Electronic Supplementary Information (ESI)

The influences of added polysaccharides on the properties of bacterial crystalline nanocellulose

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 Table S1. Molecular weight and monosaccharide compositions^a of polysaccharides.

Sample	MW (kDa)	Glucose (%)	Xylose (%)	Mannose (%)	Arabinose (%)	Galactose (%)	Rhamnose (%)
AG	14	1.8	-	-	10.4	87.8	-
EPS ^b	20/150/200	24.6	-	75.4	-	-	-
XL ^c	27/162	1.6	95.9	-	0.5	1.3	0.8
XG	139	51.4	28.2	-	1.8	18.6	-

Both molecular weight and monosaccharide compositions of polysaccharides are from previous studies^{1, 2}

^a All values are given on relative percent-weight basis

^b EPS has three major peaks

° XL has two series of peaks. The high/low molecular weight ratio is 1:5.5

- Amount below the minimum detection limit of IC

Sample	Glucose (%)	Xylose (%)	Mannose (%)	Arabinose (%)	Galactose (%)	Rhamnose (%)
EPS/BCNC	99.4	-	0.6	-	-	-
XL/BCNC	98.1	1.9	-	-	-	-
XG/BCNC	99	1	-	-	-	-

Table S2 Monosaccharide compositions^a of EPS/BCNC, XL/BCNC and XG/BCNC.

^a All values are given on relative percent-weight basis

- Amount below the minimum detection limit of IC

	T _{5%} ^a (°C)	Та	1 st process		2 nd process		Char
Sample		1 _{10%} " (°C)	T _{max} ^b (°C)	WL ^c (%)	T _{max} ^b (°C)	WL ^c (%)	residue (%)
BC	302.8	328.7	371.3	83.9	-	-	11.2
BCNC control	203.0	231.3	267.1	40.5	365.3	28.7	26.2
AG/BCNC	203.8	232.1	266.9	40.2	365.6	28.2	27.1
EPS/BCNC	209.9	234.9	269.1	41.9	365.3	27.1	27.5
XL/BCNC	217.8	240.0	272.2	44.7	365.7	26.2	24.5
XG/BCNC	224.9	244.9	275.1	48.1	365.8	25.3	24.0

Table S3. TG and DTG analysis results of pure BC and the BCNC.

^a $T_{5\%}$ and $T_{10\%}$ are temperatures corresponding to 5 and 10 wt% of weight loss, respectively.

^b T_{max} are the maximum thermal degradation temperatures corresponding to the first and the second peaks of the DTG curves, respectively.

^c Weight loss of each process.



Figure S1. Length, height and bundle width distribution histograms of BCNC samples: (a), (b) BCNC control; (c), (d) AG/BCNC; (e)-(g) EPS/BCNC; (h)-(j) XL/BCNC; (k)-(m) XG/BCNC. Both length and height values were obtained from the measurements of a minimum of 100 isolated nanoparticles from at least 5 AFM images. Bundle width values were obtained from the measurements of 30 bundles.



Figure S2. Conductometric titration curves of various BCNC samples: (a) BCNC control, (b) AG/BCNC, (c) EPS/BCNC, (d) XL/BCNC, and (e) XG/BCNC. The equivalence point was determined by the intersection of two linear regressions of each branch of V-shaped titration curves.

References

- 1. L. Fang and J. M. Catchmark, *Cellulose*, 2014, **21**, 3965-3978.
- 2. J. Gu and J. M. Catchmark, *Cellulose*, 2013, **20**, 1613-1627.