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Supporting Information

Swelling and Dissolution kinetics of Natural and Man-Made Cellulose Fibers in Solvent Power Tuned Ionic Liquid

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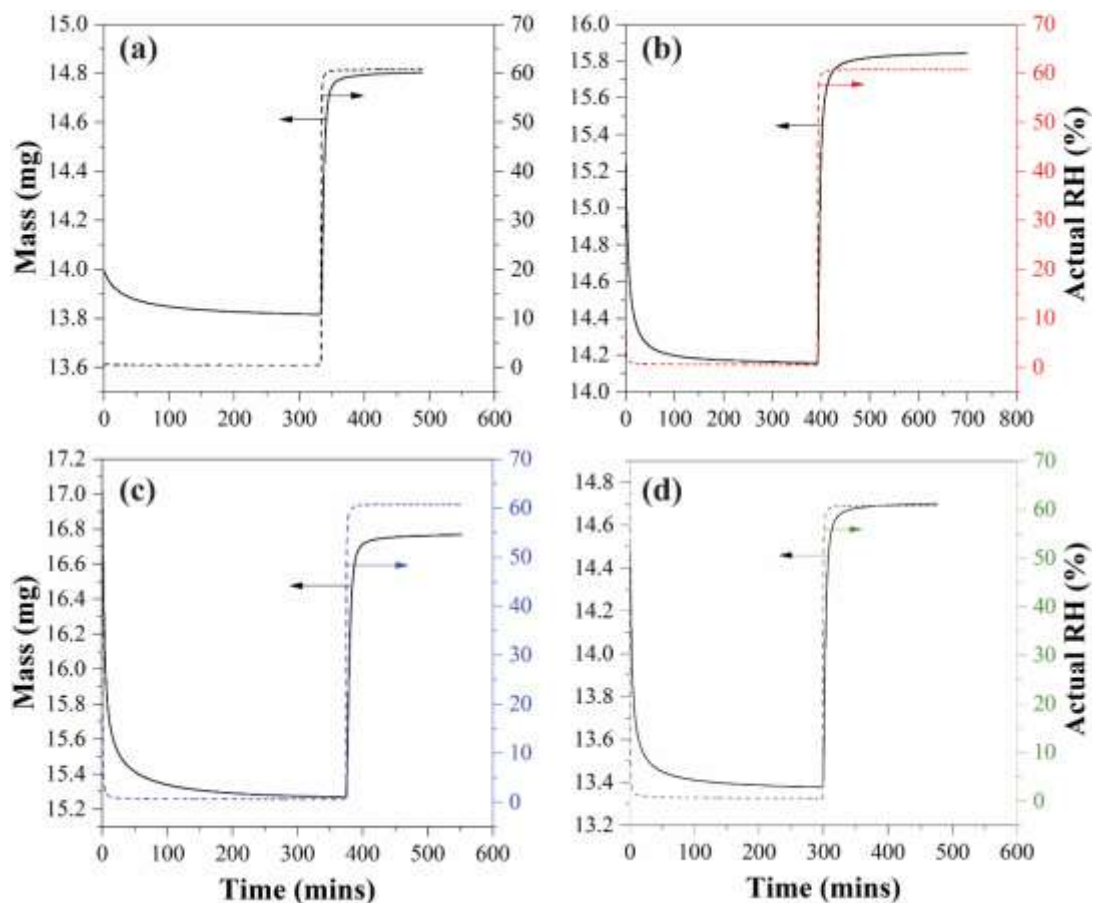


Figure S1.

Equilibrium moisture sorption isotherms of four fibers at 60% RH: (a) flax, (b) Cordenka, (c) Ioncell-FL and (d) Ioncell-F.

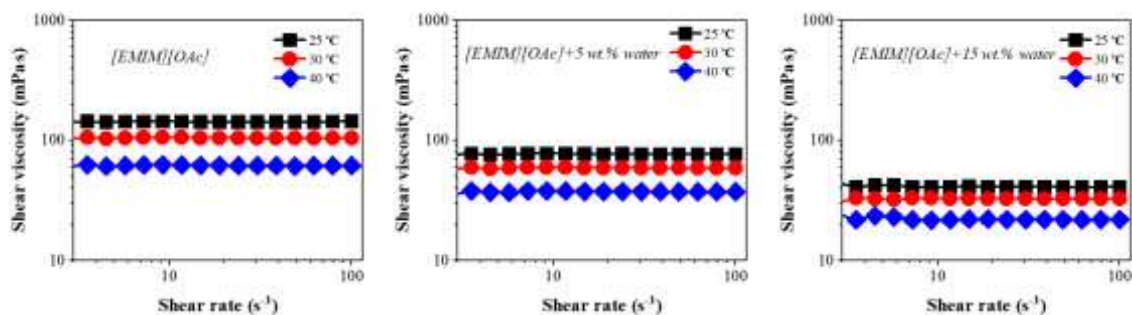


Figure S2.

Shear viscosity of [EMIM][OAc]-water mixture of different water content at 25°C, 30°C and 40°C.

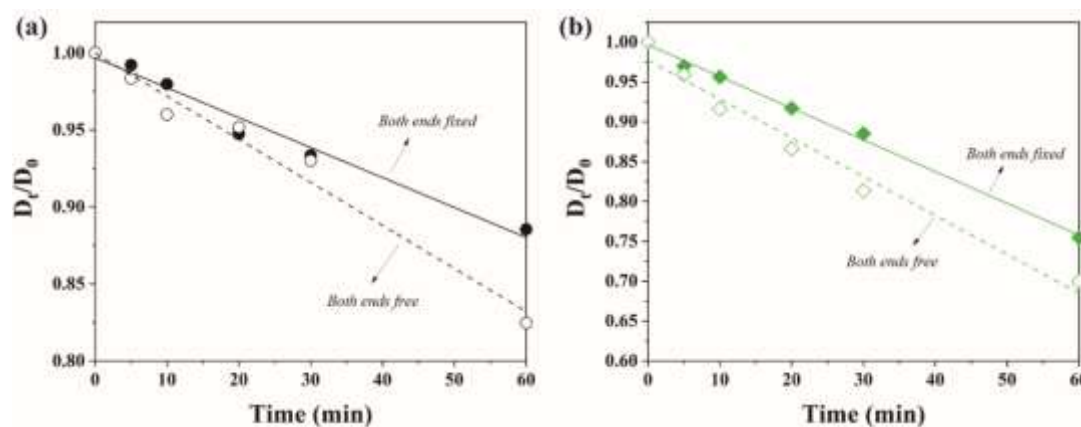


Figure S3.

Comparison of the normalized diameter of natural fiber flax (a) and Ioncell-FL (b) as an example for man-made fiber in IL [EMIM][OAc] with both ends fixed (filled symbol) and free (open symbol).

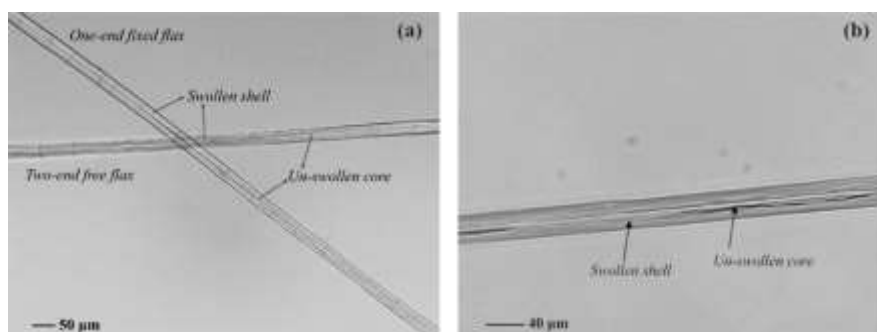


Figure S4.

Optical microscopy images of flax fibers in [EMIM][OAc]-5 wt.% water at 50 °C: (a) with one end fixed and with both ends free and (b) both ends fixed.

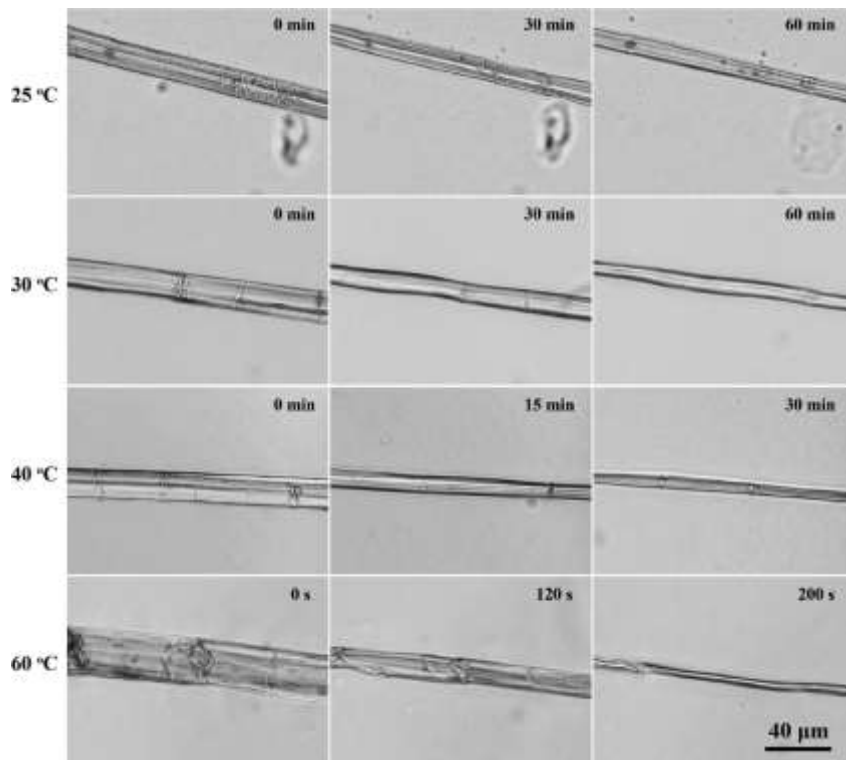


Figure S5a.

Optical microscopy images of flax in [EMIM][OAc] at different temperatures.

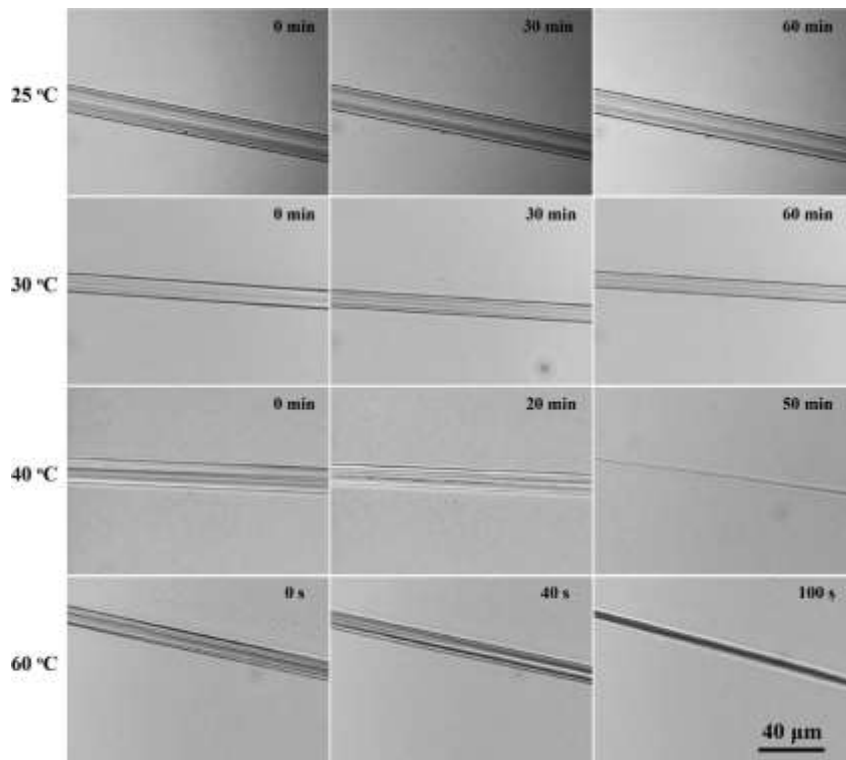


Figure S5b.

Optical microscopy images of Cordenka in [EMIM][OAc] at different temperatures.

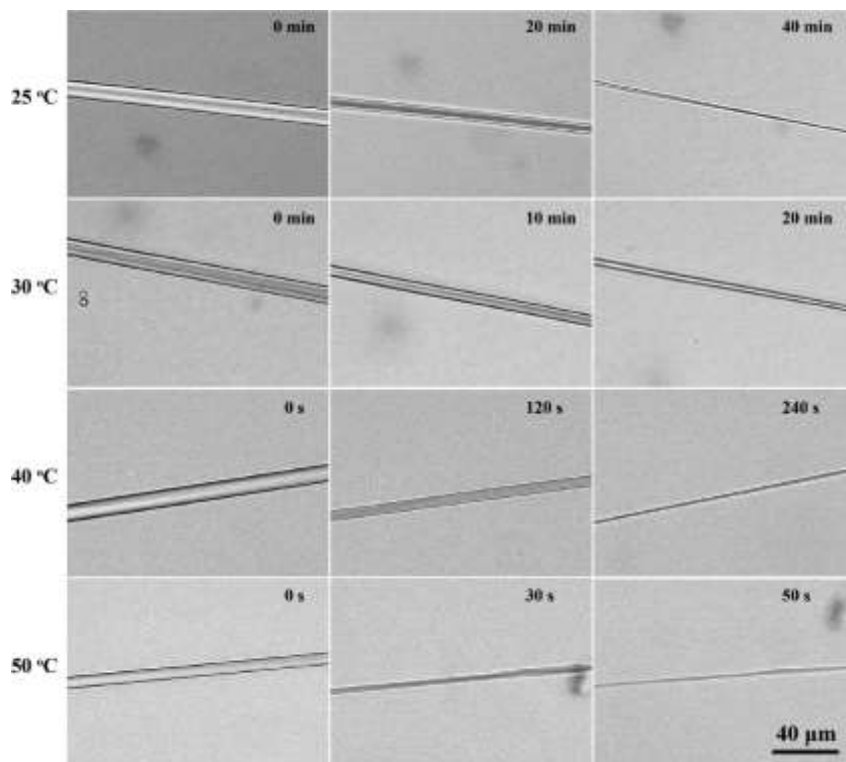


Figure S5c.

Optical microscopy images of Ioncell-F in [EMIM][OAc] at different temperature.

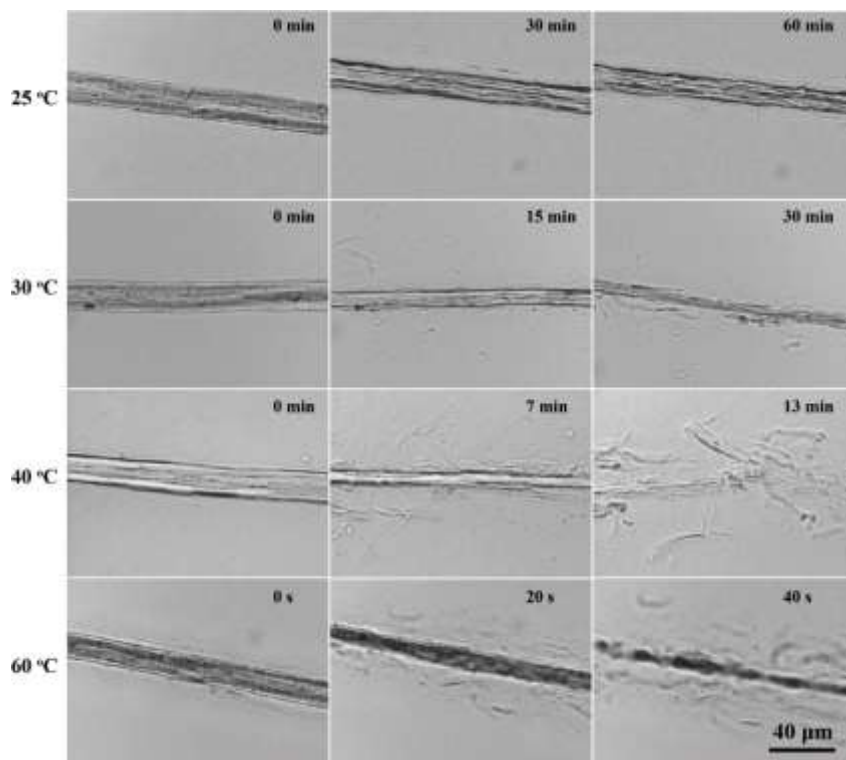


Figure S5d.

Optical microscopy images of Ioncell-FL in [EMIM][OAc] at different temperature.

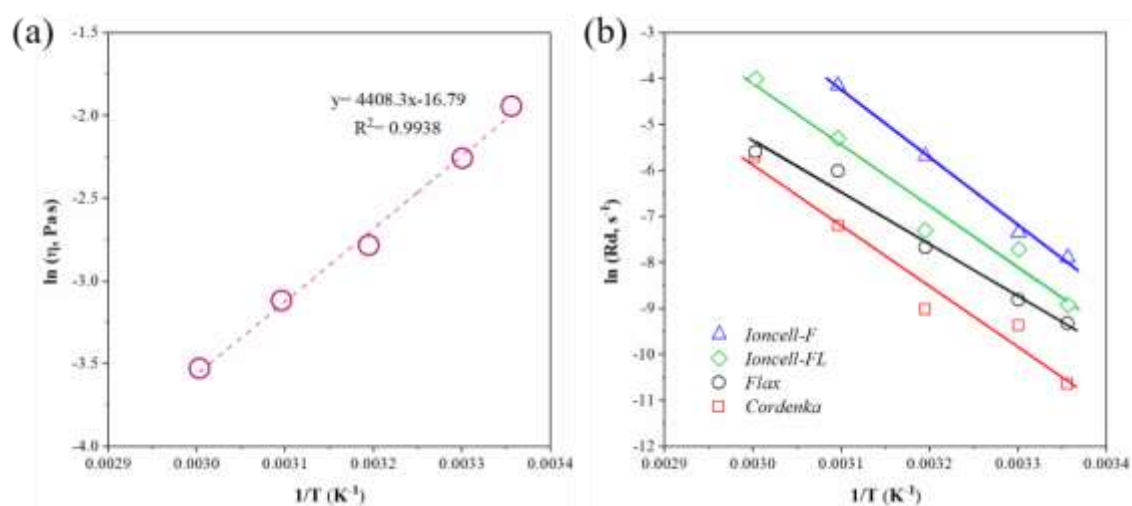


Figure S6.

Arrhenius-type plot for [EMIM][OAc] viscosity (a) and fibers' dissolution rate (b) as a function of inverse temperature.

Table S1. Comparison of dissolution rate of four fibers in [EMIM][OAc] and in [EMIM][OAc]-5 wt.% water at 30°C.

Dissolution rate (s^{-1})	Cordenka	Flax	Ioncell-FL	Ioncell-F
in [EMIM][OAc]	$8.51 \cdot 10^{-5}$	$1.49 \cdot 10^{-4}$	$4.4 \cdot 10^{-4}$	$6.48 \cdot 10^{-4}$
in [EMIM][OAc]-5 wt. % water	$3.58 \cdot 10^{-5}$	Swelling	$2.1 \cdot 10^{-4}$	$5.1 \cdot 10^{-4}$

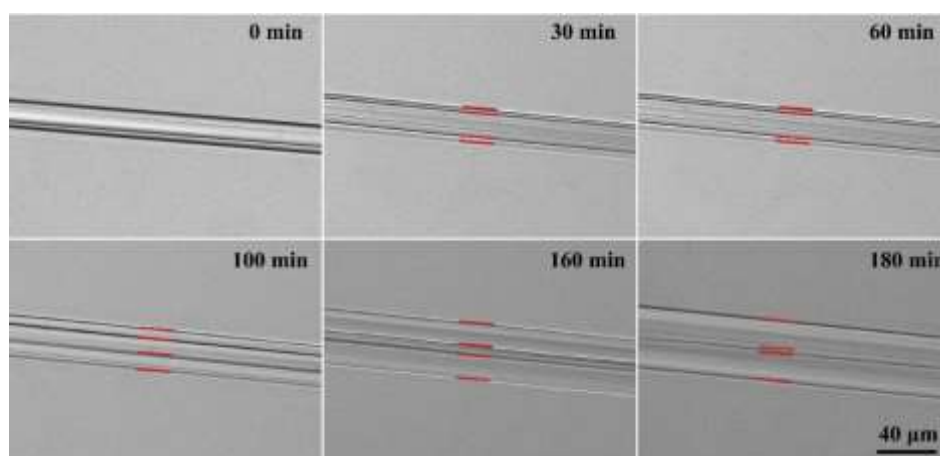


Figure S7.

Optical microscopy images of Cordenka swelling in [EMIM][OAc]+15% water at 50°C.