

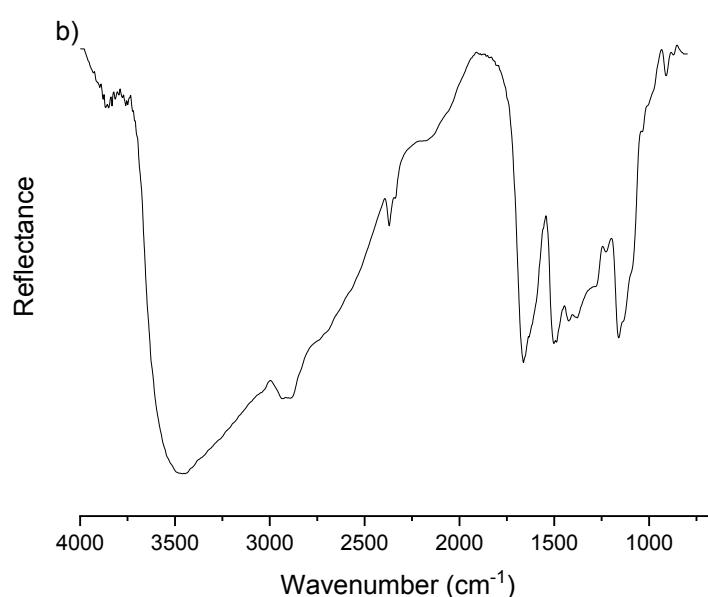
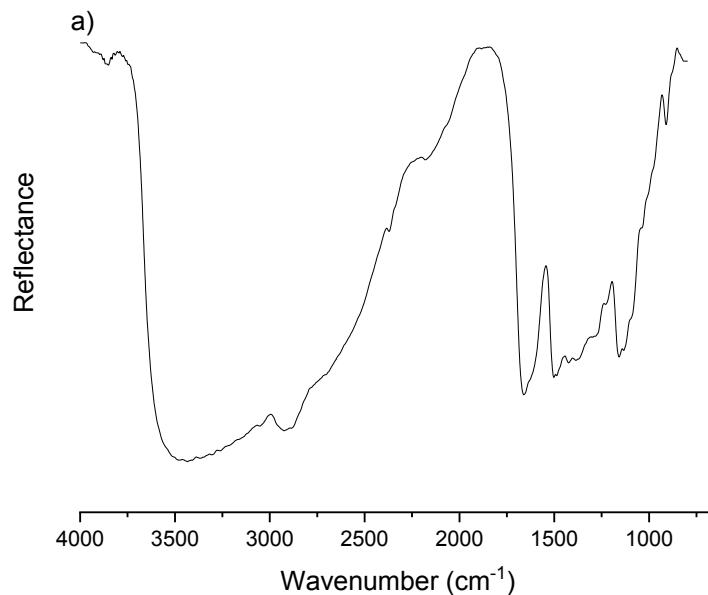
Transparent lignin-containing wood nanofiber film with UV-blocking, oxygen barrier, and anti-microbial properties

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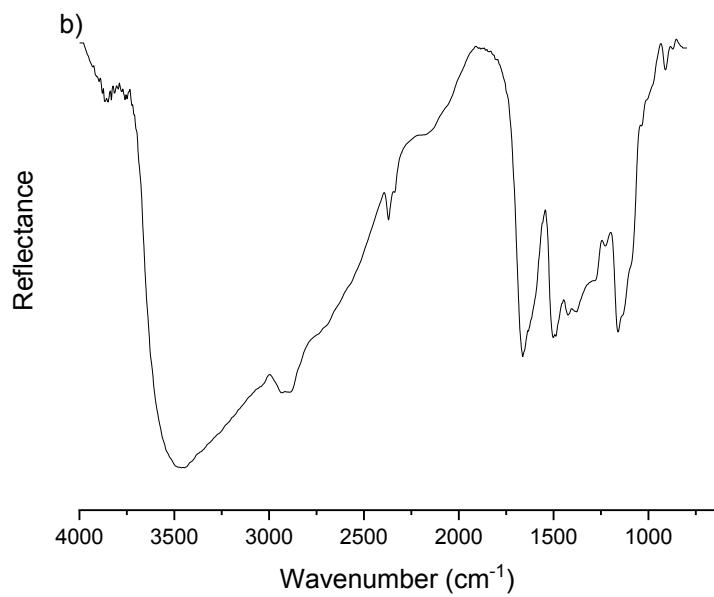
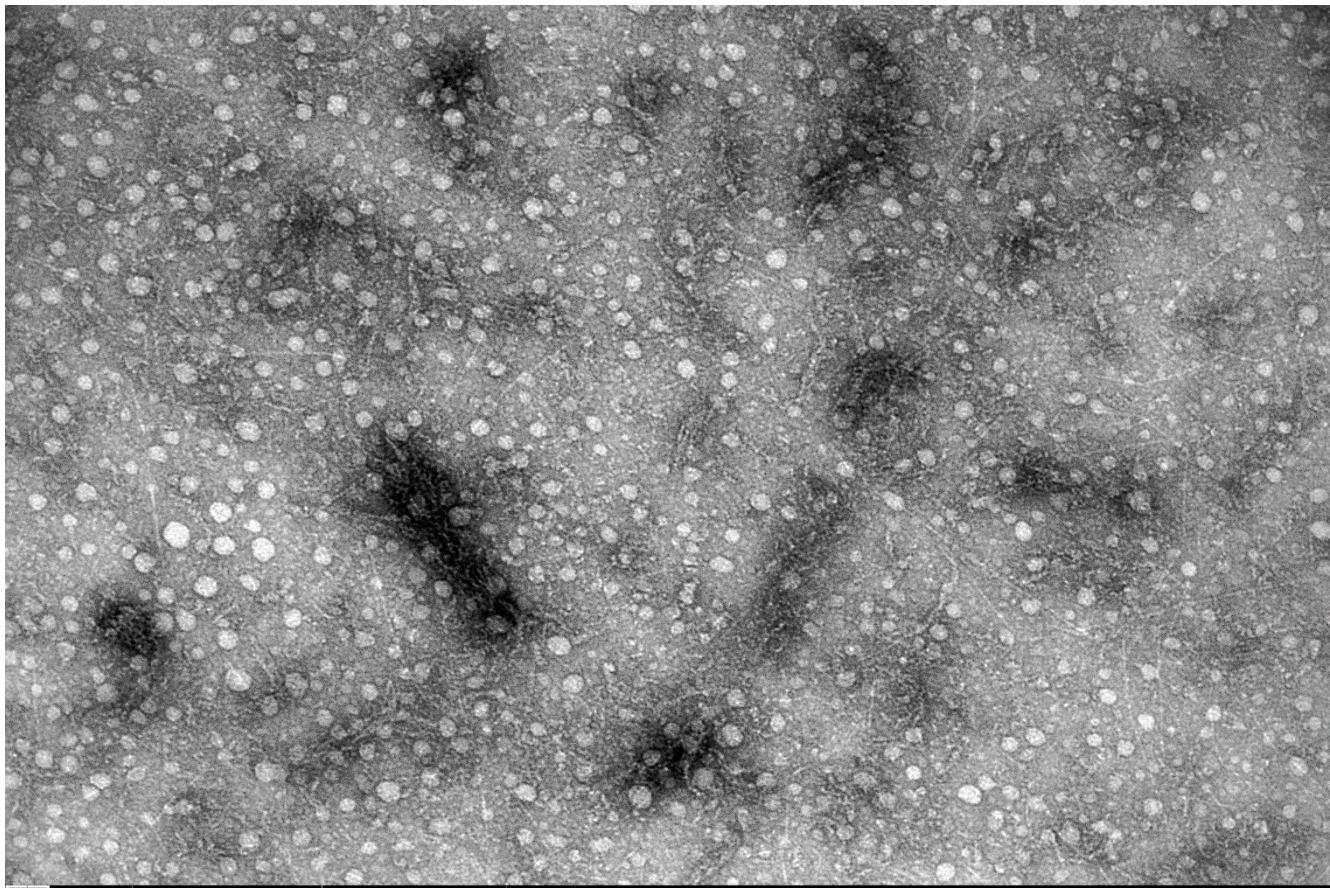


Figure S1. DRIFT spectra of cationic wood obtained using a) 1,3-DMU, b) MU, and c) EU as carbamide

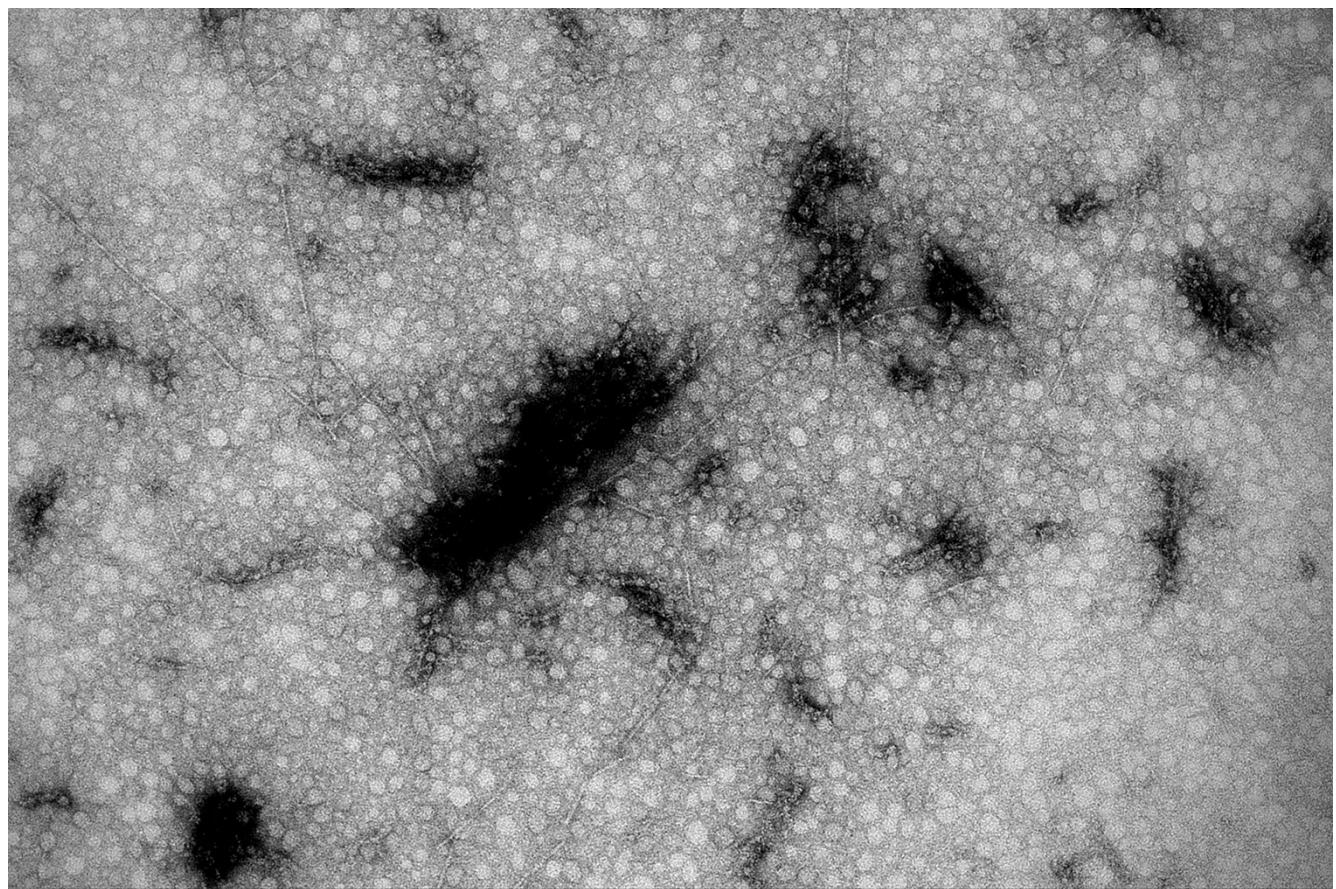


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Figure S2. Suspension of CWNFs obtained using 1) urea, 2) 1,3-DMU, 3) MU, 4) EU.

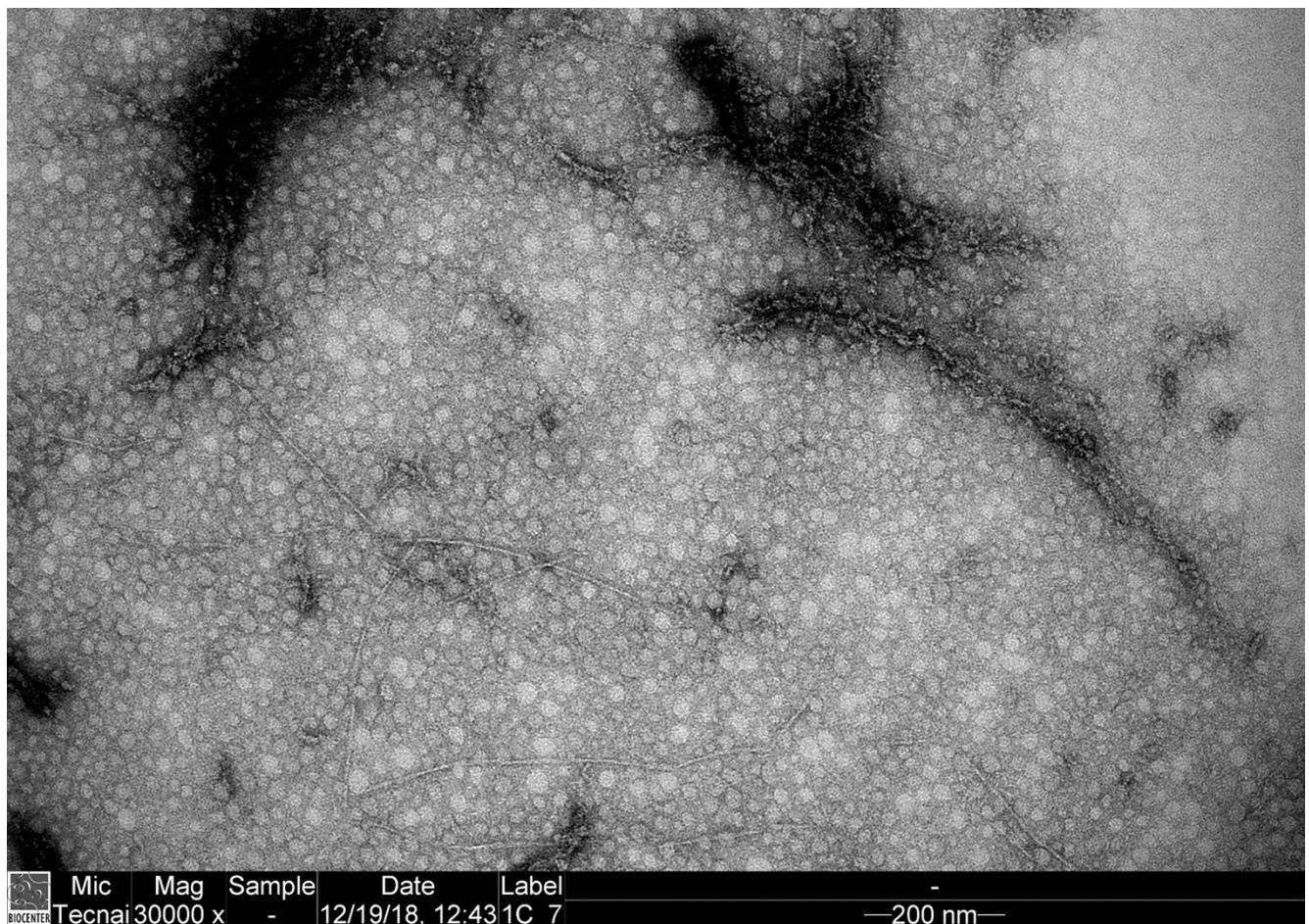


BIOCENTER GÖTEBORG	Mic	Mag	Sample	Date	Label	-
	Tecnai23000 x	-		12/19/18, 12:18	1A5	500 nm



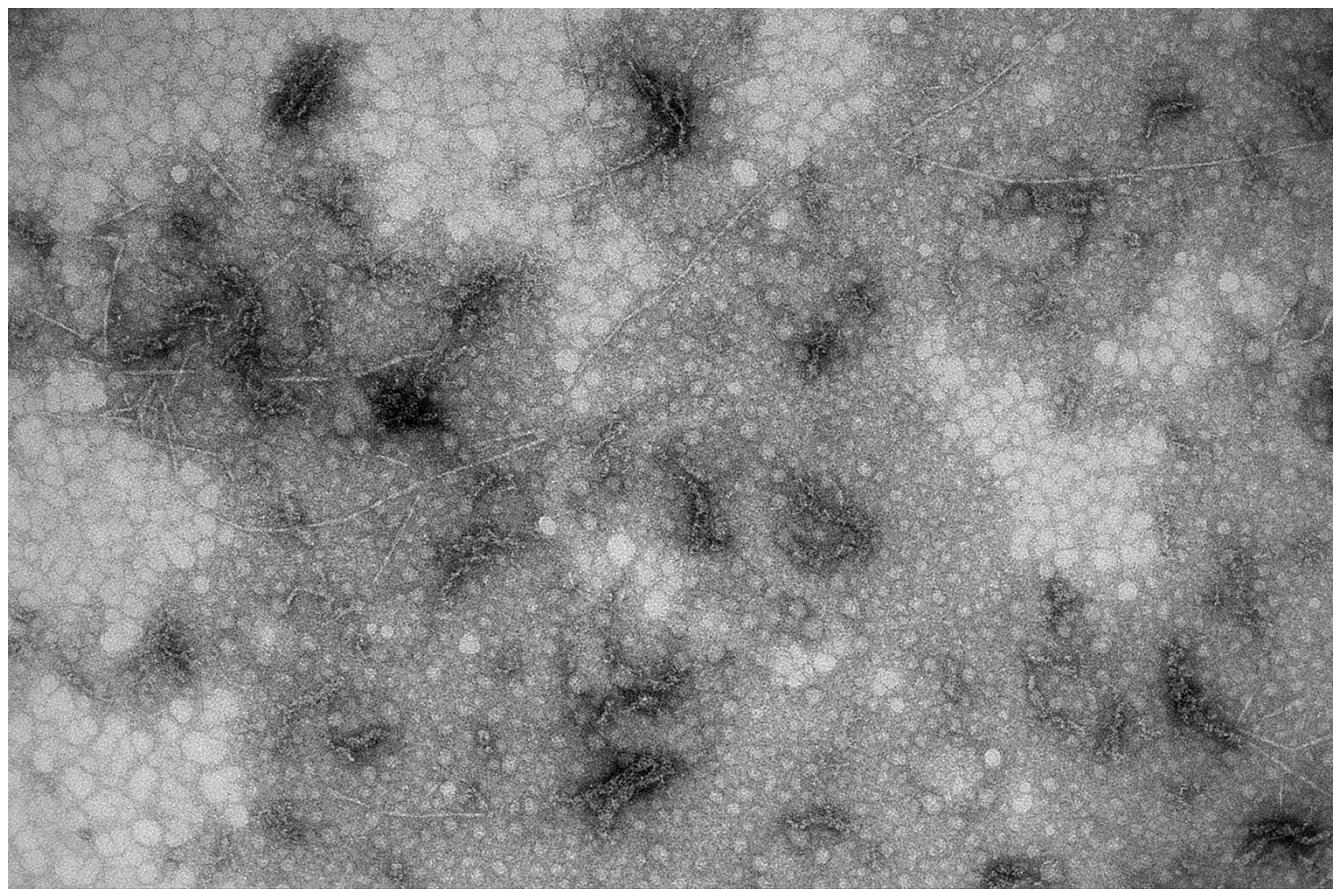
BIOCENTER	Mic	Mag	Sample	Date	Label
	Tecnai	30000 x	-	12/19/18, 12:35	1C_4

—200 nm—

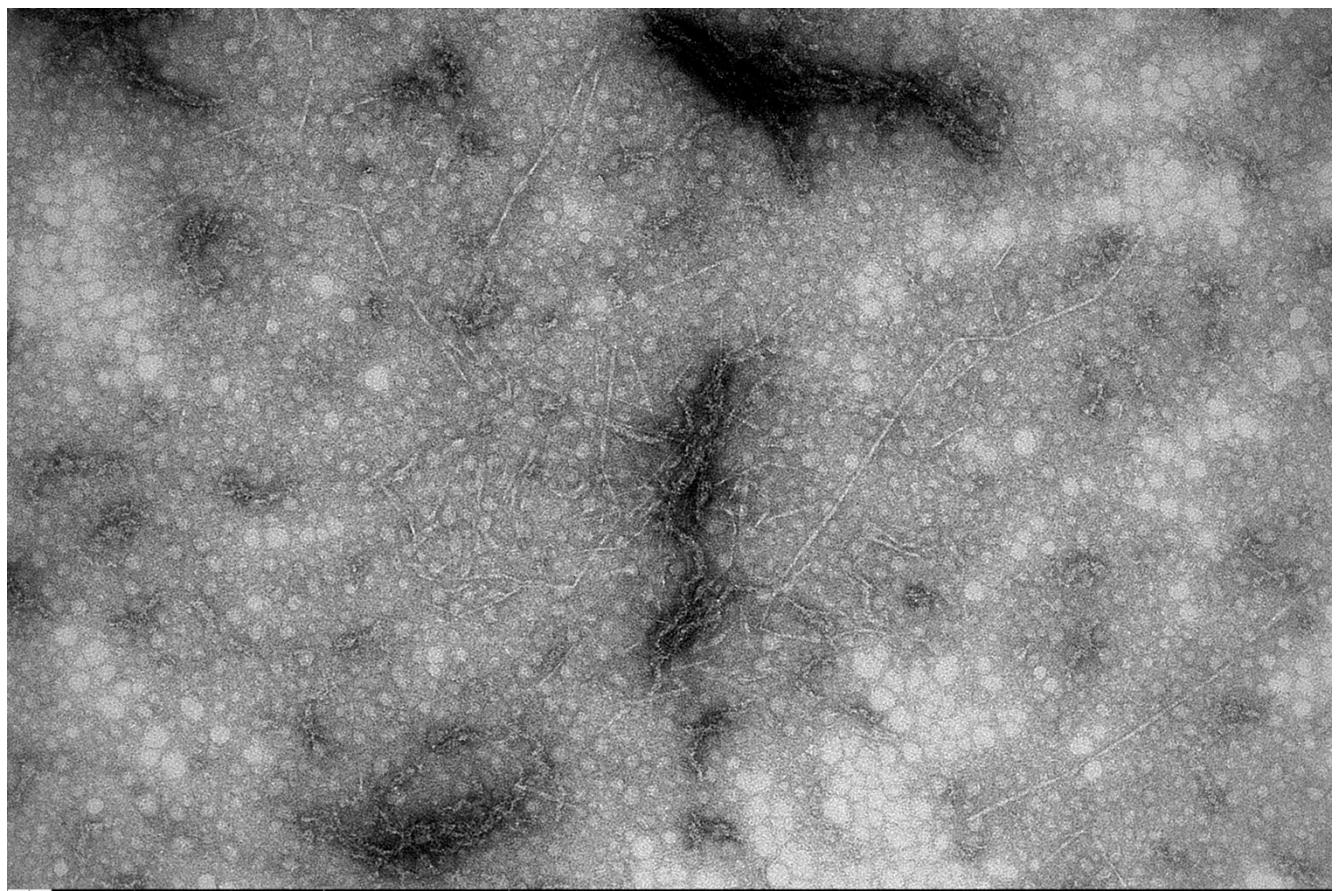


Mic	Mag	Sample	Date	Label	
Tecnai	30000 x	-	12/19/18, 12:43	1C_7	-200 nm-

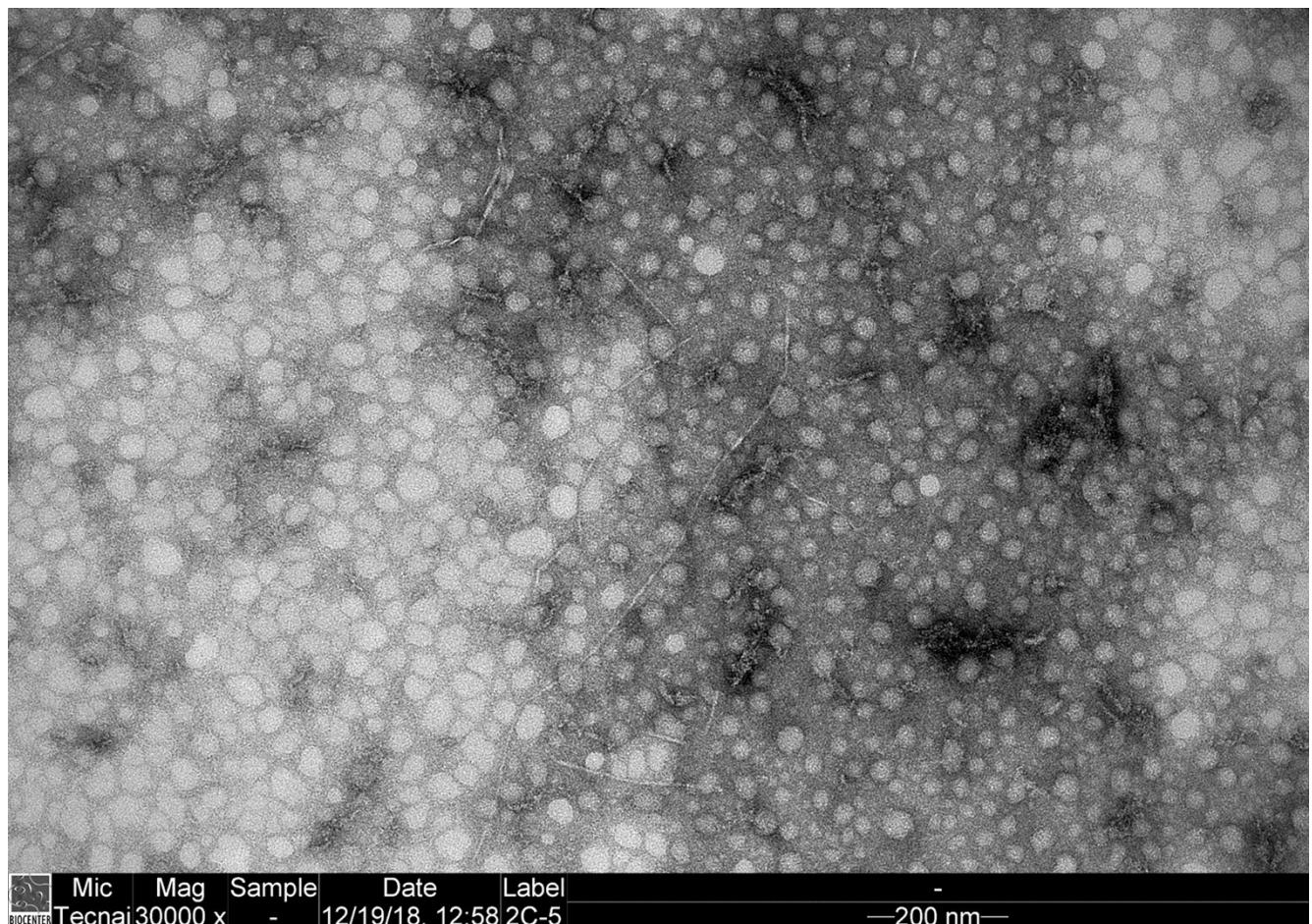
Figure S3. TEM images of CWNF1



	Mic	Mag	Sample	Date	Label	
BIOCENTER	Tecnai	30000 x	-	12/19/18, 12:53	2C-2	- —200 nm—

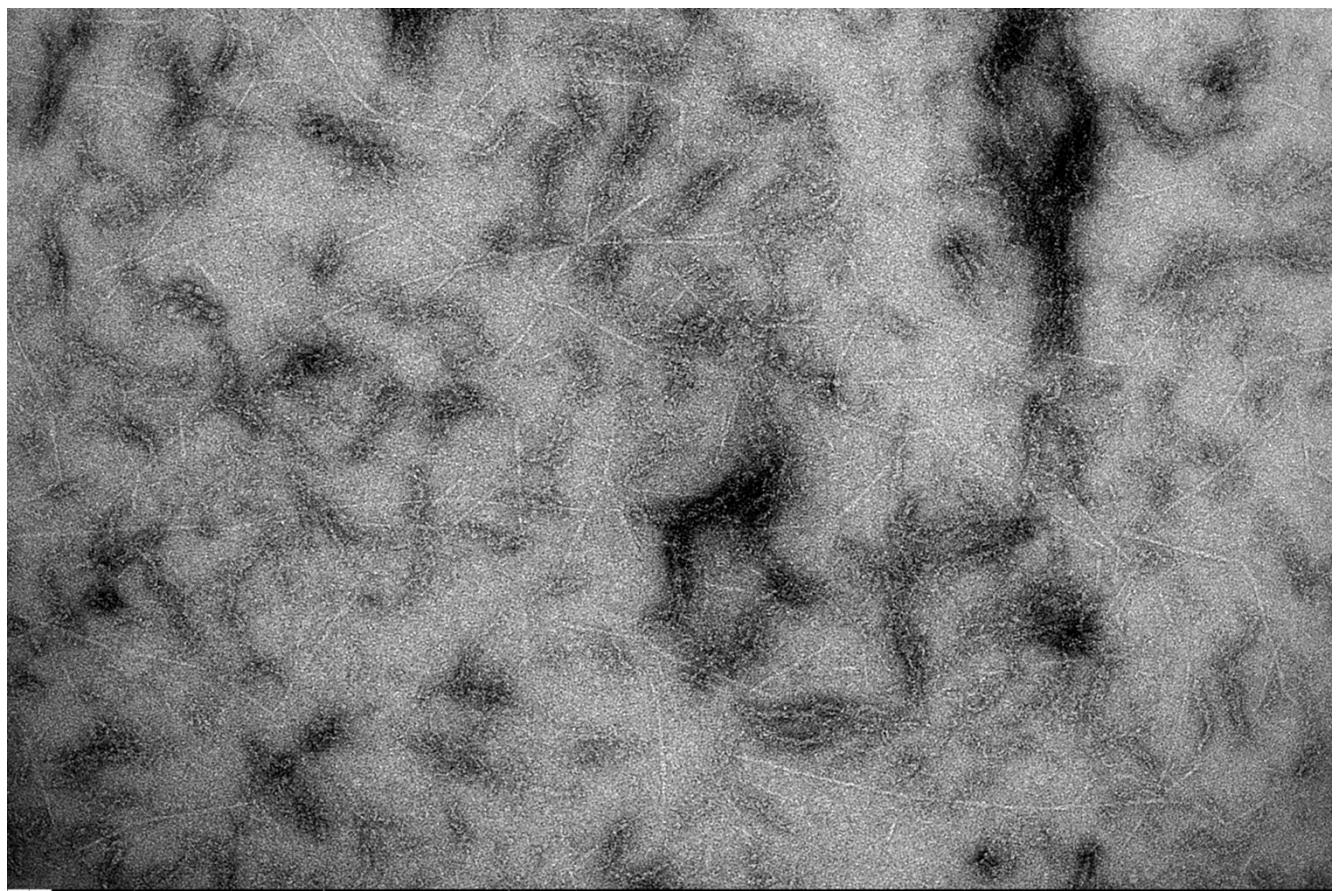


Mic	Mag	Sample	Date	Label	
Tecnai	30000 x	-	12/19/18, 12:54	2C-3	- —200 nm—

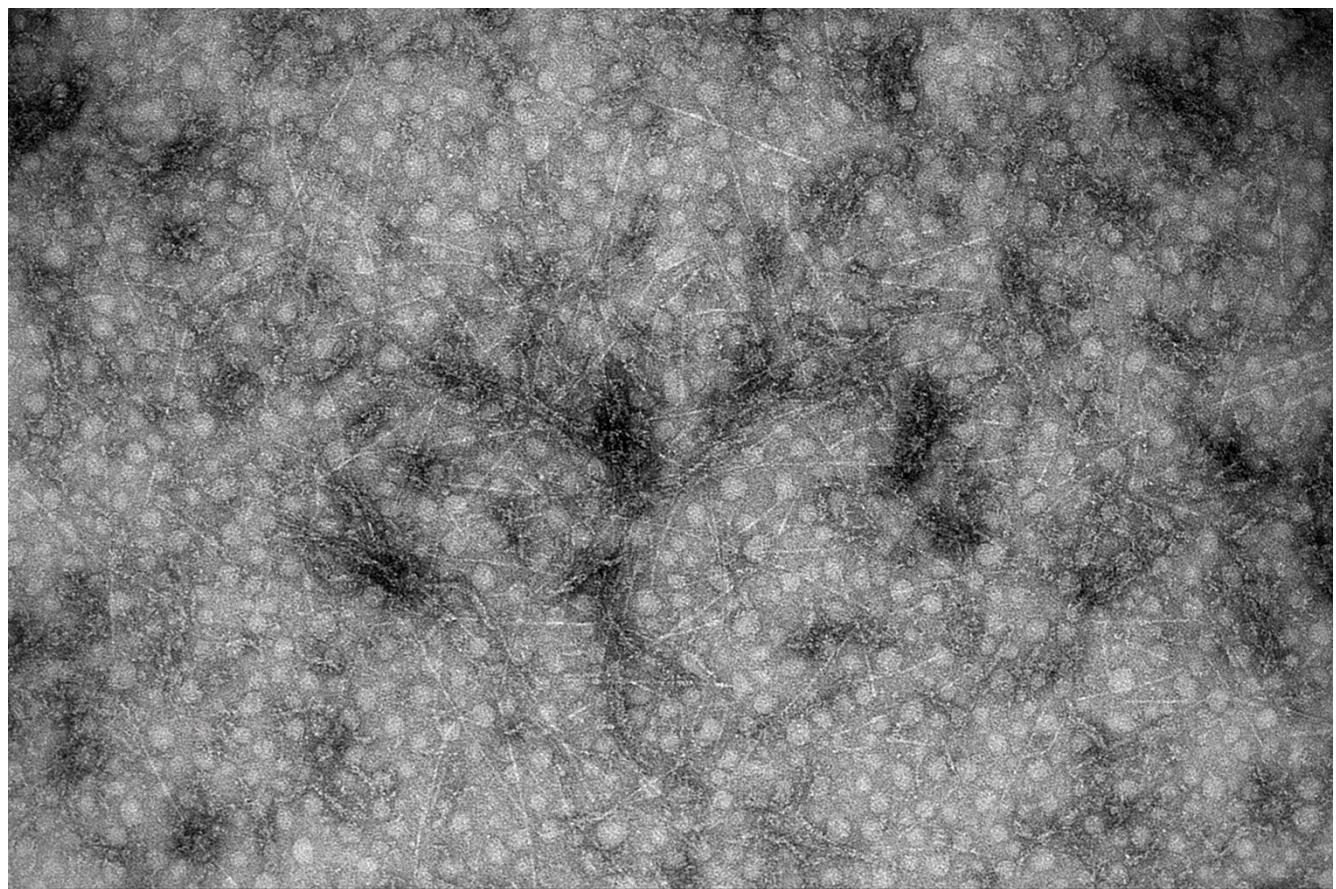


BIOCENTER	Mic	Mag	Sample	Date	Label	-
	Tecnai	30000 x	-	12/19/18, 12:58	2C-5	—200 nm—

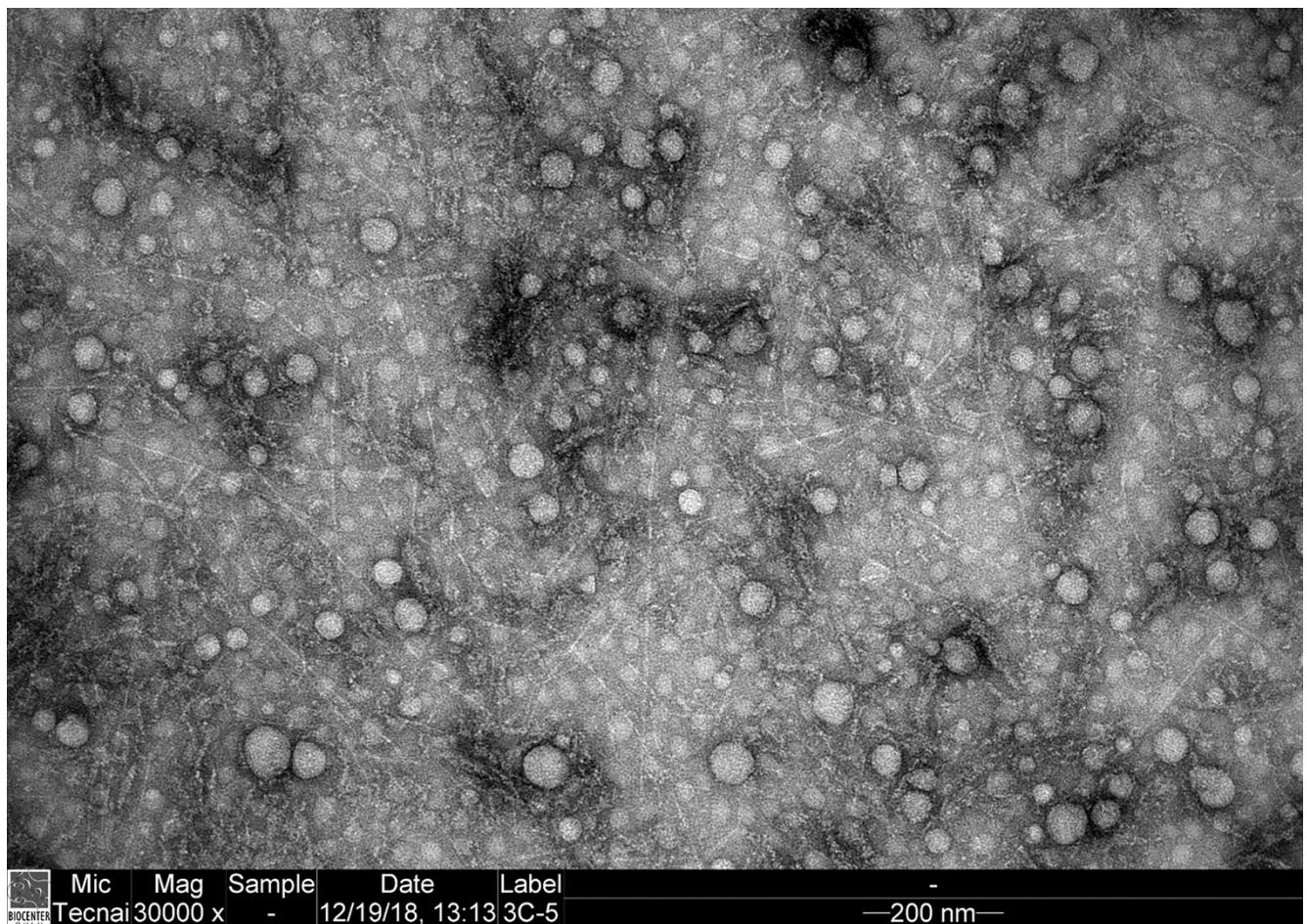
Figure S4. TEM images of CWNF2



	Mic	Mag	Sample	Date	Label	
BIOCENTER	Tecnai	30000 x	-	12/19/18, 13:09	3C-2	- —200 nm—

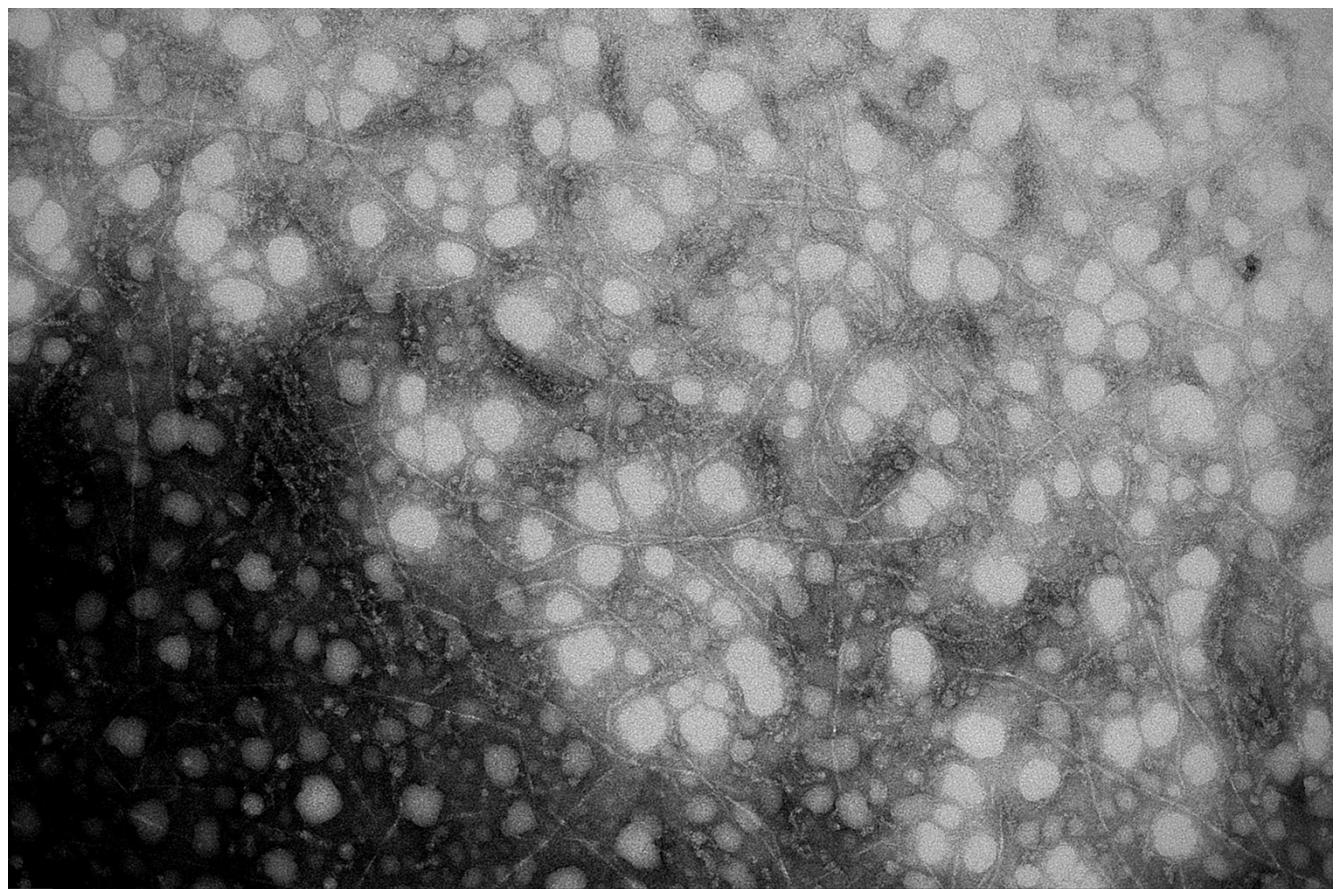


	Mic	Mag	Sample	Date	Label	
BIOCENTER	Tecnai	30000 x	-	12/19/18, 13:12	3C-4	- —200 nm—

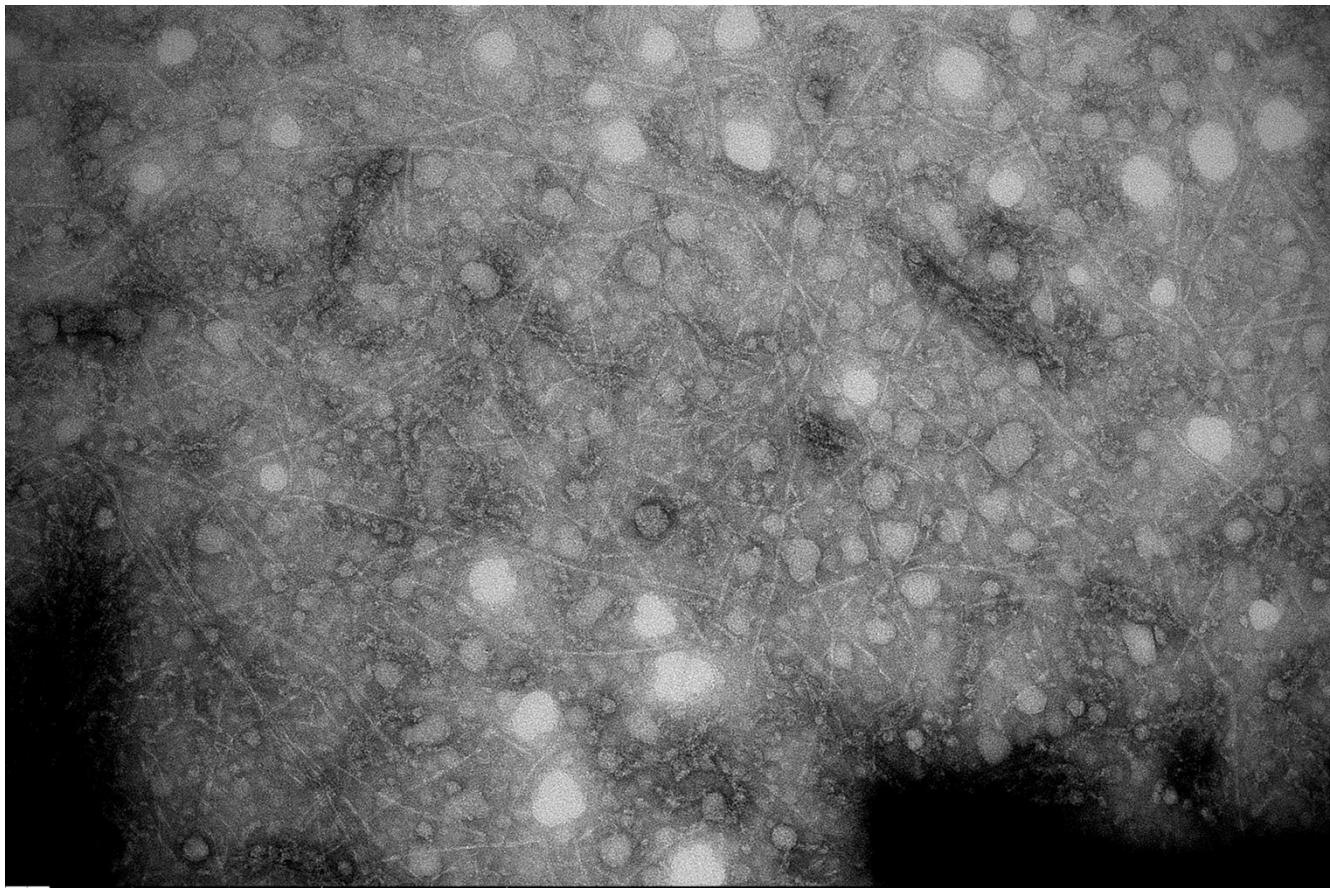


	Mic	Mag	Sample	Date	Label	
BIOCENTER	Tecnai	30000 x	-	12/19/18, 13:13	3C-5	- —200 nm—

Figure S5. TEM images of CWNF3



BIOCENTER	Mic	Mag	Sample	Date	Label	-	-
DÜSSELDORF	Tecnai	30000 x	-	12/19/18, 13:21	4C-1	—200 nm—	



BIOCENTER	Mic	Mag	Sample	Date	Label	
	Tecnai	30000 x	-	12/19/18, 13:23	4C-3	- —200 nm—

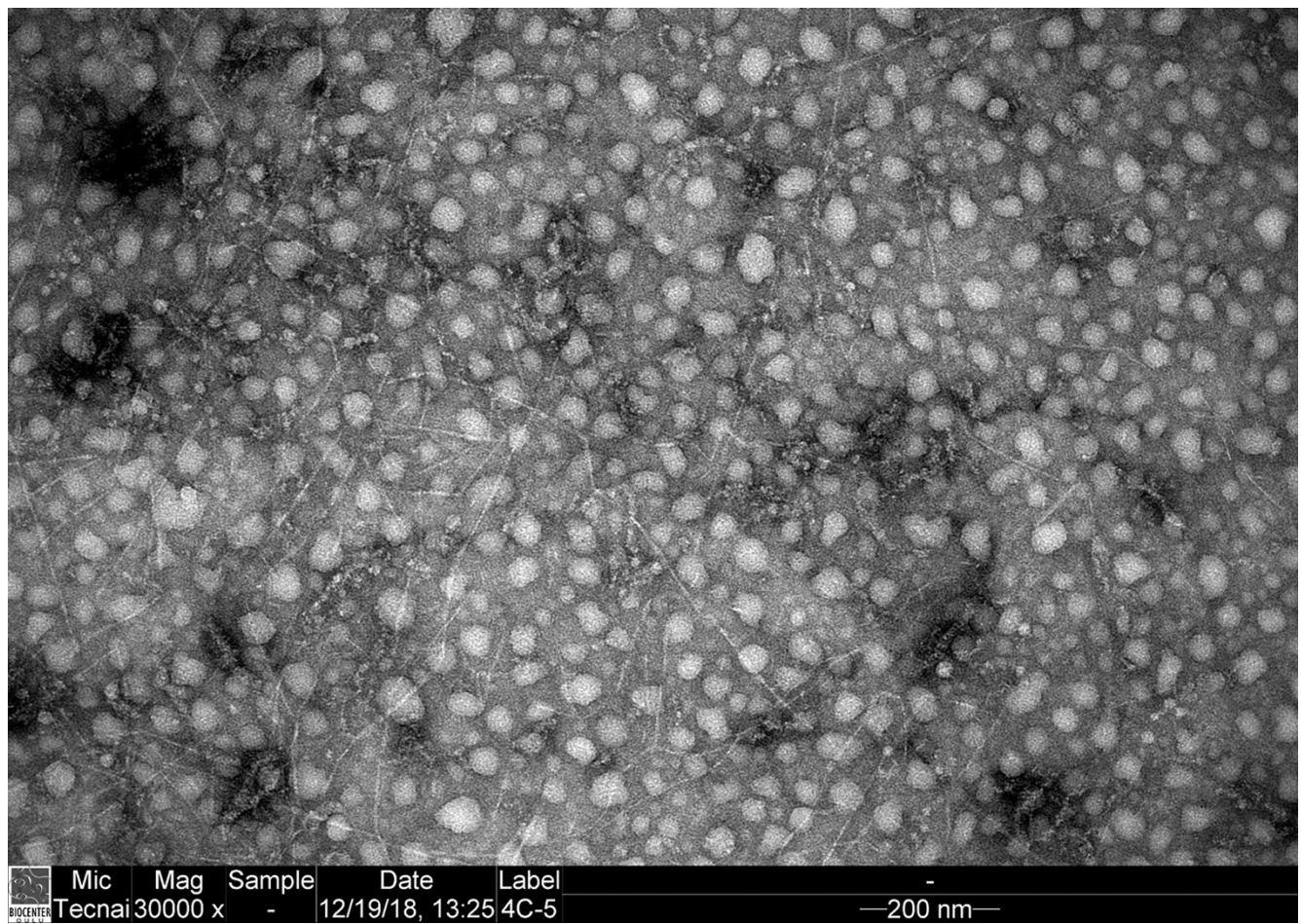


Figure S6. TEM images of CWNF4

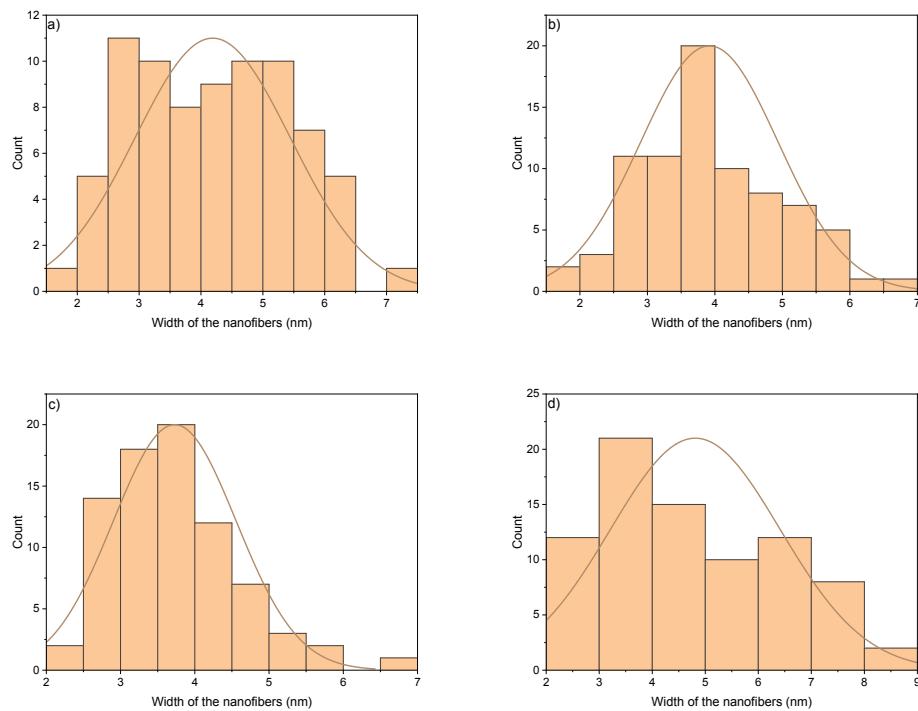


Figure S7. Histograms of the width of CWNFs obtained using a) urea, b) 1,3-DMU, c) MU, e) EU

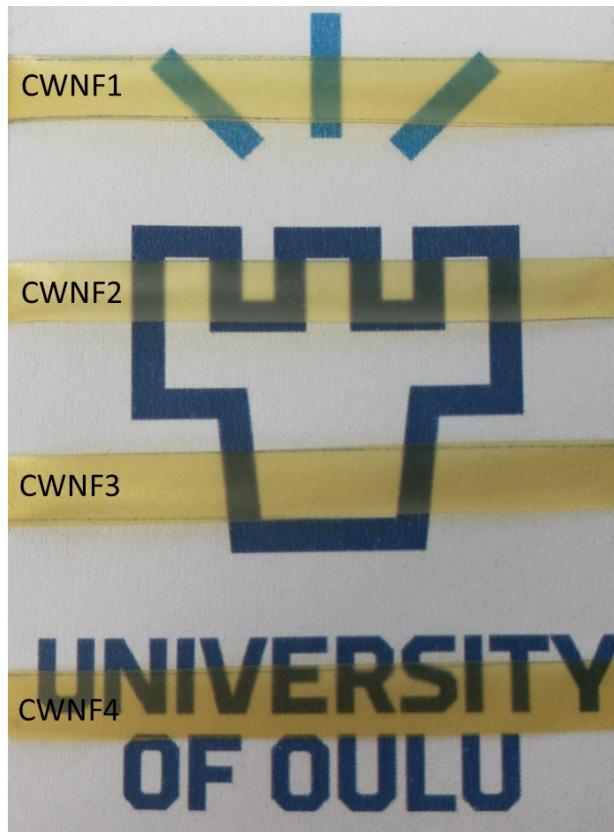


Figure S8. Photograph of CWNF films

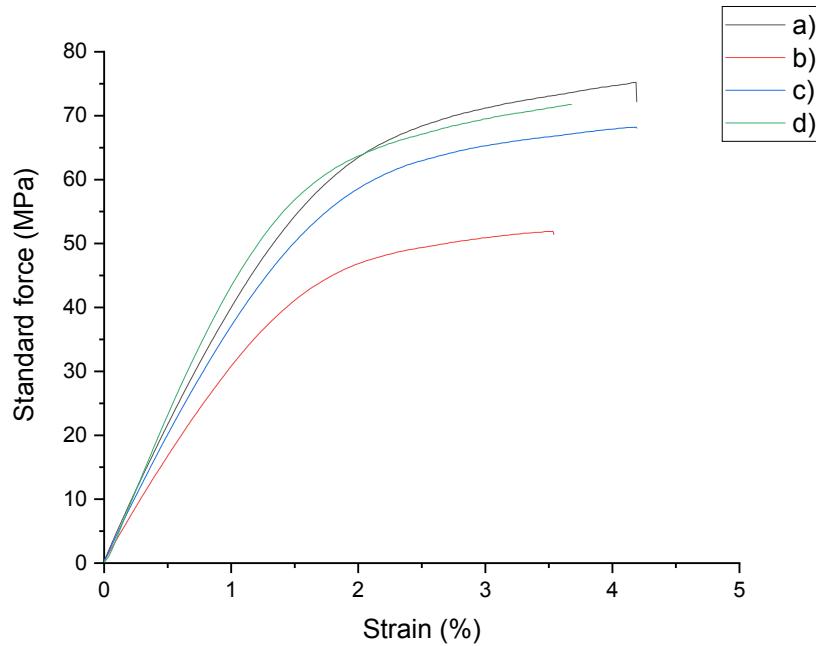
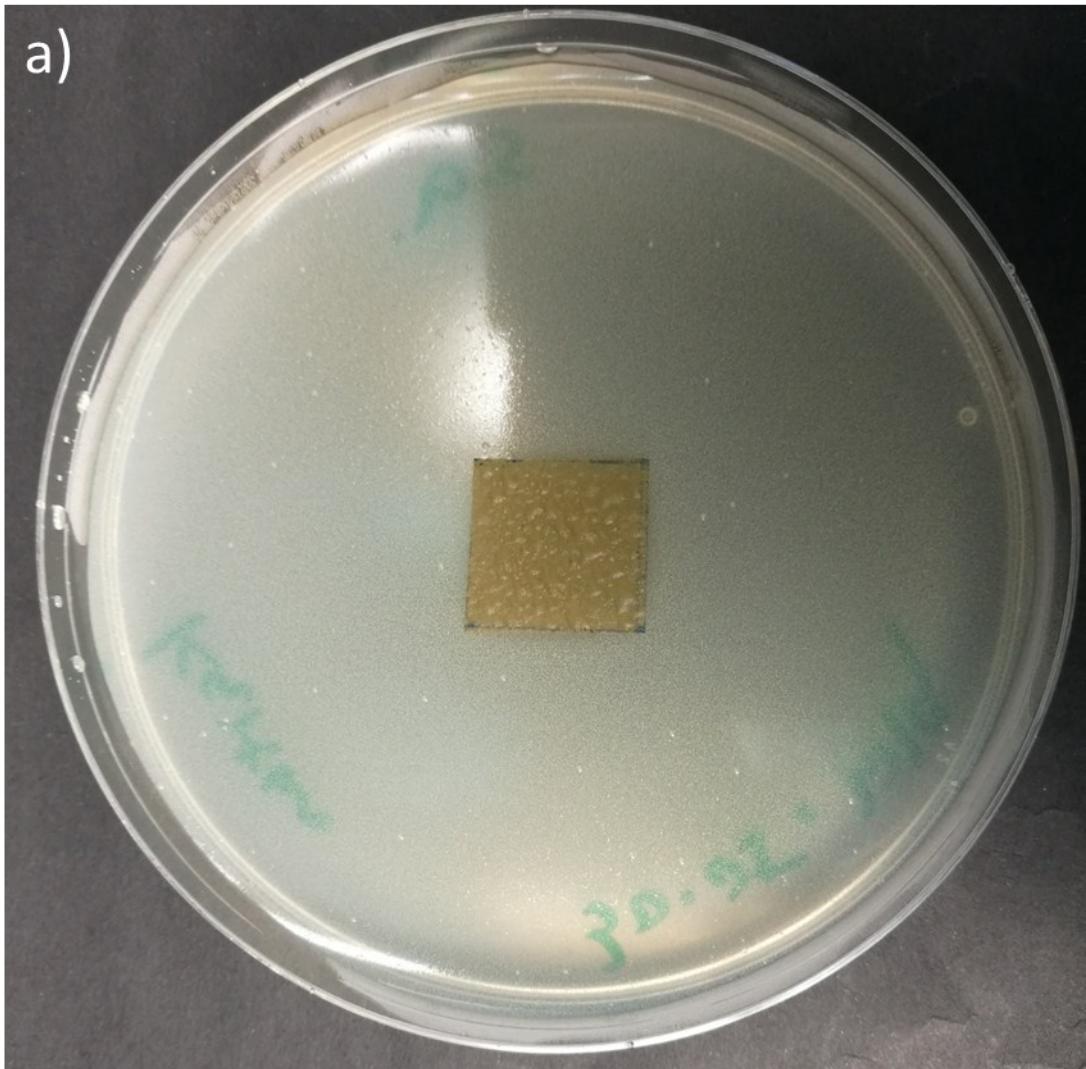


Figure S9. Examples of stress-strain curves of CNWF films obtained using a) urea, b) 1,3-DMU, c) MU, e) EU

a)



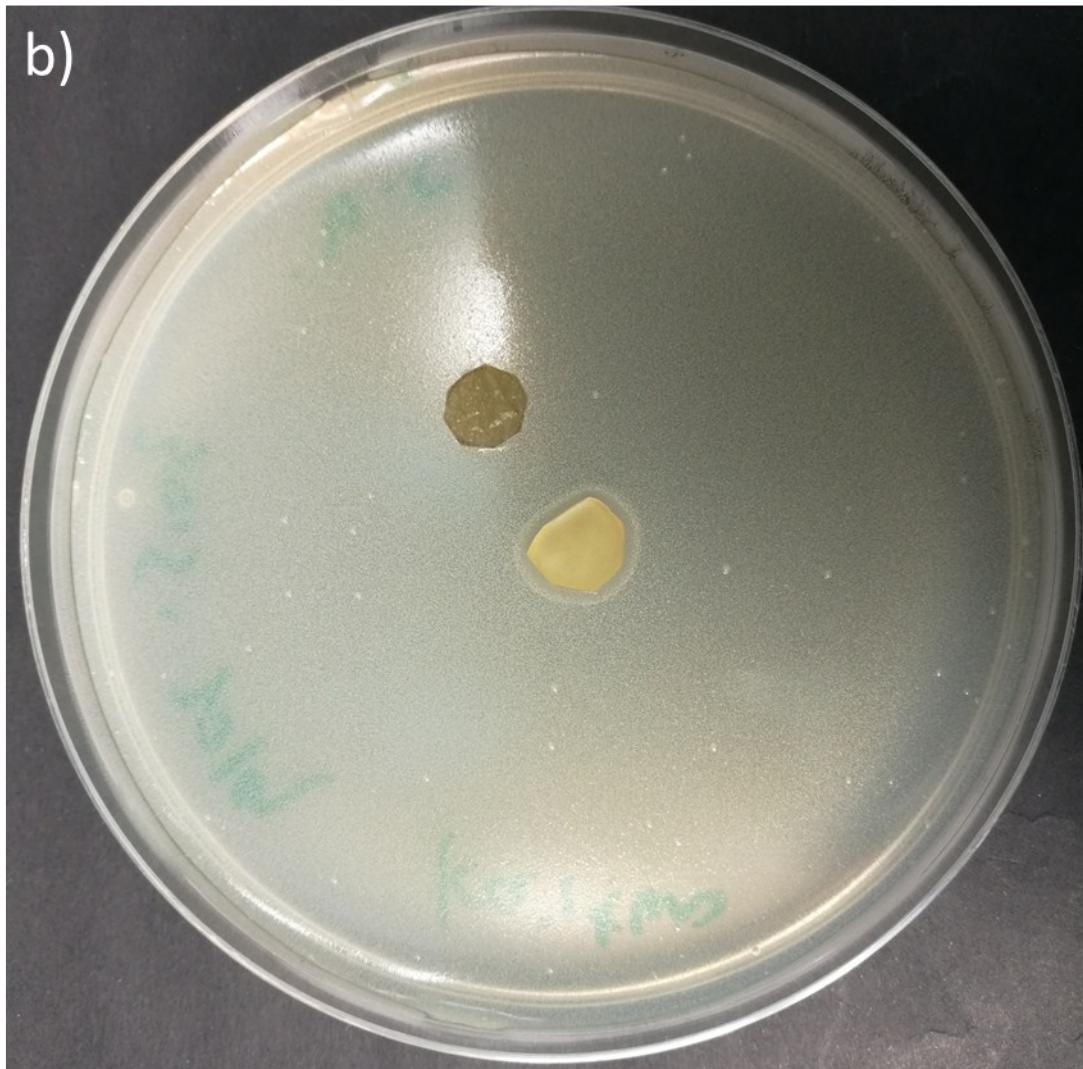
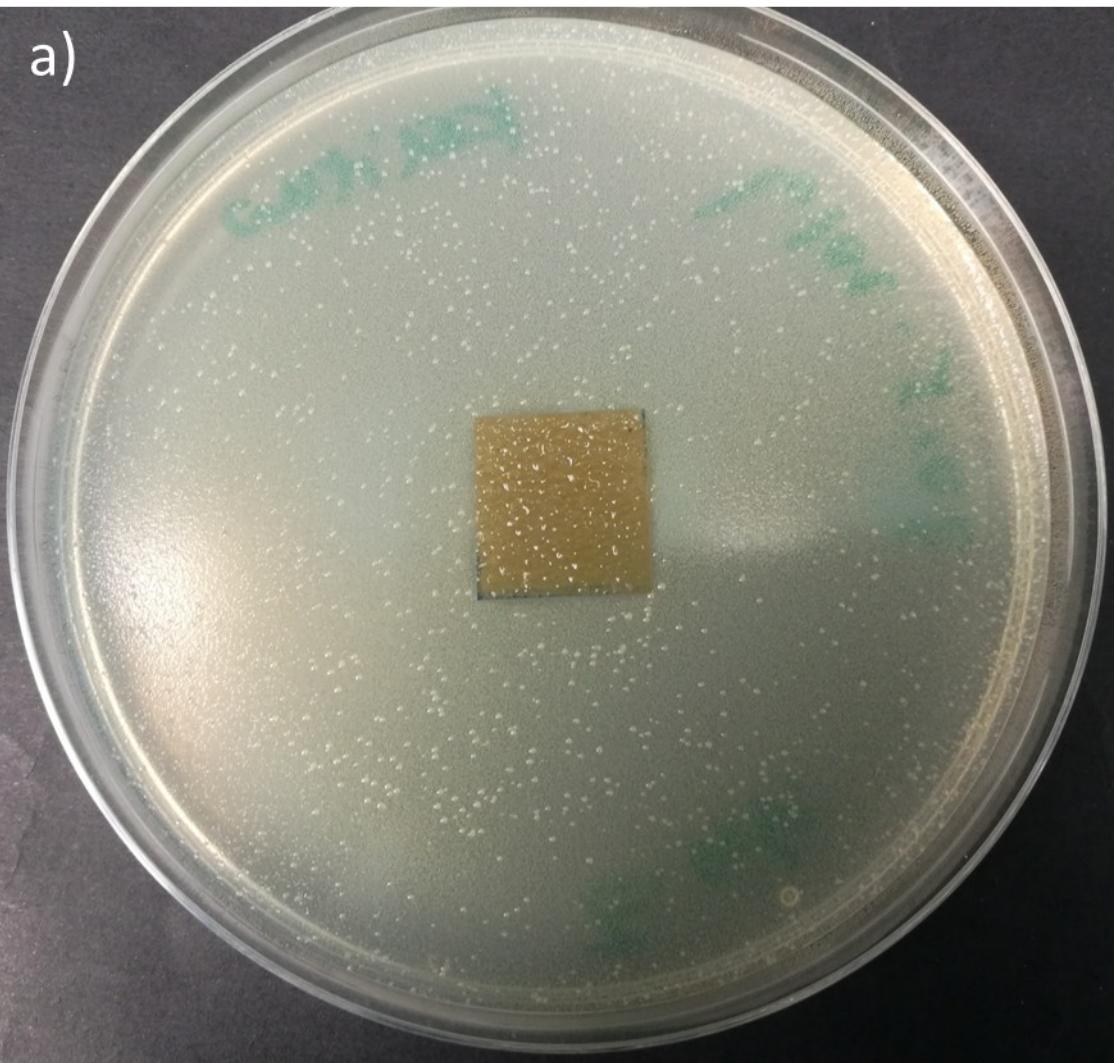


Figure S10. Photograph of the antimicrobial performance of the reference WNF film (sulfated WNF) (a) and reference film together with CWNF film (b) against *E. coli*



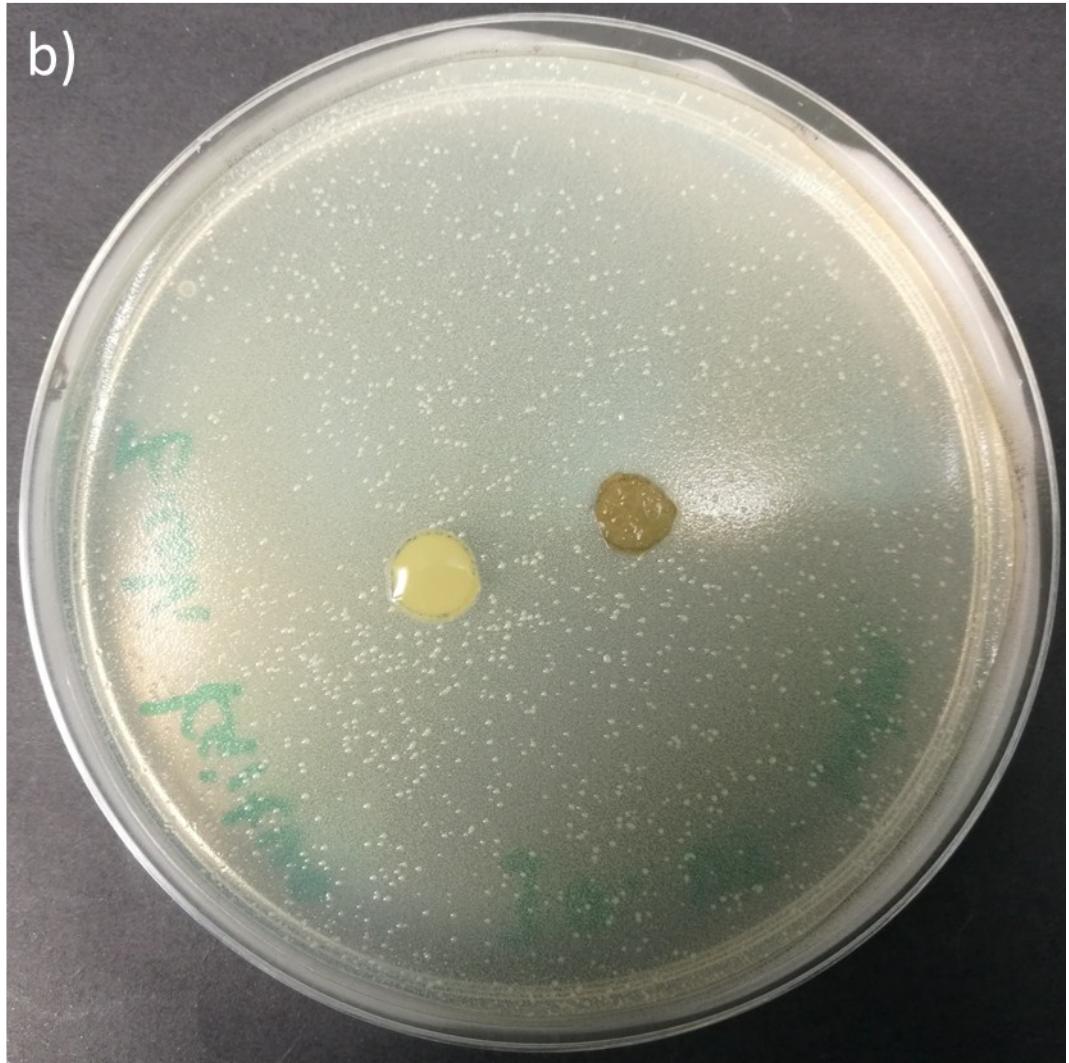


Figure S11. Photograph of the antimicrobial performance of the reference WNF film (sulfated WNF) (a) and reference film together with CWNF film (b) against *S. aureus*