

Materials List for:

# Towards Biomimicking Wood: Fabricated Free-standing Films of Nanocellulose, Lignin, and a Synthetic Polycation

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## Materials

Name	Company	Catalog Number	Comments
Sulfate pulp	Weyerhaeuser	donated	brightness level of 88%
Organosolv lignin	Sigma Aldrich	371017	discontinued
Hardwood milled wood lignin	see reference in paper		
Polydiallyldimethylammonium chloride	Sigma Aldrich	409022	Mn = 7.2 x 10 <sup>4</sup> , Mw = 2.4 x 10 <sup>5</sup>
2,2,6,6-Tetramethylpiperidine 1-oxyl (TEMPO)	Sigma Aldrich	214000	catalytic oxidation of primary alcohols to aldehydes with a purity of 98%, molecular weight is 156.25 g/mol
Sodium bromide	Sigma Aldrich	S4547	purity ≥99.0%, molecular weight 102.89
Sodium hypochlorite	Sigma Aldrich	425044	reagent grade, available chlorine 10~15%, molecular weight 74.44 g/mol
Sodium hydroxide	VWR	BDH7221-4	0.5 N aqueous solution, density 1.02 g/ml, molecular weight 40 g/mol
Sodium hydroxide	Acros Organics	AC12419-0010	0.1 N aqueous solution, specific gravity 1.0 g/ml, molecular weight 40 g/mol
Ammonium hydroxide	Acros Organics	AC39003-0025	25% solution in water, pH 13.6, density 0.89, molecular weight 35.04 g/mol
Hydrogen peroxide	Fisher Scientific	H325-100	30.0~32.0% certified ACS, pH 3.3, density 1.11
Mica sheets	TED Pella	NC9655733	Pelco, grade V5, 10 x 40 mm, 23 mm T, minimum air and bubbles, very clean
Sulfuric acid	Fisher Scientific	A300-212	95.0~98.0 w/w%, certified ACS plus, molecular weight 98.08 g/mol
Cellulose acetate	McMaster Carr	8564K44	degree of substitution 2.5
Ethanol	Decon Laboratories	04-355-223	200 proof (100%), USP
Name	Company	Catalog Number	Comments
Acetone	Fisher Scientific	A18-4	purity ≥99.5%, certified ACS reagent grade, density 0.79 g/ml, molecular weight 58.08 g/mol

Syringe pump	Harvard Apparatus	552226	pump 22 infusion/withdraw with standard syringe holder, flow rate 0.002 $\mu$ l/hr~55.1 ml/min
Mill-Q water purification system	EMD Millipore	D3-UV	Direct-Q, UV, water conductivity 18.5 M $\Omega$ ·cm with 20 L reservoir
pH meter	Mettler Toledo		SeverMulti
Balance	Mettler Toledo	AB135-S	accuracy 0.1 mg
Atomic force microscope	Asylum Research		MFP-3D, Olympic fluorescent microscope stage
Ellipsometer	Beaglehole Instruments		
Fiber centrifuge	unknown		basket style centrifuge
Waring blender	Waring		Commercial
Ultrasonic processor	Sonics		Sonics 750 W, sound enclosure
Quartz crystal microbalance with dissipation monitoring (QCM-D)	Q-Sense Inc.	E4	measure fundamental frequency of 5 MHz, and monitor odd number overtones/harmonics from 3~13, use gold-coated piezoelectric quartz crystals
Automatted dipper arm	Lynxmotion		