Supporting Information

Super-tough biodegradable poly(vinyl alcohol)/poly(vinyl pyrrolidone) blends plasticized by glycerol and sorbitol

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FTIR

Table S1 Peak assignments in the FTIR spectra of PVP, PVA-l, and PVA-h films.

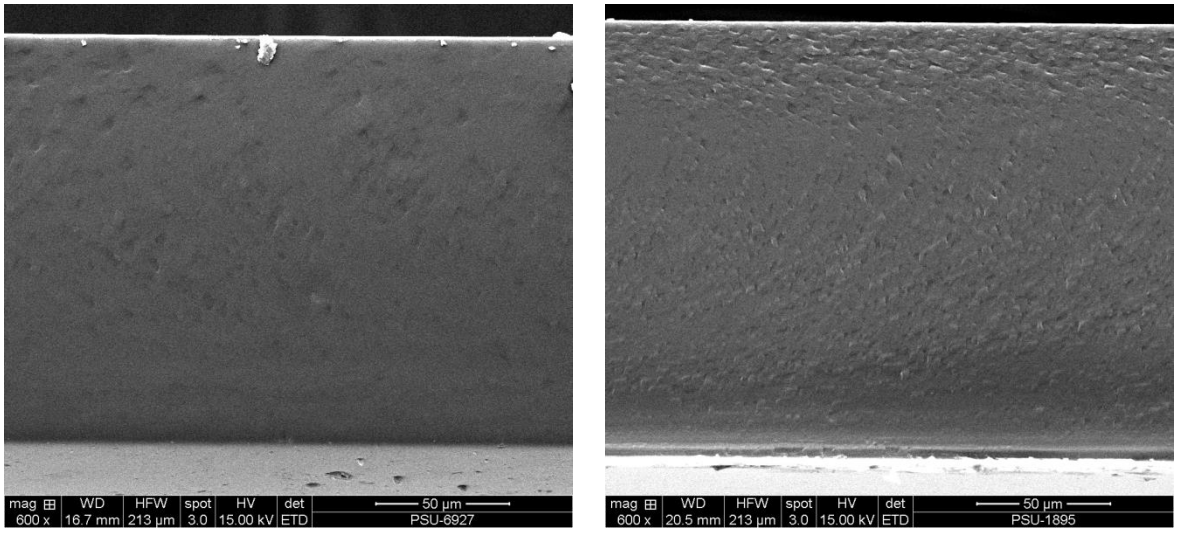
Peak assignment	PVP	PVA-l	PVA-h
–OH stretching	3446	3283	3258
CH_2 asymmetric stretching	2950	2939	2938
CH_2 symmetric stretching	2920	2911	2906
C=O stretching	1651	1732	1660, 1567
CH_2 bending	1421, 843	1422, 835	1415, 833
C-O-H bending	-	1373	1375
C-O-C stretching	-	1327	1325
C-O stretching	-	1241, 1087	1085
C–N stretching	1284, 1017	-	-

Table S2 Peak assignments in the FTIR spectra of pure PVA-l/PVP, PVA-l/PVP/plasticizer, pure PVA-h/PVP, and PVA-h/PVP/plasticizer films.

Peak assignment	PVA-l/PVP				PVA-h/PVP			
	pure	GLY	SOR	GLY-SOR	pure	GLY	SOR	GLY-SOR
–OH stretching	3304	3294	3294	3294	3294	3292	3291	3273
CH_2 asymmetric stretching	2938	2937	2939	2937	2941	2937	2937	2937
CH_2 symmetric stretching	2917	2877	2920	2920	2914	2920	2919	2917
C=O stretching (PVA)	1733	1731	1732	1732	-	-	-	-
C=O stretching (PVP)	1650	1649	1649	1649	1648	1651	1650	1651
CH_2 bending	1423	1423	1423	1423	1423	1423	1423	1423
C-O-H bending	1372	1374	1373	1373	1374	1374	1374	1374
C-N vibration (PVP)	1289	1290	1289	1290	1289	1290	1290	1290
C-O stretching	1243, 1091	1290, 1097, 1039	1082, 1041	1089, 1039	1092	1093, 1039	1083, 1043	1087, 1041

Morphology

The miscibility of PVA and PVP blends was determined using SEM. In Figure S1, the SEM micrographs of the fracture surfaces of the blend films show no phase separation, indicating complete blend miscibility.[1] The good miscibility was attributed to the strong interaction from hydrogen bonding between the hydroxyl groups of PVA and the carbonyl groups of PVP chains.[2,3]



(a) pure PVA-l/PVP (b) pure PVP-h/PVP

Figure S1. SEM images of cryo-fracture surfaces of PVA/PVP blend films.

References

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2. Rajeswari, N.; Selvasekarapandian, S.; Sanjeeviraja, C.; Kawamura, J.; Asath Bahadur, S. *Polym. Bull.* **2014**, *71*, 1061.
3. Feng, H.; Feng, Z.; Shen, L. *Polymer* **1993**, *34*, 2516.