Supporting Information for

Metal-Assisted Injection Spinning of Ultra Strong Fibers from Megamolecular LC Polysaccharides

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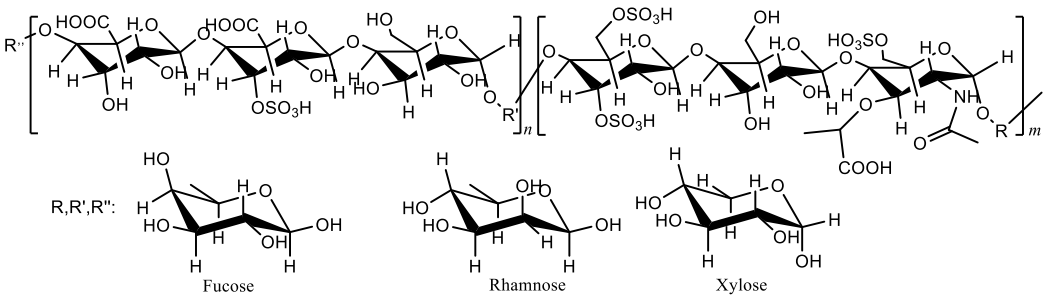

Figure S1. Main structure of sacran which is a supergiant liquid crystalline sulfated polysaccharide.

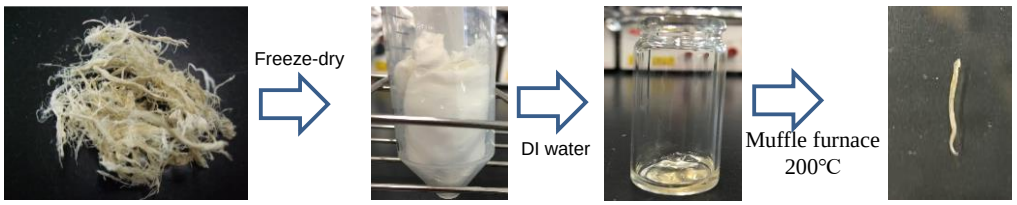

Figure S2. Preparation trial of sacran fibers by dry-spinning in 200 °C atmosphere from 30wt% aqueous solution.

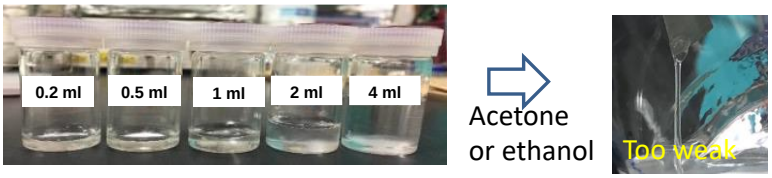

Figure S3. Preparation trial of sacran fibers by jelly-state spinning from gradually dehydrated jelly solutions by stepwise addition of acetone into aqueous solution.

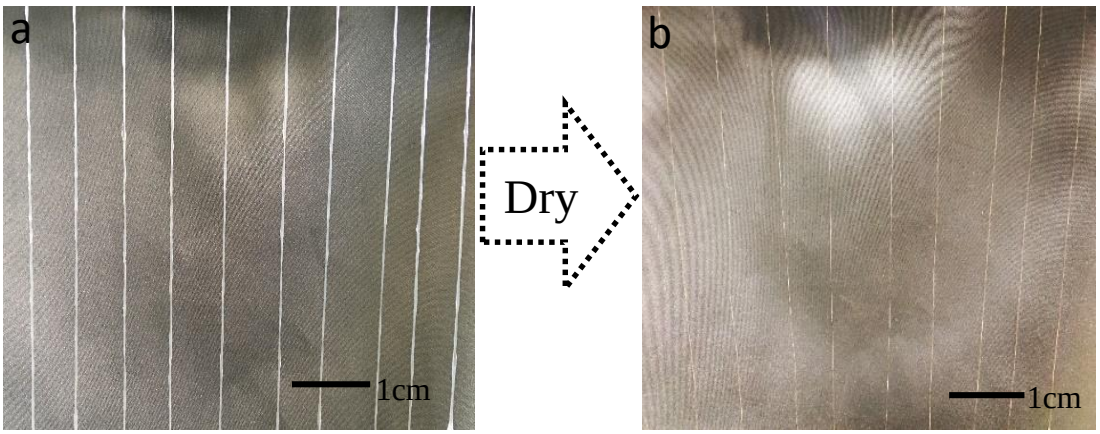

Figure S4. Sacran-metal complex fibers. (a) Sacran hydrogel fibers of 0.5wt% sacran aqueous solution cross-linked with 0.01M cerium (III) solution by sacran-metal complexation during injection. (b) Sacran-metal complex fibers formed by drying the hydrogel fibers shown in (a).

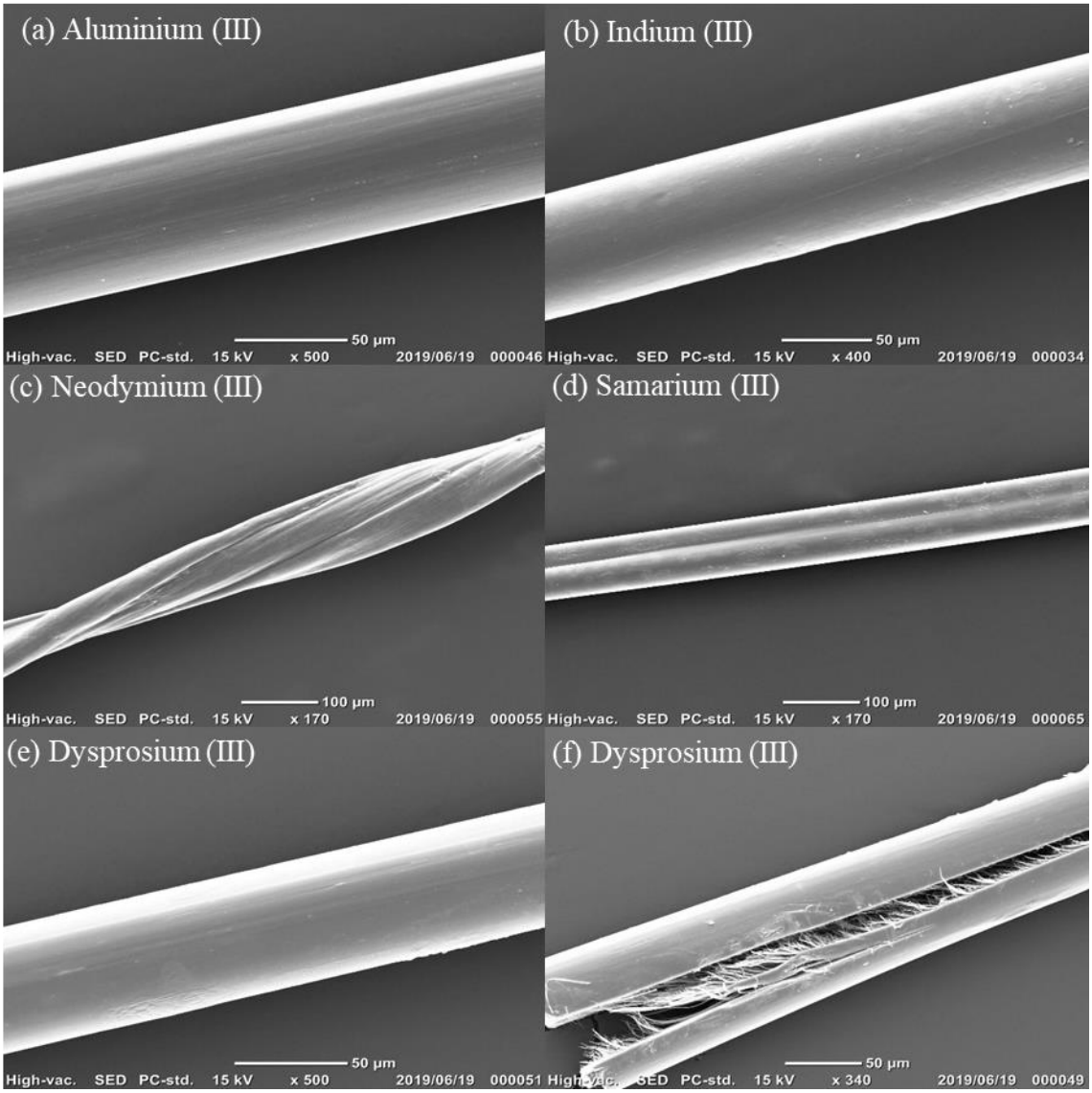

Figure S5. Representative SEM images of sacran complex fibers cross-linked with a) Al^{3+}, b) In^{3+}, c) Nd^{3+}, d) Sm^{3+}, and e) Dy^{3+}, showing the striped texture on the surface. f) Spontaneously-fractured fibers of (e). .

Table S1. Mechanical properties of sacran complex fibers prepared under different concentration condition of cerium chloride.

Concentration of cerium (III) chloride solution	Sacran-cerium complex (III) fibers			
	E **(GPa)**	***σ*** **(GPa)**	***ε*** **(mm/mm)**	***U*** **(kJ/m^3)**
0.001 M	1.1±0.3	0..09±0.03	0.05±0.02	1.96±1.47
0.005 M	2.3±0.5	0.11±0.03	0.05±0.02	2.92±1.95
0.01 M	5.4±0.6	0.19±0.05	0.03±0.01	5.55±2.06
0.05 M	2.9±0.7	0.09±0.01	0.03±0.01	1.83±0.61
0.1 M	1.9±0.4	0.08±0.01	0.03±0.01	1.65±0.39

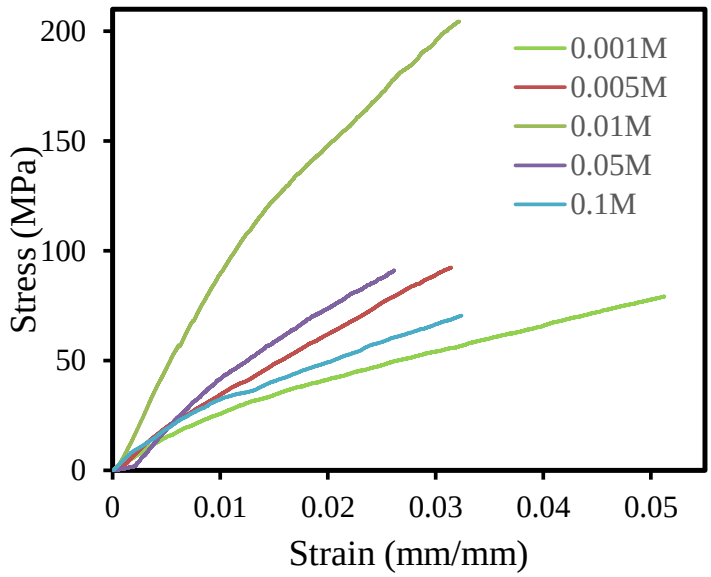

Figure S6. Stress-strain curve of sacran complex fibers prepared under different concentration condition of cerium chloride.

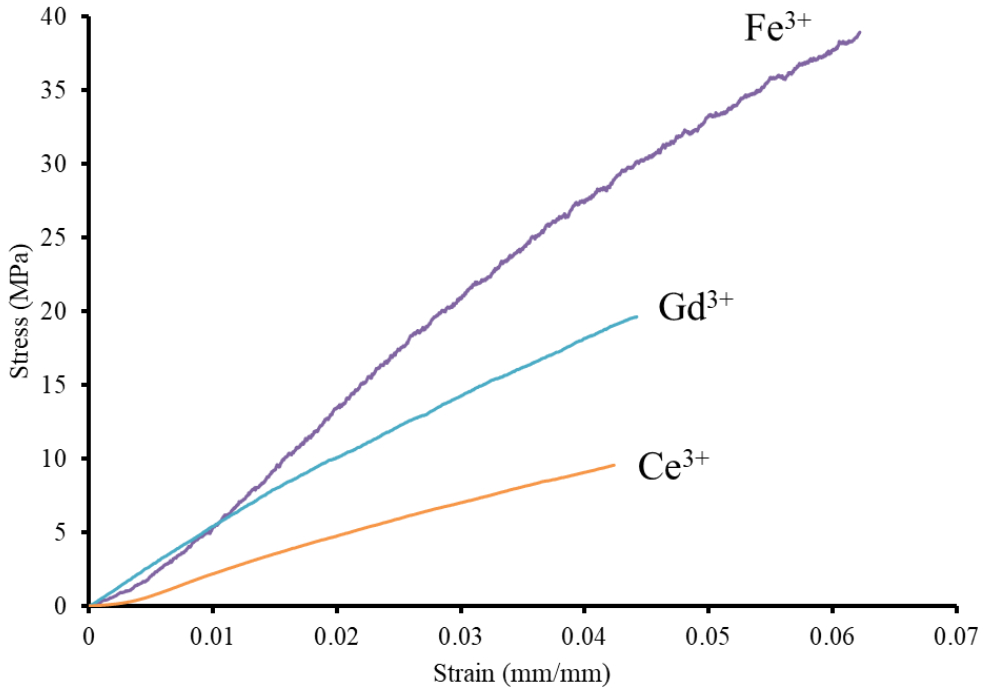

Figure S7. Stress-strain curves of sacran-metal complex hydrogel fibers prepared by metal-mediated injection spinning using Ce^{3+}, Gd^{3+}, and Fe^{3+}.