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Supporting Information

Effect of water state and polymer chain motion on the mechanical properties of a bacterial cellulose and polyvinyl alcohol (BC/PVA) hydrogel

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Table. SI1 Contents of BC and PVA in BC/PVA hydrogel group Ⅰ

	B0.5P15	B0.7P15	B1.0P15	B1.5P15
BC(wt%)	0.56±0.08	0.67±0.06	0.97±0.10	1.42±0.07
PVA(wt%)	13.57	14.08	14.65	14.98

Table. SI2 Contents of BC and PVA in BC/PVA hydrogel group Ⅱ

	B0.5P10	B0.5P15	B0.5P20	B0.5P25
BC(wt%)	0.51±0.03	0.56±0.08	0.78±0.04	0.86±0.02
PVA(wt%)	8.19	13.57	20.95	25.49

Table. SI3 Contents of BC and PVA in BC/PVA hydrogel group Ⅲ

	B1.0P10	B1.5P15	B2.0P20	B3.0P30
BC(wt%)	1.23±0.07	1.42±0.07	2.03±0.03	3.08±0.02
PVA(wt%)	9.16	14.98	22.25	27.51

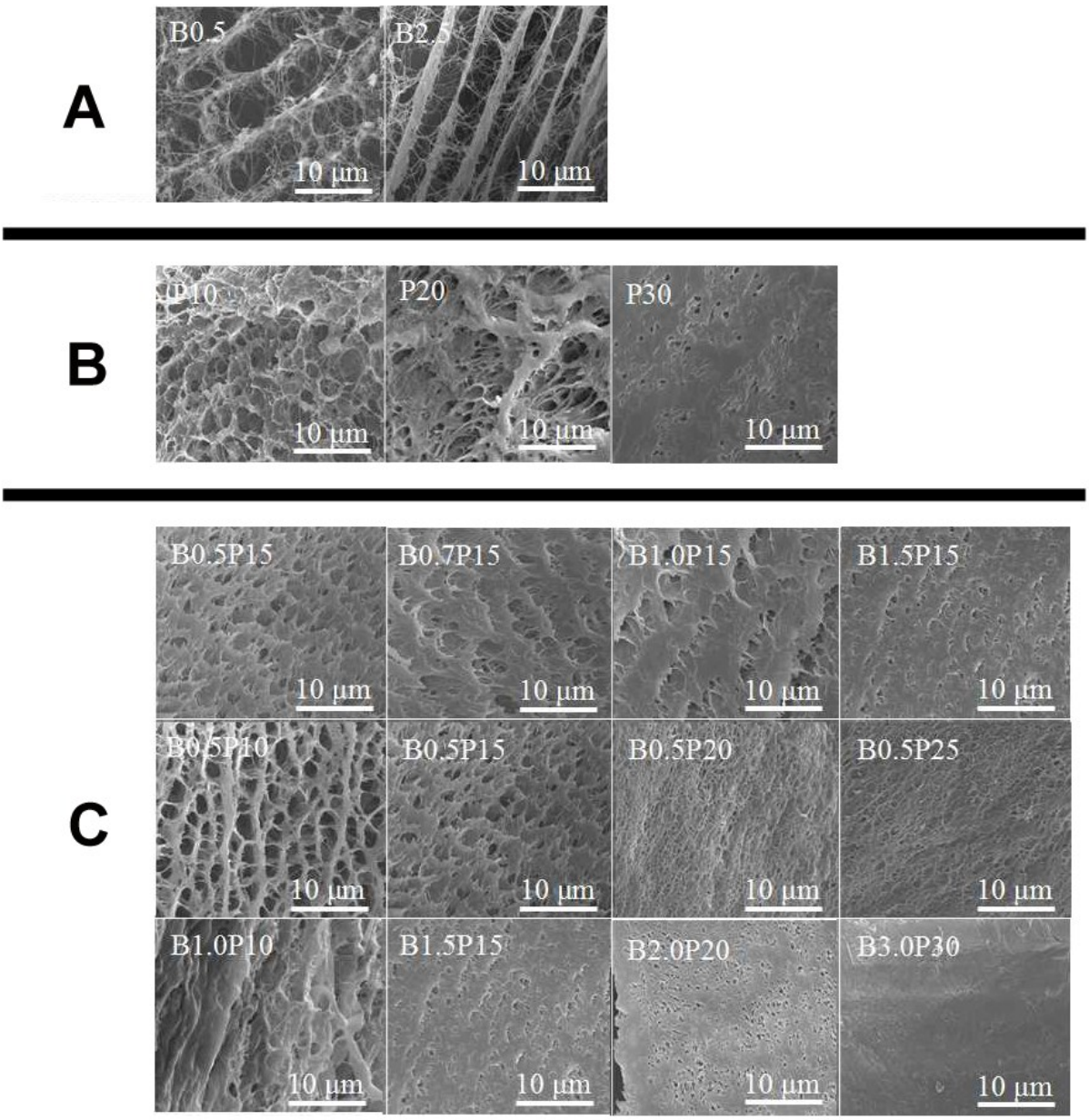

Fig.SI1-1 SEM image of A: BC, B: PVA, and C: BC/PVA hydrogels.

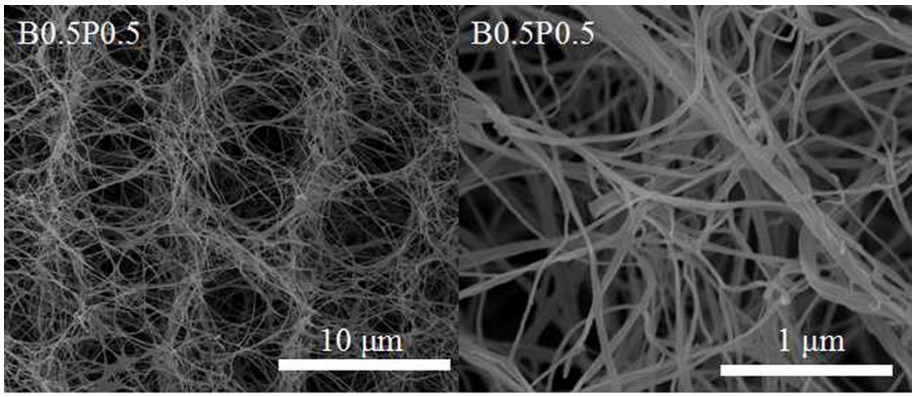

Fig.SI1-2 SEM image of BC/PVA hydrogel (B0.5P0.5 with 0.5wt% BC and 0.5wt% PVA).

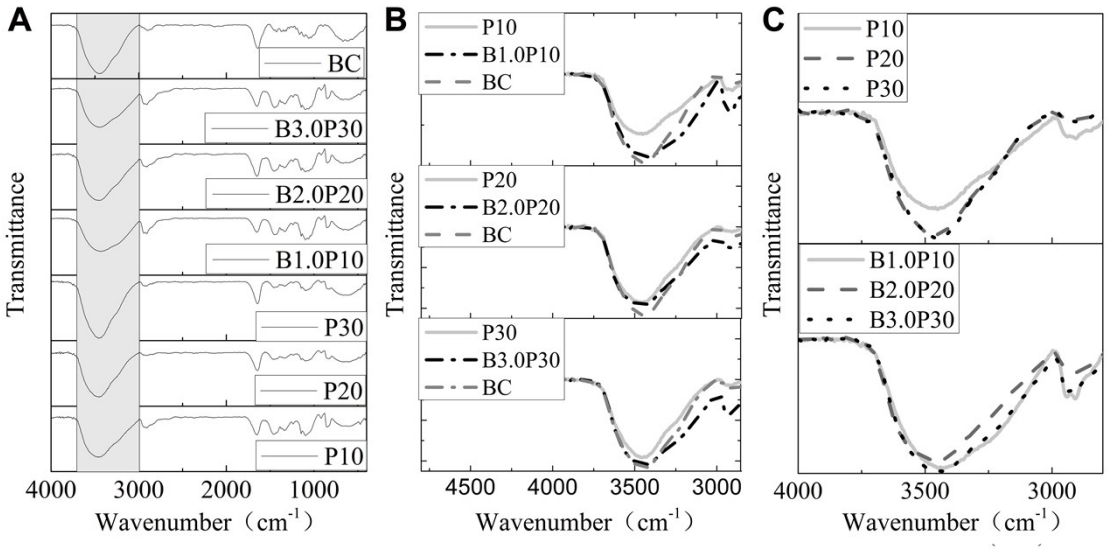

Fig. SI2 FTIR spectra of BC, PVA, BC/PVA hydrogels. A: FTIR spectra of BC (B2.5), BC/PVA hydrogels (B1.0P10, B2.0P20, B3.0P30) and pure PVA hydrogels (P10, P20, P30); B: the variation between BC, PVA and BC/PVA hydrogels (wavenumber range of 4000-3000 cm-1); C: the variation of pure PVA and BC/PVA hydrogels with different PVA content (wavenumber range of 4000-3000 cm-1).

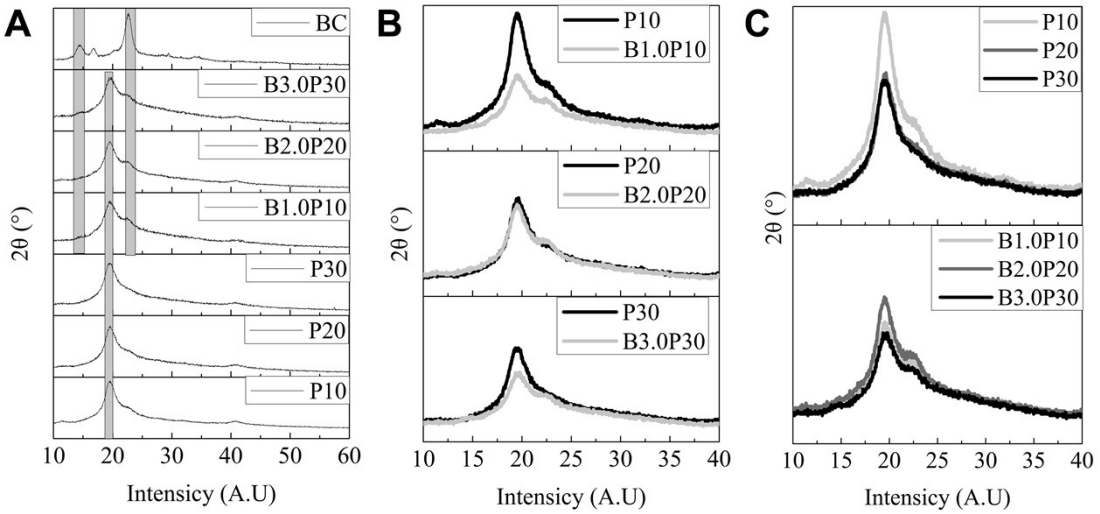

Fig. SI3 XRD pattern of BC, PVA, BC/PVA hydrogels. A: XRD pattern of BC (B2.5), BC/PVA hydrogels (B1.0P10, B2.0P20, B3.0P30), and pure PVA hydrogels (P10, P20, P30); B: the variation between PVA and BC/PVA hydrogels; C: the variation of PVA and BC/PVA hydrogels with different PVA content.

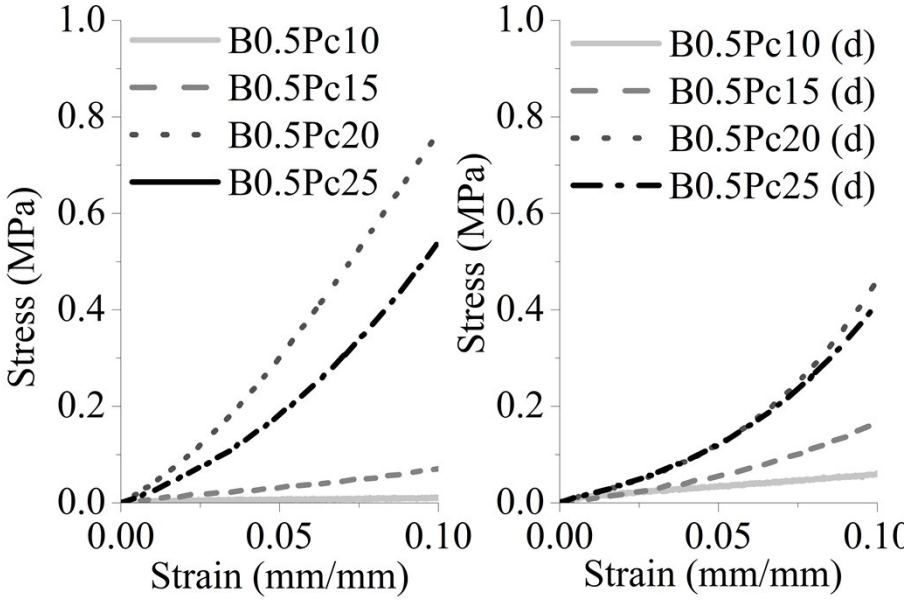

Fig.SI4 Effect of the dehydration on the compression properties of BC/PVA hydrogel. A: Stress-strain curve （strain range of 0-0.1mm/mm） of original samples (BB0.5Pc10, B0.5Pc15, B0.5Pc20, and B0.5Pc25); and B: Stress-strain curve （strain range of 0-0.1mm/mm） of dehydrated samples (B0.5Pc10(d), B0.5Pc15(d), B0.5Pc20(d), B0.5Pc25(d)); (The PVA molecular weight used in this BC/PVA hydrogel is 146 ~ 186kg mol-1, it was purchased from Sigma.)

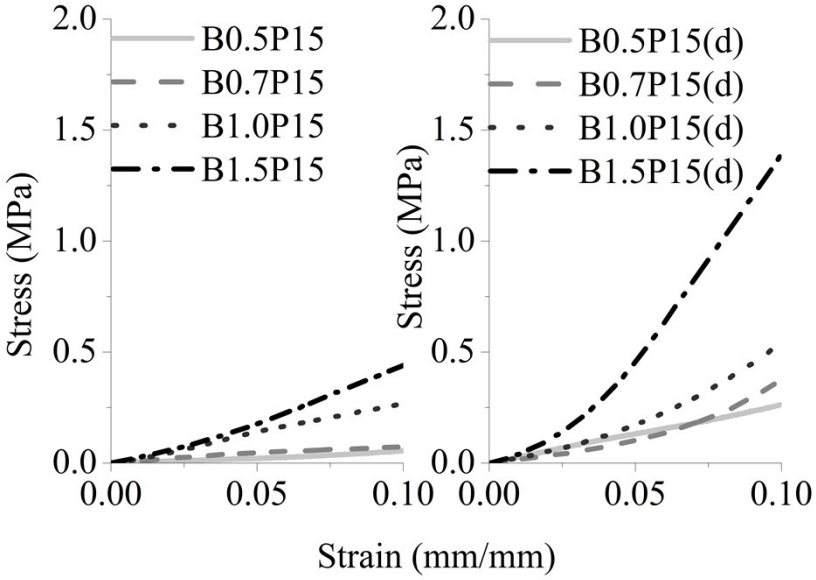

Fig. SI5 Effect of the dehydration on the compression properties of BC/PVA hydrogel. A: Stress-strain curve （strain range of 0-0.1mm/mm） of original sample (B0.5P15, B0.7P15, B1.0P15, B1.5P15); and B:Stress-strain curve （strain range of 0-0.1mm/mm） of dehydrated samples (B0.5P15 (d), B0.7P15 (d), B1.0P15(d), B1.5P1a5(d));

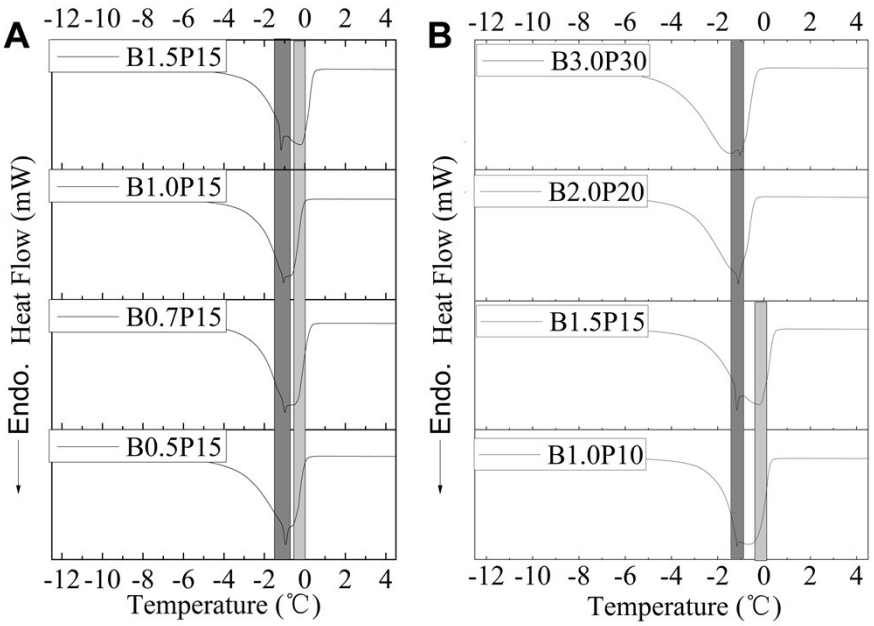

Fig. SI6 DSC curves of water in BC/PVA hydrogels. A: DSC curves of water in samples of B0.5P15, B0.7P15, B1.0P15, B1.5P15; B: DSC curves of water in samples of B1.0P10, B1.5P15, B2.0P20, B3.0P30

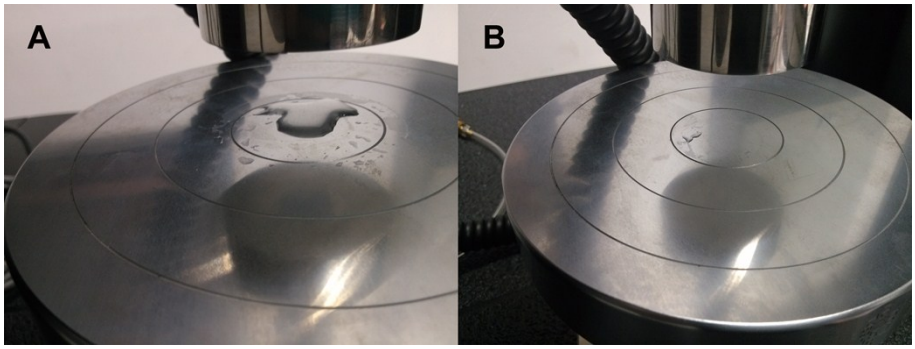

Fig. SI7 The remaining water on compression plate of BB0.5P10 (A) and B0.5P20 (B) after compression test

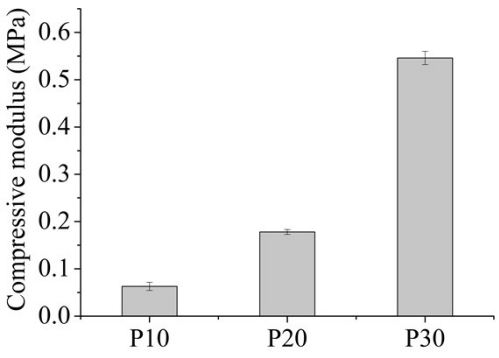

Fig. SI8 Compressive modulus of pure PVA hydrogels