

Scalable preparation of cellulose nanofibers from office waste paper by an environment-friendly method

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Supporting Information

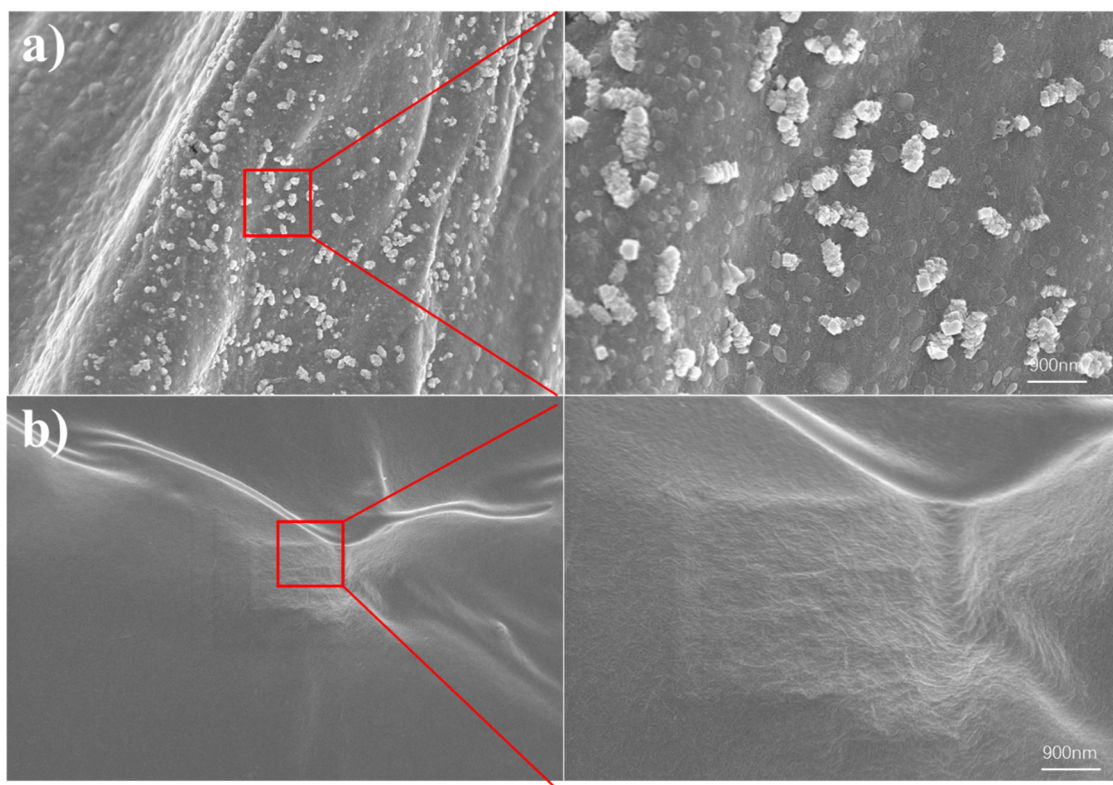


Figure S1. SEM images of CNF. (a)WCNF1, (b)WCNF2

It is obvious that irregular small particles are distributed on the surface of WCNF1, in contrast, the surface of WCNF2 is very smooth in Figure S1.

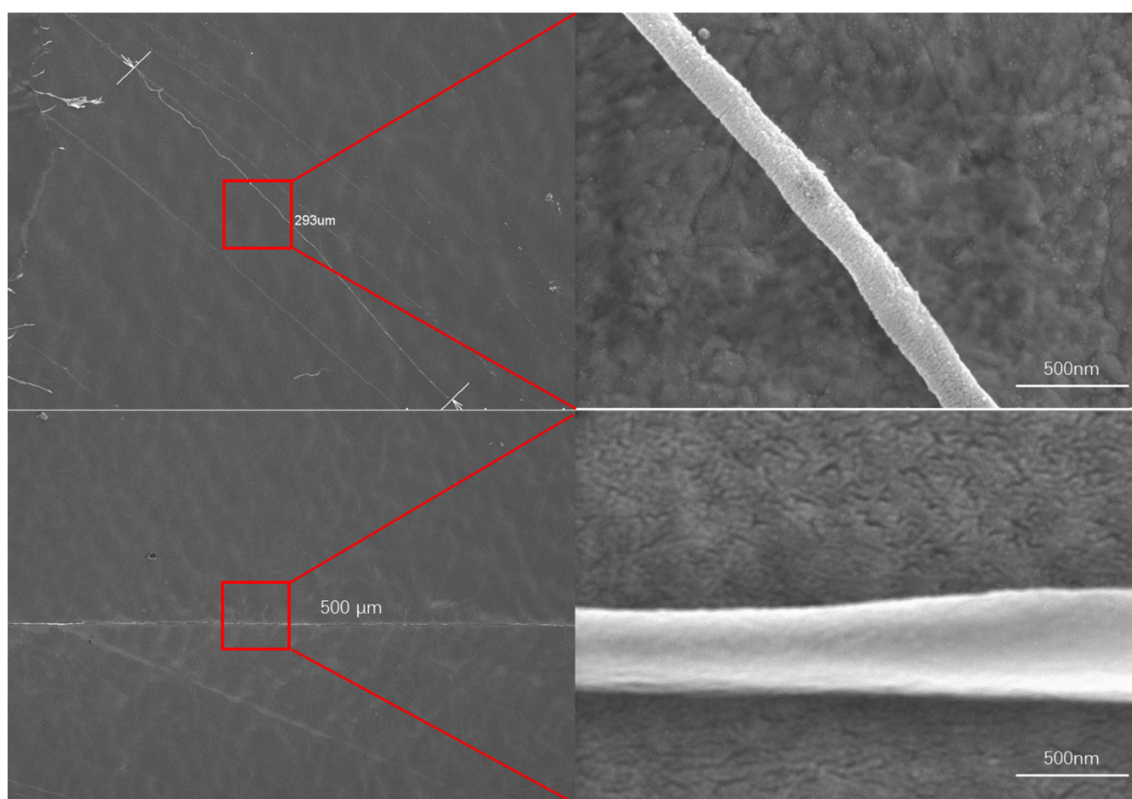


Figure S2. SEM images of BCNF1.

A rough calculation shows that the aspect ratio of BCNF1 is in the range of 1000-1465, indicating that it is possible to prepare CNF with a high aspect ratio by the combination of acid treatment and bleaching treatment.

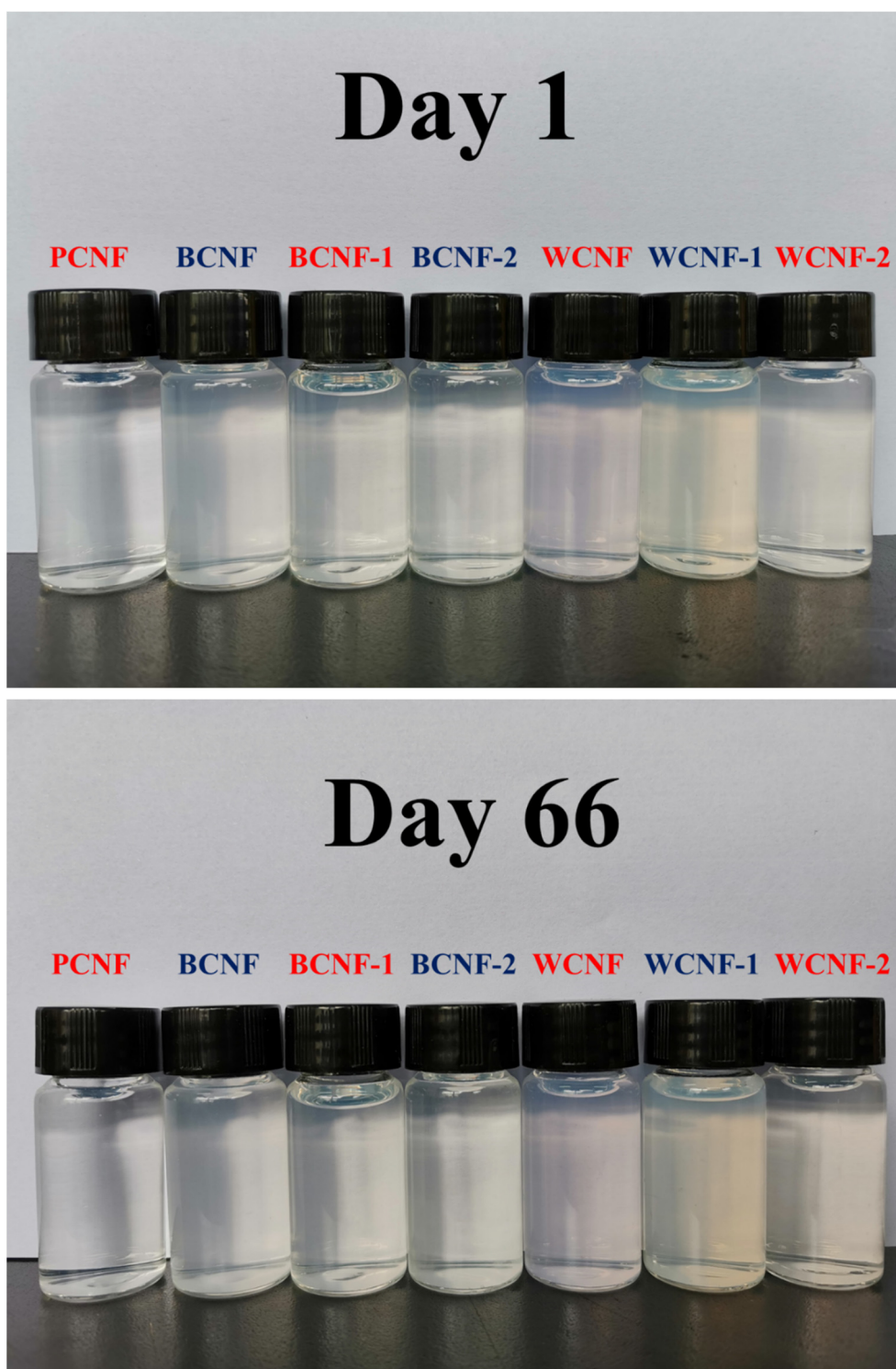


Figure S3. The CNF solutions was placed for 1 day and 66 days.

The CNF solution produced no precipitate after 66 days and showed no significant general change, indicating that the TEMPO-oxidised CNF remained well stabilised at room temperature.

Table S1. Different pretreatment methods and preparation of nanocellulose for office waste paper.

Source	Pretreatment	Type	Fabrication method	Ref.
newspaper	alkali pretreatment (NaOH)	CNC	60 wt% H ₂ SO ₄ at 45 °C, 90 min	[11]
	bleaching treatment (NaClO)			
paper residue	alkali pretreatment (NaOH)	CNC	40 wt% H ₂ SO ₄ at 50 °C, 60 min	[12]
	acid pretreatment (H ₂ SO ₄)			
	bleaching treatments (H ₂ O ₂ + NaOH)			
waste paper	pulping and flotation pretreatment	CNF	ultrafine ground	[13]
	alkali pretreatment (NaOH)			
	bleaching treatment (H ₂ O ₂ + NaOH)			
newspapers	——	CNF	ultrafine ground	[14]
^a OWP	bleaching treatment (H ₂ O ₂ + NaOH)	CNC	64 wt% H ₂ SO ₄ at 45 °C, 60 min	[38]
	deinking pretreatment			

OWP	deinking pretreatment	CNC	59 wt% H ₂ SO ₄ at 45 °C, 60 min	[39]
^b WTP	——	CNC	47 wt% H ₂ SO ₄ at 60 °C, 120 min	[15]
OWP	alkali pretreatment (NaOH)	CNC	64 wt% H ₂ SO ₄ at 45 °C, 30 min	[16]
^c WPP	deinking process (chloroform + dimethyl sulfoxide) alkali pretreatment (NaOH)	CNC	64 wt% H ₂ SO ₄ at 45 °C, 60 min	[17]
OWP	——	CNF	mechanical fibrillation	[18]

a: OWP is office waste paper;

b: WTP is waste tissue paper;

c: WPP is waste printing paper