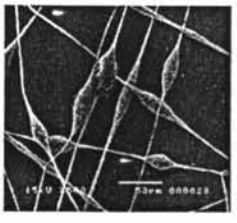
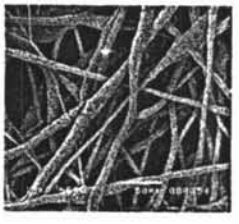
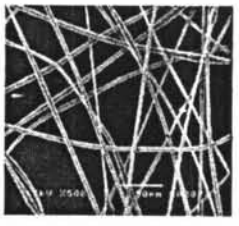
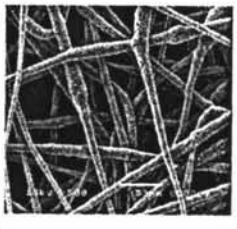
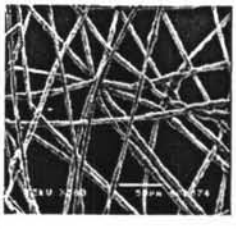
Table A1 Viscosity at 50°C of PHB and PHBV solutions

Polymer Solution	Conc. (wt.%)	Viscoity (cP)				
		1st	2nd	3rd	Avg.	sd.
PHB	10	366	423	310	366.33	56.50
	12	702	593	606	633.67	59.53
	14	1159	1287	1181	1209.00	68.44
	16	1822	1606	1976	1801.33	185.86
PHBV	10	235	483	360	359.33	124.00
	12	395	1020	710	708.33	312.50
	14	753	760	755	756.00	3.61
	16	1530	1800	1765	1698.33	146.83

Table A2 Conductivity at 25°C of PHB and PHBV solution

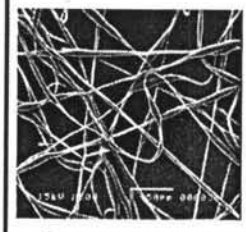
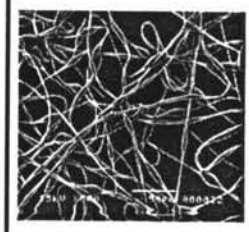
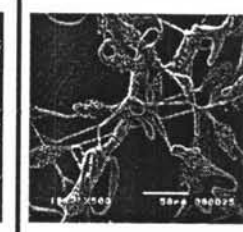
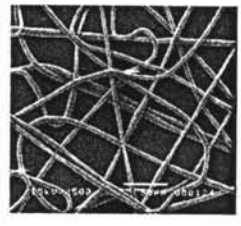
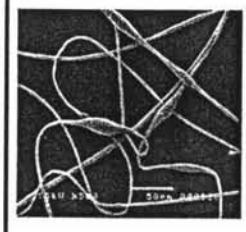
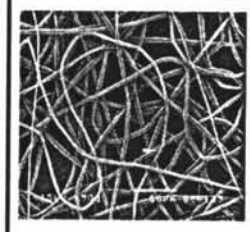
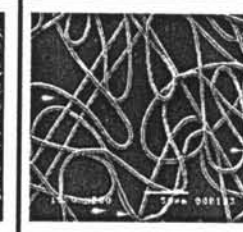
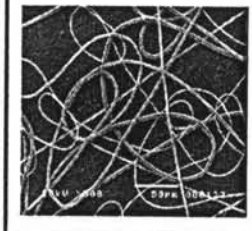
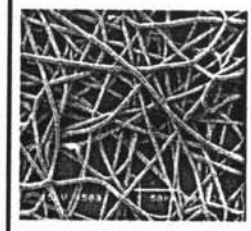
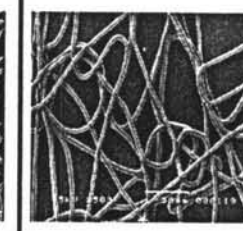
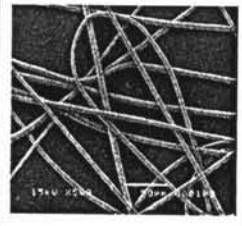
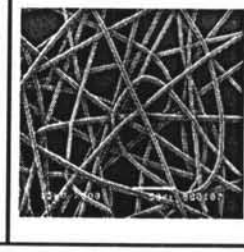
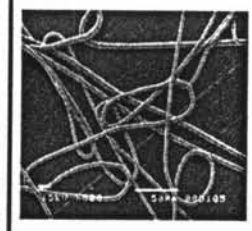
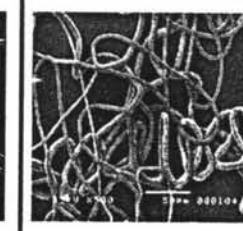
Polymer Solution	Conc. (wt.%)	Electrical Conductivity (μs/cm)				
		1st	2nd	3rd	Avg.	sd.
PHB	10	0.06	0.07	0.06	0.063	0.006
	12	0.07	0.07	0.07	0.07	0
	14	0.07	0.07	0.07	0.07	0
	16	0.07	0.07	0.07	0.07	0
PHBV	10	0.06	0.05	0.05	0.053	0.006
	12	0.07	0.06	0.06	0.063	0.006
	14	0.07	0.07	0.07	0.07	0
	16	0.08	0.07	0.08	0.077	0.006

Appendix B Influence of Solution Properties on Fiber Sizes

Conc. (%w/v)	Applied voltage (kV)			
	8	10	12	14
10				
12				
14				
16				

Note: scale bar = 50 μm

Figure B1 The morphology of PHB as spun fibers at applied voltage from 8 to 14kV at concentration from 10 to 16%w/v with a constant tip-to-collector distance of 20cm. (collection time 5min).

Conc. (%w/v)	Applied voltage (kV)			
	8	10	12	14
10				
12				
14				
16				

Note: scale bar = 50 μm

Figure B2 The morphology of PHBV as spun fibers at applied voltage from 8 to 14kV at concentration from 10 to 16%w/v with a constant tip-to-collector distance of 20cm. (collection time 5min).

Appendix C Mechanical Evaluation

Results of mechanical testing of the solution-cast films and electrospun scaffolds of PHB and PHBV were presented in Table C1, Table C2 and Table C3

Table C1. Tensile Strength of electrospun scaffolds

No. of sample	Tensile strength(MPa)	
	PHB As pun fiber	**PHBV As pun fiber**
1	1.53	1.98
2	1.64	1.86
3	1.67	1.82
4	1.65	1.97
5	1.63	1.72
6	1.57	1.52
7	1.52	1.57
8	1.52	1.61
9	1.63	1.85
10	1.66	1.70
Avg.	1.60	1.76
Sd.	0.06	0.16

Table C2 Young's Modulus of electrospun scaffolds

No. of sample	Young's Modulus (MPa)	
	PHB As pun fiber	**PHBV As pun fiber**
1	142.90	105.87
2	139.53	131.18
3	145.32	121.61
4	157.84	124.97
5	144.05	120.29
6	140.43	110.35
7	146.39	136.59
8	156.20	123.36
9	152.90	142.65
10	147.08	140.40
Avg.	147.26	125.73
Sd.	6.36	12.17

Table C3 Percentage strain at break of electrospun scaffolds

No. of sample	Percentage strain at break (%)	
	PHB As pun fiber	**PHBV As pun fiber**
1	2.66	3.48
2	1.17	3.99
3	1.77	4.65
4	2.01	3.97
5	2.47	2.21
6	3.02	2.22
7	2.30	3.15
8	3.72	3.33
9	1.99	3.42
10	1.60	3.15
Avg.	2.27	3.36
Sd.	0.74	0.72

Appendix D Physical Evaluation of PHB/PHBV Solution-Cast Films and Electrospun Scaffolds: Contact Angle

Wettability was examined by measuring contact angles. The contact angles were measured for the films and electrospun ultrafine fiber meshs with a sessile drop method using a Contact Angle Meter. Distilled water of approximately 40 μl was gently plated on the surface of the specimens. At least ten reading on different parts of the specimens were averaged for data collecting as shown in Table D1.

Table D1 Contact angle of solution-cast films and eiectrospun scaffolds

No	Contact angle θ(°)			
	PHB		PHBV	
	Casting film	As pun fiber	Casting film	As pun fiber
1	80.00	104.50	77.00	100.00
2	80.00	104.00	77.00	100.00
3	80.00	104.00	78.00	100.00
4	80.00	104.00	78.00	103.00
5	80.00	104.00	76.00	104.00
Avg.	80.00	104.10	77.20	101.40
Sd.	0.00	0.22	0.84	1.95

Appendix E Cell Study

Indirect cytotoxic, cell adhesion and cell proliferation were evaluated on fibrous scaffolds from electrospun mats of PHB and PHBV based on viability of Schwann cells (RT4-D6P2T) and mouse fibroblasts (L929).

Table E1 Raw data of Indirect Cytotoxicity (Measured 1st times)

No. of sample	RT4-D6P2T			L929		
	TCP	As spun fiber		TCP	As spun fiber	
		PHB	PHBV		PHB	PHBV
1	1.00	0.98	0.99	0.47	0.59	0.64
2	1.00	0.99	1.00	0.47	0.59	0.63
3	1.03	0.99	1.02	0.49	0.61	0.66
4	1.03	1.03	1.02	0.46	0.58	0.65
Avg.	1.02	0.99	1.01	0.47	0.59	0.65
Sd.	0.01	0.02	0.01	0.01	0.01	0.02

Table E2 Raw data of Indirect Cytotoxicity (Measured 2nd times)

No. of sample	RT4-D6P2T			L929		
	TCP	As spun fiber		TCP	As spun fiber	
		PHB	PHBV		PHB	PHBV
1	0.65	0.68	0.49	0.47	0.60	0.65
2	0.66	0.71	0.60	0.49	0.59	0.64
3	0.71	0.87	0.61	0.45	0.58	0.65
4	0.76	0.92	0.97	0.49	0.57	0.66
Avg.	0.69	0.79	0.67	0.48	0.59	0.65
Sd.	0.05	0.12	0.21	0.02	0.01	0.01

Table E3 Raw data of Schwann cells adhesion on solution-cast films and electrospun scaffold at 2, 4, 8 and 16h (Measured 1st times)

Time	TCP	Casting film		As spun fiber	
		PHB	PHBV	PHB	PHBV
2h	0.488	0.253	0.256	0.219	0.193
2h	0.489	0.277	0.276	0.220	0.217
2h	0.503	0.290	0.278	0.225	0.284
2h	0.520	0.291	0.282	0.230	0.328
Avg.	0.500	0.278	0.273	0.224	0.256
SD.	0.015	0.018	0.012	0.005	0.062
4h	0.510	0.224	0.253	0.184	0.204
4h	0.527	0.265	0.285	0.576	0.185
4h	0.529	0.274	0.583	0.510	0.191
4h	0.531	0.288	0.303	0.230	0.397
Avg.	0.524	0.263	0.356	0.375	0.244
SD.	0.010	0.028	0.153	0.197	0.102
8h	0.405	0.280	0.223	0.196	0.199
8h	0.439	0.289	0.230	0.314	0.257
8h	0.651	0.338	0.262	0.316	0.284
8h	0.668	0.350	0.298	0.358	0.304
Avg.	0.541	0.314	0.253	0.296	0.261
SD.	0.138	0.035	0.034	0.070	0.046
16h	0.526	0.213	0.240	0.189	0.204
16h	0.639	0.225	0.241	0.190	0.210
16h	0.679	0.230	0.243	0.205	0.226
16h	0.715	0.234	0.245	0.219	0.254
Avg.	0.640	0.226	0.242	0.201	0.224
SD.	0.082	0.009	0.002	0.014	0.022

Table E4 Raw data of Schwann cells adhesion on solution-cast films and electrospun scaffold at 2, 4, 8 and 16h (Measured 2nd times)

Time	TCP	Casting film		As spun fiber	
		PHB	PHBV	PHB	PHBV
2h	0.316	0.196	0.211	0.186	0.167
2h	0.319	0.188	0.207	0.179	0.168
2h	0.293	0.184	0.224	0.176	0.163
2h	0.317	0.186	0.209	0.195	0.164
Avg.	0.311	0.189	0.213	0.184	0.166
SD.	0.012	0.005	0.008	0.008	0.002
4h	0.330	0.177	0.229	0.189	0.182
4h	0.360	0.180	0.231	0.193	0.206
4h	0.351	0.184	0.214	0.197	0.184
4h	0.317	0.173	0.234	0.183	0.183
Avg.	0.340	0.179	0.227	0.191	0.189
SD.	0.020	0.005	0.009	0.006	0.012
8h	0.428	0.226	0.249	0.196	0.195
8h	0.471	0.232	0.259	0.194	0.199
8h	0.434	0.225	0.274	0.194	0.192
8h	0.457	0.243	0.245	0.198	0.198
Avg.	0.448	0.232	0.257	0.196	0.196
SD.	0.020	0.008	0.013	0.002	0.003
16h	0.462	0.256	0.306	0.225	0.237
16h	0.506	0.238	0.320	0.233	0.264
16h	0.487	0.246	0.269	0.214	0.234
16h	0.509	0.254	0.309	0.212	0.221
Avg.	0.491	0.249	0.301	0.221	0.239
SD.	0.022	0.008	0.022	0.010	0.018

Table E5 Raw data of Schwann cells proliferation on solution-cast films and electrospun scaffold at 1, 3 and 5 days (Measured 1st times)

Time	TCP	Casting film		As spun fiber	
		PHB	PHBV	PHB	PHBV
D1	0.400	0.159	0.193	0.210	0.197
D1	0.424	0.211	0.207	0.225	0.198
D1	0.456	0.223	0.242	0.230	0.237
D1	0.439	0.203	0.206	0.224	0.217
Avg.	0.430	0.199	0.212	0.222	0.212
SD	0.024	0.028	0.021	0.009	0.019
D3	1.761	0.572	0.519	0.386	0.473
D3	1.910	0.662	0.648	0.388	0.581
D3	1.913	0.515	0.514	0.365	0.661
D3	1.507	0.630	0.610	0.392	0.536
Avg.	1.773	0.595	0.573	0.383	0.563
SD	0.191	0.065	0.067	0.012	0.079
D5	2.142	1.036	2.124	0.631	0.642
D5	2.566	1.031	2.059	0.649	0.607
D5	2.421	1.036	1.995	0.683	0.677
D5	2.509	1.294	2.022	0.714	0.686
Avg.	2.410	1.099	2.050	0.669	0.653
SD	0.188	0.130	0.056	0.037	0.036

Table E6 Raw data of Schwann cells proliferation on solution-cast films and electrospun scaffold at 1, 3 and 5 days (Measured 2nd times)

Time	TCP	Casting film		As spun fiber	
		PHB	PHBV	PHB	PHBV
D1	0.605	0.314	0.319	0.415	0.377
D1	0.638	0.276	0.323	0.449	0.293
D1	0.757	0.321	0.375	0.458	0.440
D1	0.778	0.344	0.384	0.475	0.432
Avg.	0.695	0.314	0.350	0.449	0.386
SD	0.086	0.028	0.034	0.025	0.068
D3	0.963	0.619	0.893	0.398	0.783
D3	0.858	0.574	0.693	0.372	0.784
D3	0.885	0.593	0.936	0.454	0.668
D3	0.920	0.604	0.721	0.372	0.879
Avg.	0.907	0.598	0.811	0.399	0.779
SD.	0.045	0.019	0.122	0.039	0.086
D5	1.263	0.873	1.084	1.004	0.721
D5	1.262	0.943	0.990	0.845	0.817
D5	1.287	0.956	1.014	1.019	0.817
D5	1.341	0.920	0.943	0.796	0.866
Avg.	1.288	0.923	1.008	0.916	0.805
SD.	0.037	0.037	0.059	0.112	0.061

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