**Supplementary Information**

*List of gels discussed in this manuscript:*

Table S1: Gels and their abbreviations. The sample naming convention is O(mg/mL O-CNC)A(mg/mL ODA)(mixing order)(cooling method) where the mixing order is 1 for O-CNC first dispersed in DMSO with ODA added later and 2 for ODA dispersed first followed by O-CNC addition. The cooling method is F for refrigerator, Q for quenching in an ice bath and S for slow cool in air.

| Name | Weight percent O-CNC (mg/mL) | Weight percent ODA (mg/mL) | Ratio of ODA to O-CNC | Mixing Order | Cooling Method |
|---|---|---|---|---|---|
| O10A10-1-F | 10 | 10 | 1 | O-CNC then ODA | Fridge |
| O10A20-1-F | 10 | 20 | 2 | O-CNC then ODA | Fridge |
| O10A30-1-F | 10 | 30 | 3 | O-CNC then ODA | Fridge |
| O10A40-1-F | 10 | 40 | 4 | O-CNC then ODA | Fridge |
| O10A50-1-F | 10 | 50 | 5 | O-CNC then ODA | Fridge |
| O50A30-1-F | 50 | 30 | 0.6 | O-CNC then ODA | Fridge |
| O40A30-1-F | 40 | 30 | 0.75 | O-CNC then ODA | Fridge |
| O30A30-1-F | 30 | 30 | 1 | O-CNC then ODA | Fridge |
| O5A10-2-F | 5 | 10 | 2 | ODA then O-CNC | Fridge |
| O5A20-2-F | 5 | 20 | 4 | ODA then O-CNC | Fridge |
| O10A10-2-F | 10 | 10 | 1 | ODA then O-CNC | Fridge |
| O10A20-2-F | 10 | 20 | 2 | ODA then O-CNC | Fridge |
| O10A30-2-F | 10 | 30 | 3 | ODA then O-CNC | Fridge |
| O10A40-2-F | 10 | 40 | 4 | ODA then O-CNC | Fridge |
| O10A50-2-F | 10 | 50 | 5 | ODA then | Fridge |

| | | | | | |
|---|---|---|---|---|---|
| | | | | O-CNC | |
| O50A30-2-F | 50 | 30 | 0.6 | ODA then O-CNC | Fridge |
| O40A30-2-F | 40 | 30 | 0.75 | ODA then O-CNC | Fridge |
| O30A30-2-F | 30 | 30 | 1 | ODA then O-CNC | Fridge |
| O20A30-2-F | 20 | 30 | 1.5 | ODA then O-CNC | Fridge |
| O20A40-2-F | 20 | 40 | 2 | ODA then O-CNC | Fridge |
| O30A60-2-F | 30 | 60 | 2 | ODA then O-CNC | Fridge |
| O5A15-2-F | 5 | 15 | 3 | ODA then O-CNC | Fridge |
| O20A60-2-F | 20 | 60 | 3 | ODA then O-CNC | Fridge |
| O40A120-2-F | 40 | 120 | 3 | ODA then O-CNC | Fridge |
| O10A10-2-Q | 10 | 10 | 1 | ODA then O-CNC | Ice bath |
| O10A20-2-Q | 10 | 20 | 2 | ODA then O-CNC | Ice bath |
| O10A30-2-Q | 10 | 30 | 3 | ODA then O-CNC | Ice bath |
| O10A10-2-S | 10 | 10 | 1 | ODA then O-CNC | Slow cool |
| O10A20-2-S | 10 | 20 | 2 | ODA then O-CNC | Slow cool |
| O10A30-2-S | 10 | 30 | 3 | ODA then O-CNC | Slow cool |

*Images of gels before and after shaking:*

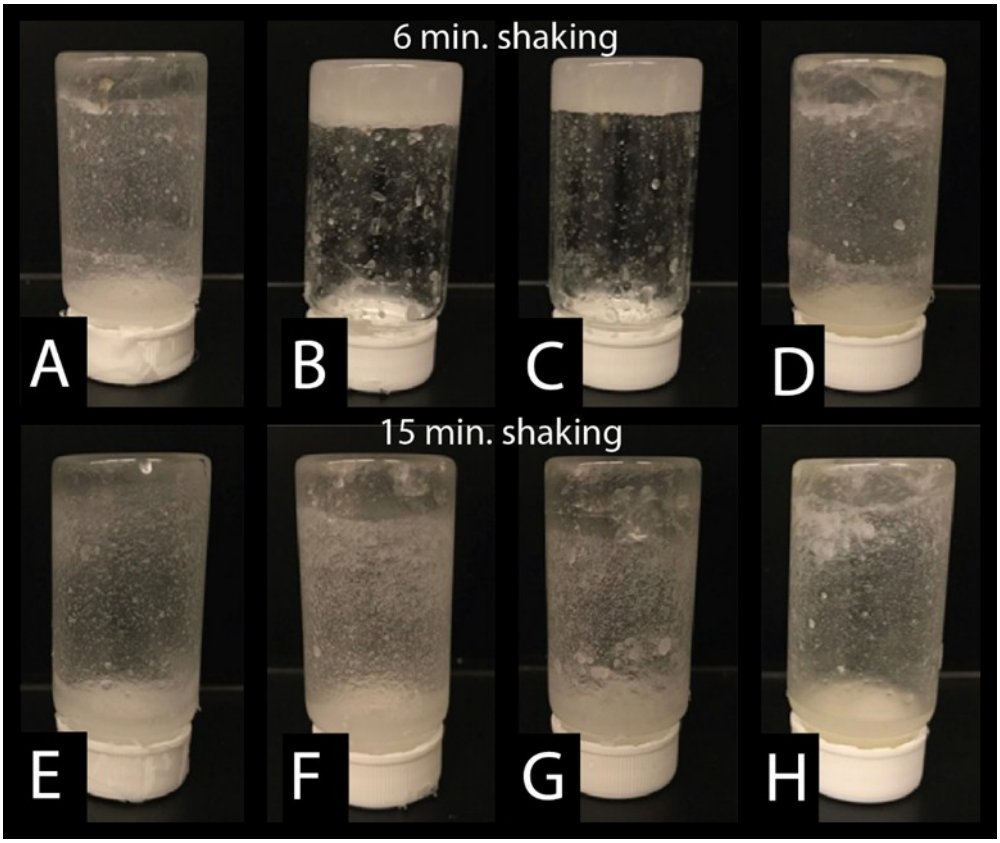


**Figure S1: Nanocellulose organogels with 10 mg/mL O-CNC and increasing concentrations of ODA after shaking at 450 rpm for 6 min. (A. 20 mg/mL, B. 30 mg/mL, C. 40 mg/mL, D. 50 mg/mL) and organogels with 10 mg/mL O-CNC and increasing concentrations of ODA after shaking at 450 rpm for 15 min. (E. 20 mg/mL, F. 30 mg/mL, G. 40 mg/mL, H. 50 mg/mL)**

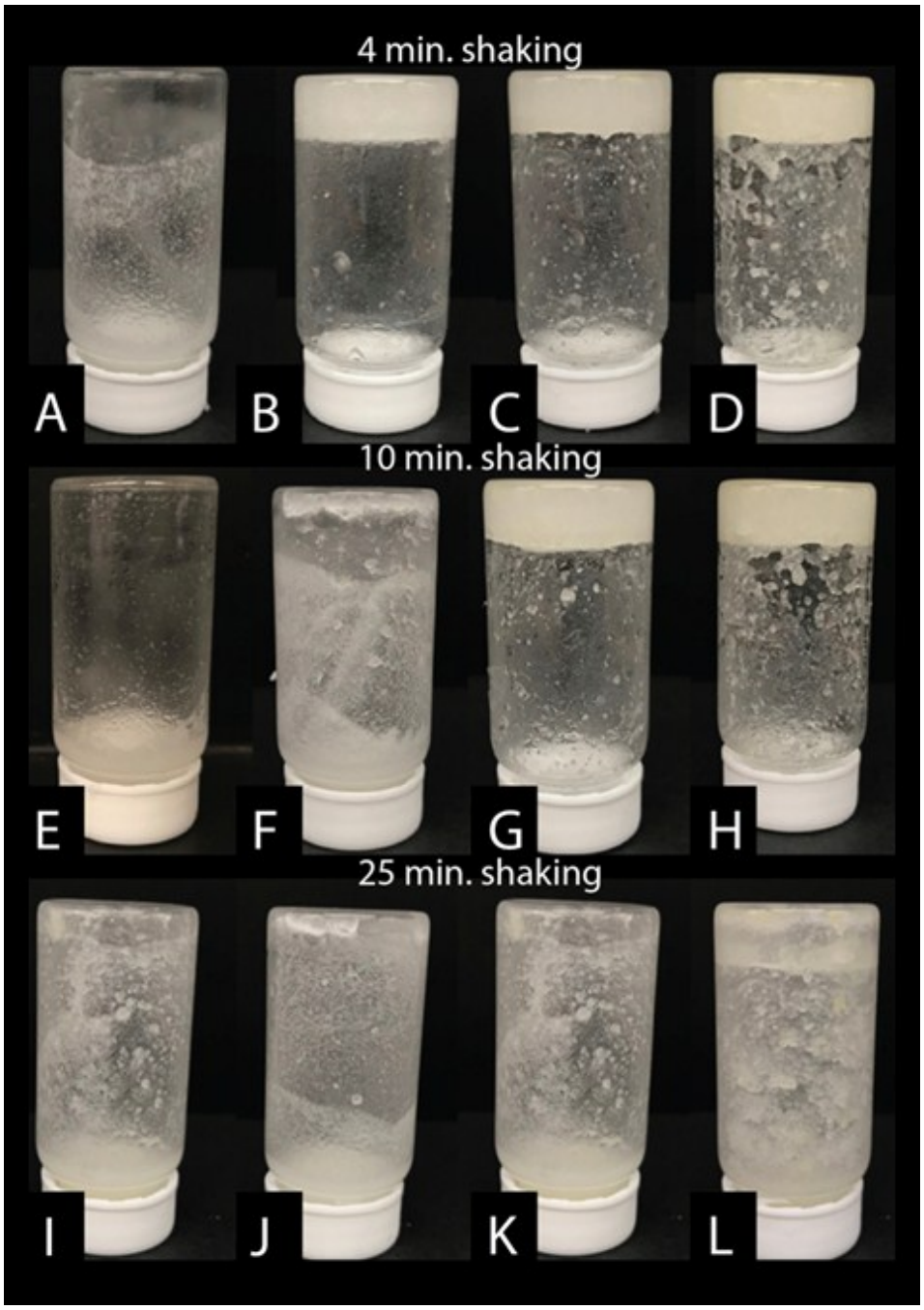


**Figure S2: Gel strength for increasing O-CNC concentration and constant ODA to O-CNC ratio of 3:1. 5 mg/mL O-CNC (A, E, I), 10 mg/mL O-CNC (B, F, J), 20 mg/mL (C, G, K), and 30 mg/mL (D, H, L). Gels were shaken at 450 rpm for 4 min. (A-D), 10 min. (E-H), and 25 min. (I-L)**

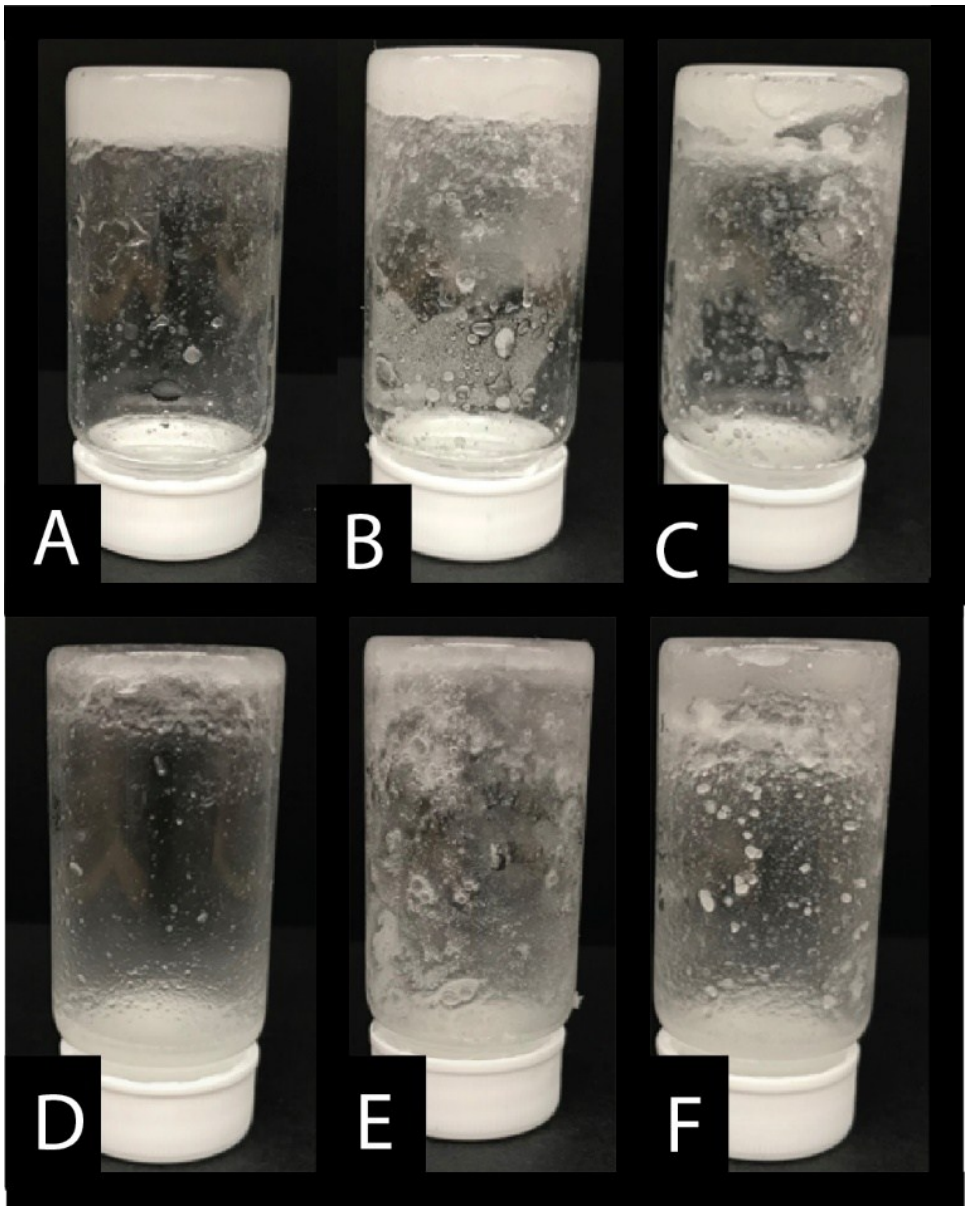


**Figure S3: Nanocellulose organogels with 1 mole oxidant per mole CNC (0.16 D.O.) containing 10 mg/mL and increasing concentrations of ODA. No shaking – (a. 20 mg/mL ODA, b. 30 mg/mL ODA, c. 50 mg/mL ODA). Shaking at 450 RPM for 4 minutes (d. 20 mg/mL ODA, e. 30 mg/mL ODA, f. 50 mg/mL ODA).**

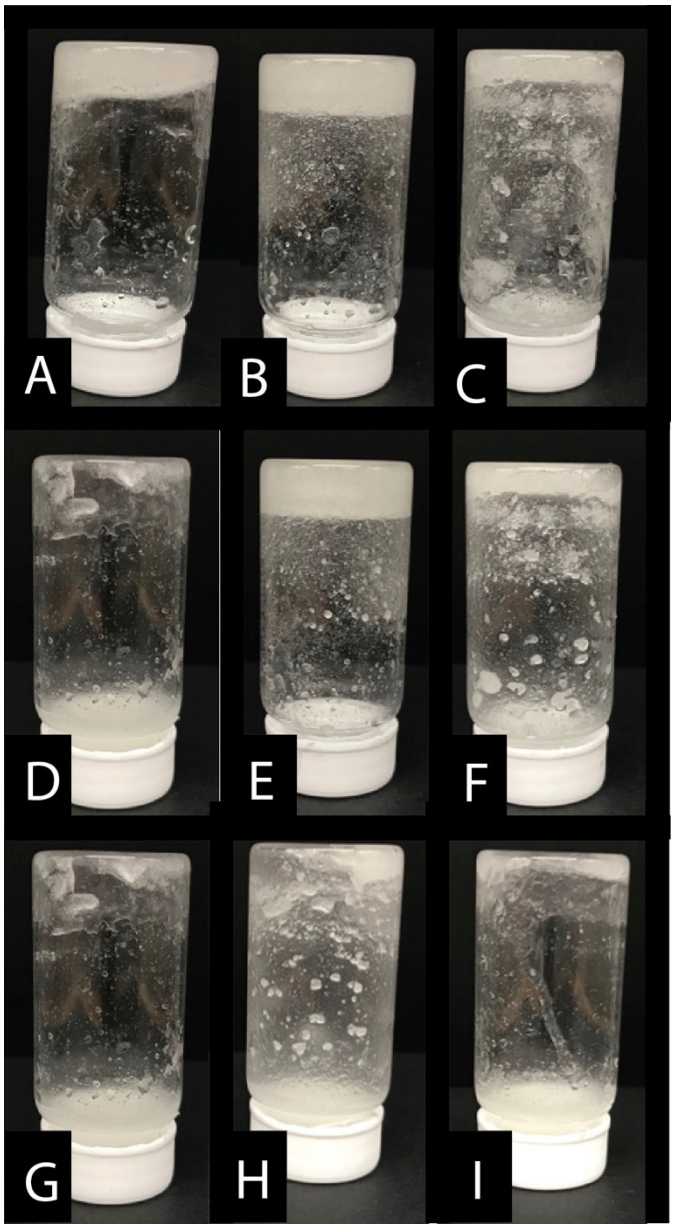


**Figure S4: Nanocellulose organogels with 5 mole oxidant per mole CNC (0.30 D.O.) containing 10 mg/mL and increasing concentrations of ODA. No shaking – (a. 20 mg/mL ODA, b. 30 mg/mL ODA, c. 50 mg/mL ODA). Shaking at 450 RPM for 4 minutes (d. 20 mg/mL ODA, e. 30 mg/mL ODA, f. 50 mg/mL ODA). Shaking at 450 RPM for 12 minutes (g. 20 mg/mL ODA, h. 30 mg/mL ODA, i. 50 mg/mL ODA).**

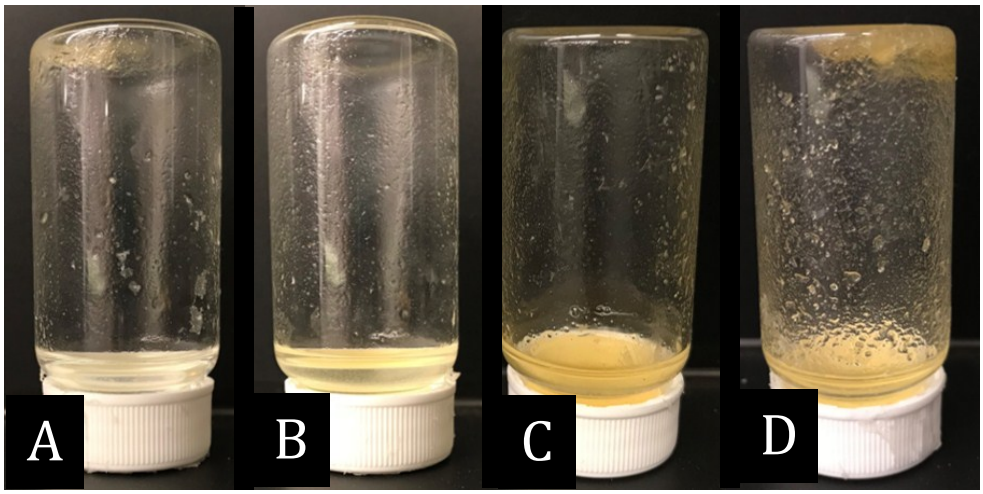


**Figure S5: Mixtures in DMSO with 10 mg/mL O-CNC and (A. 10 mg/mL, B. 20 mg/mL, C. 30 mg/mL and D. 40 mg/mL) diaminooctane showing no gelation.**

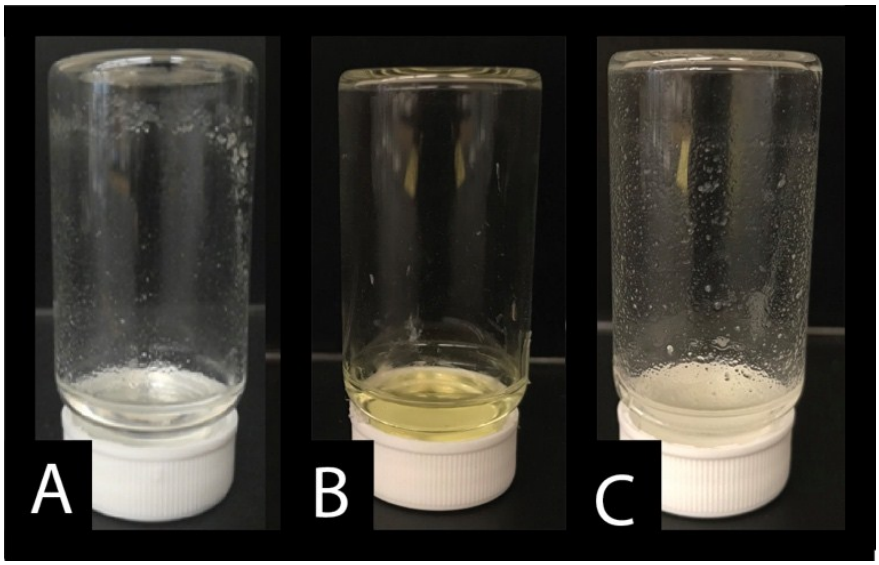


**Figure S6: Mixtures in DMSO with 10 mg/mL O-CNC and (A. 14 mg/mL, B. 25 mg/mL, and C. 50 mg/mL) polyethyleneimine showing no gelation.**

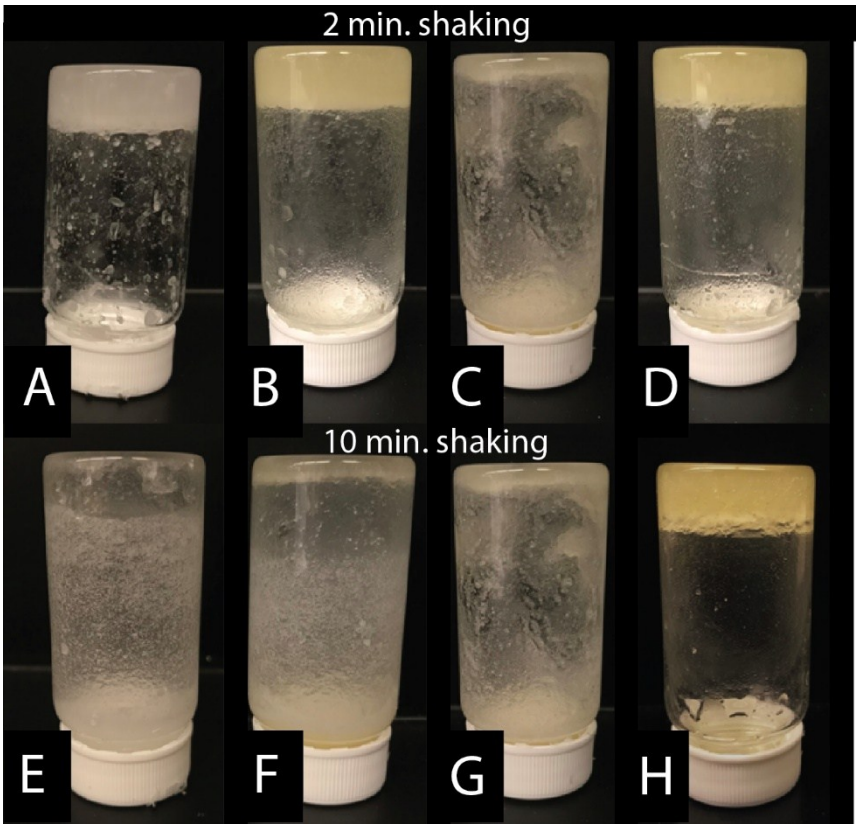


**Figure S7: Gels containing 10 mg/mL O-CNC, 30 mg/mL ODA and 200 mg/mL of APIs (B, F: SMX; C, G: SP; D, H: SMZ). Gels were shaken at 450 rpm for 2 min. (A-D) and 10 min. (E-H).**

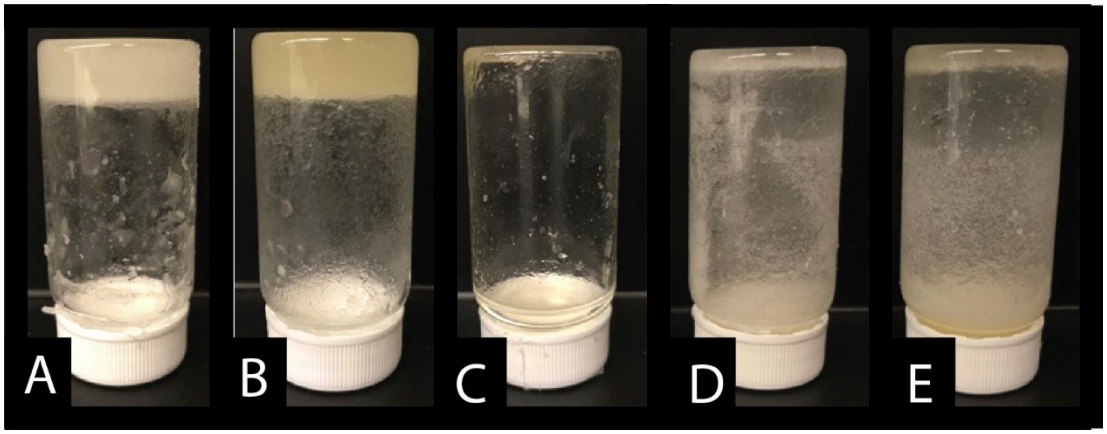


**Figure S8: Nanocellulose organogels containing SMX after shaking for 1 minute (A-C) and 10 minutes (D-E) at 400 RPM. Gels were made with 10 mg/mL O-CNC, 30 mg/mL ODA and (A. 50 mg/mL SMX, B. 200 mg/mL SMX, and C. 500 mg/mL SMX). Organogels broke after 10 minutes for 50 mg/mL (D) and 8 minutes for 200 mg/mL (E).**

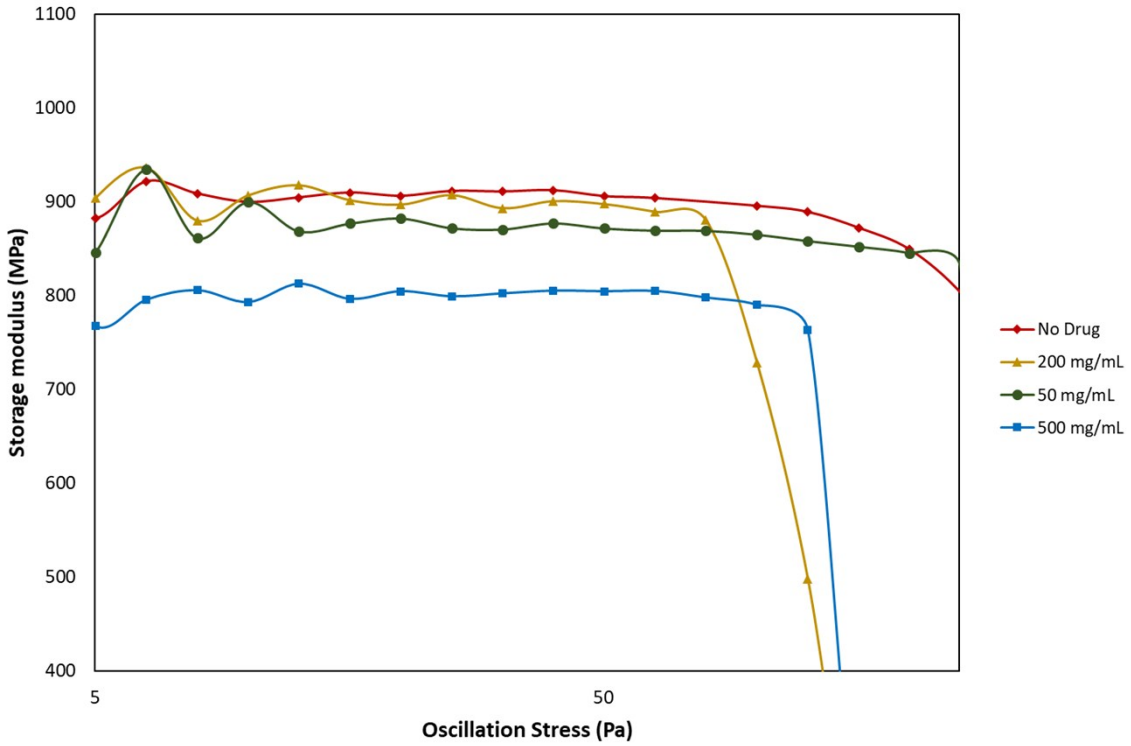


**Figure 9: Rheology data of nanocellulose organogels containing 10 mg/mL O-CNC, 30 mg/mL ODA and amount of SMX listed in the legend.**

*Decomposition analysis of SMX:*

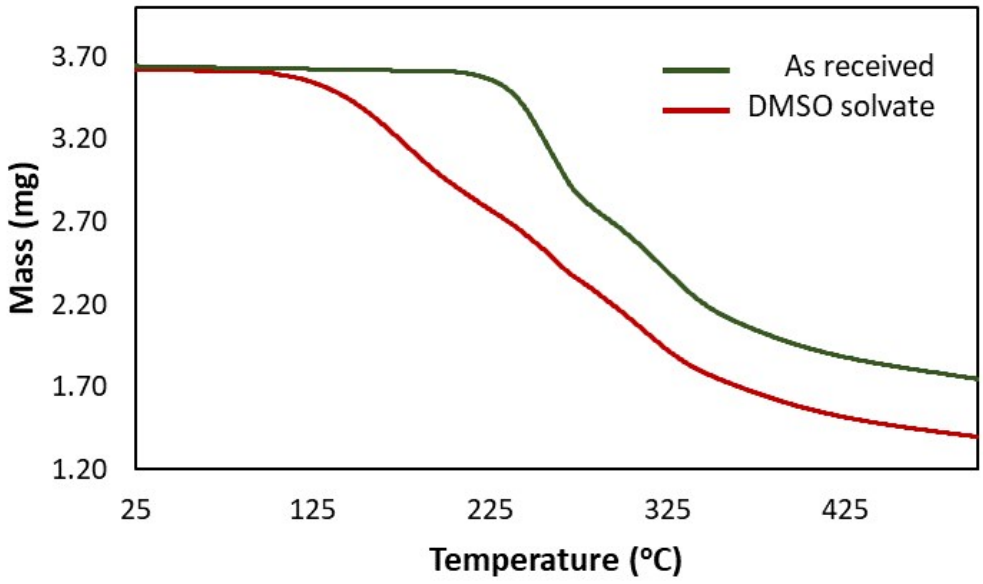


**Figure S8: Thermogravimetric analysis of as-received SMX (green) showing decomposition starting at 225℃ and additional degradation occurring at 273℃ and the SMX DMSO solvate (red) with decomposition starting at 106.5℃**

*X-Ray Diffraction – comparison of samples to simulated powder patterns from the Cambridge Structural Database, reference code for simulated pattern listed in the caption.*

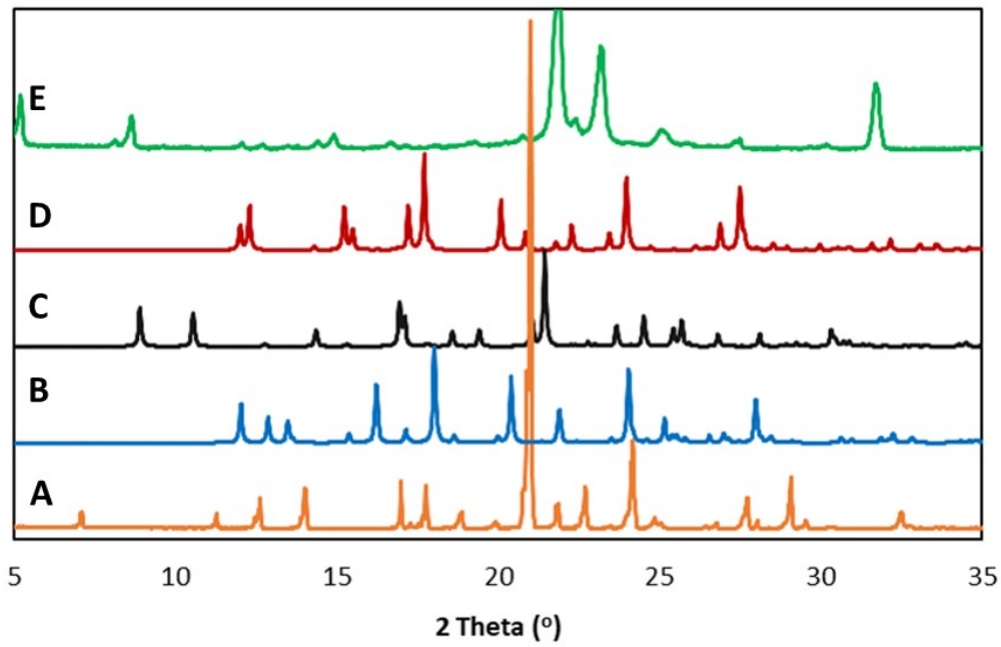


**Figure S9: Powder XRD Patterns for SMX a. as received SMX, b. polymorph I or II (SLFNMB04), c. polymorph III (SLFNMB05), d. polymorph IV (SLFNMB06) and e. recovered SMX from gel**

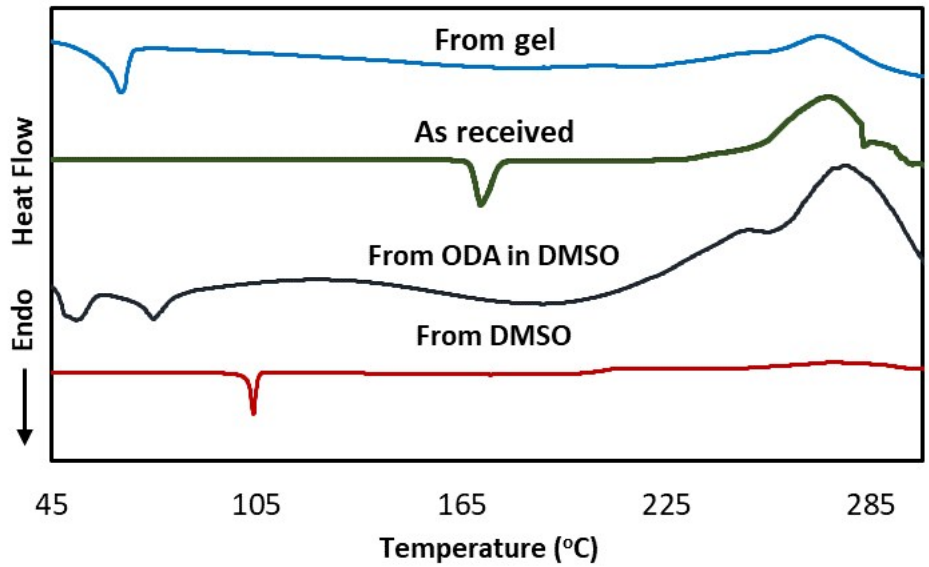


**Figure S10: DSC Thermograms for SMX obtained from OCNC-ODA gels, obtained from the ODA-DMSO mixture, obtained from a supersaturated DMSO solution, and the as received SMX from MP Biomedicals**

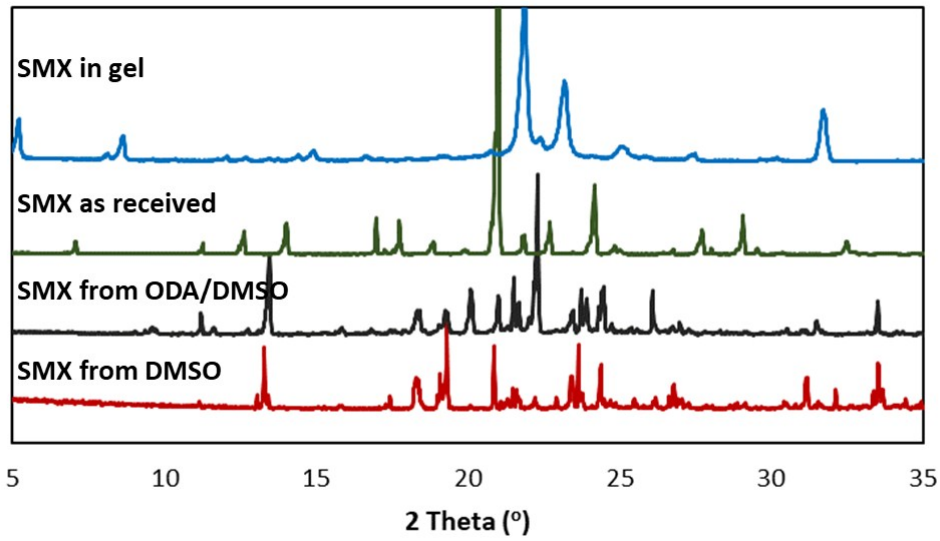


**Figure S11: XRD Patterns for the various SMXs (same as in S8) for comparison**

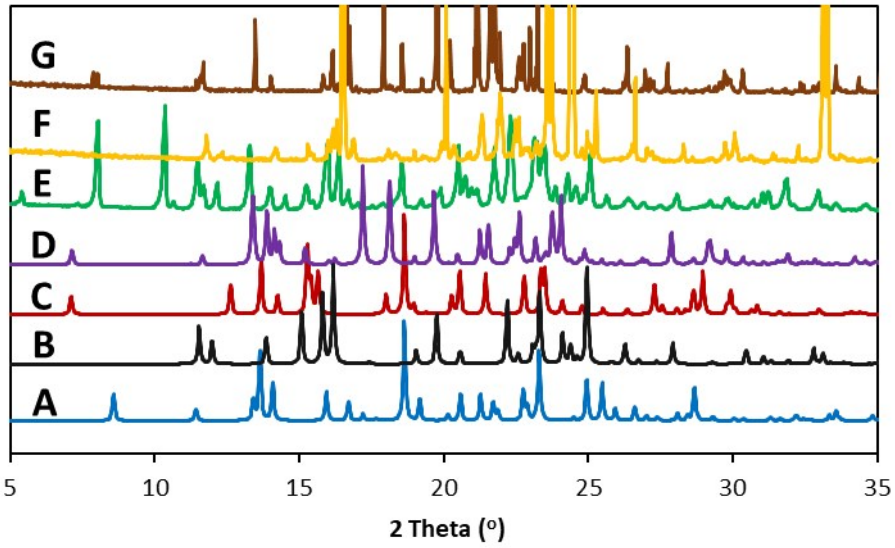


**Figure S12: Powder XRD Patterns for SP a. polymorph II (BEWKUJ11), b. polymorph III (BEWKUJ), c. polymorph IV (BEWKUJ05), d. polymorph V (BBEWKUJ13) and e. recovered SP from gel, f. SP from ODA-DMSO mixture, g. SP from DMSO**

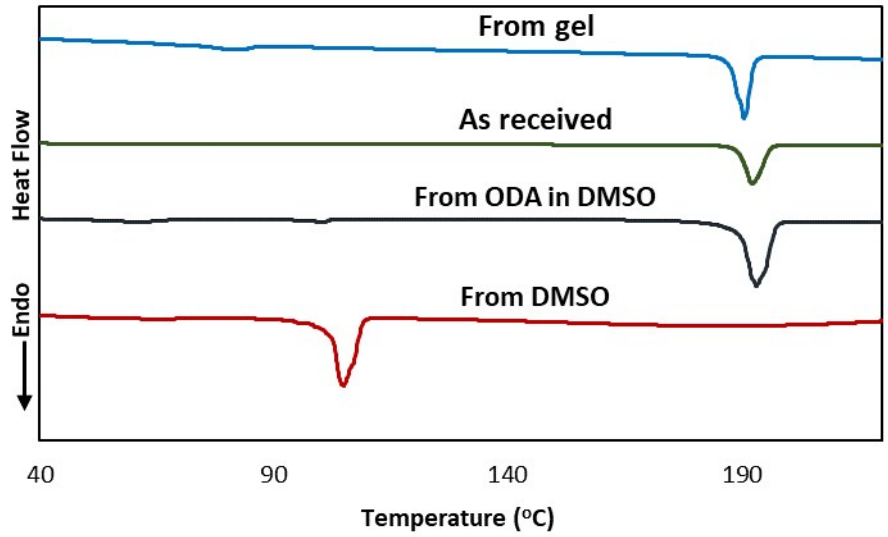


**Figure S13: DSC Thermograms for sulfapyridine obtained from OCNC-ODA gels, obtained from the ODA-DMSO mixture, obtained from a supersaturated DMSO solution, and the as received SP from TCI**

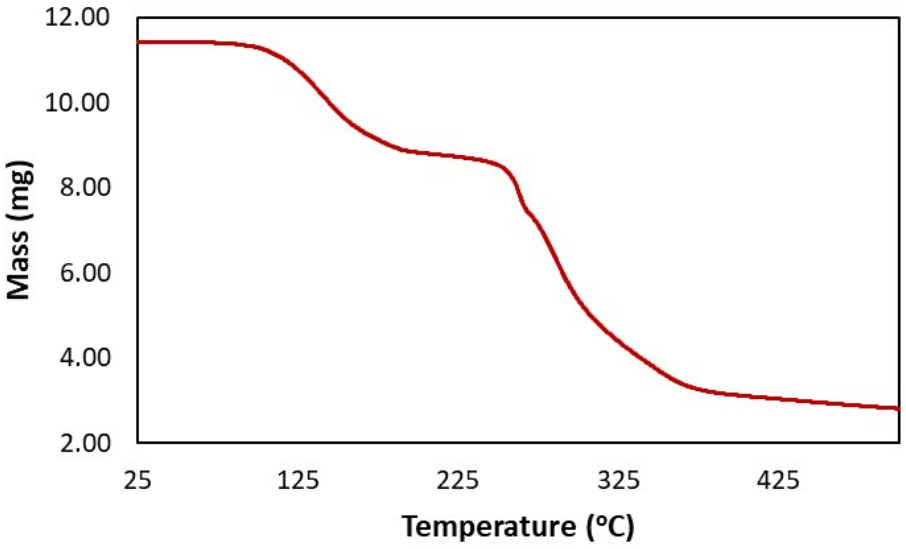


**Figure S14: TGA of SP solvate showing decomposition starting at 100.4°C and additional degradation at 252.9°C.**

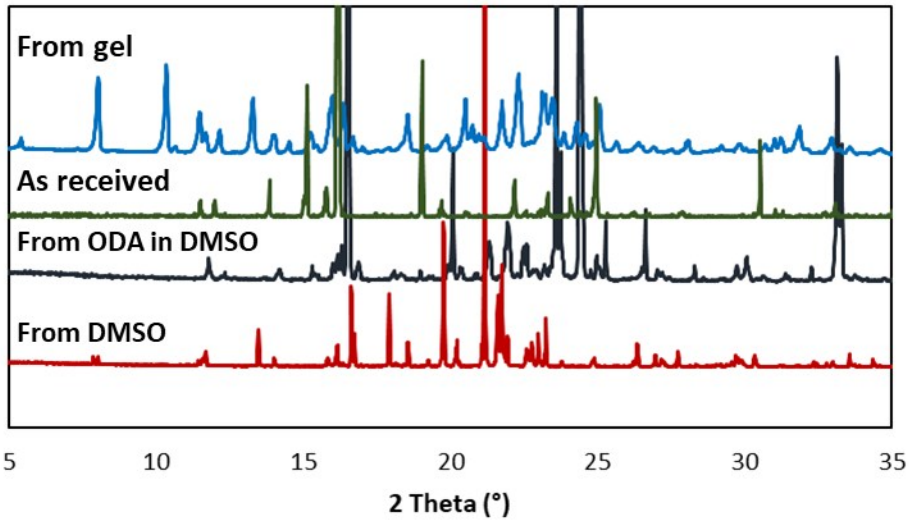


**Figure S15: XRD Patterns for the various SPs (same as in S10) for comparison**

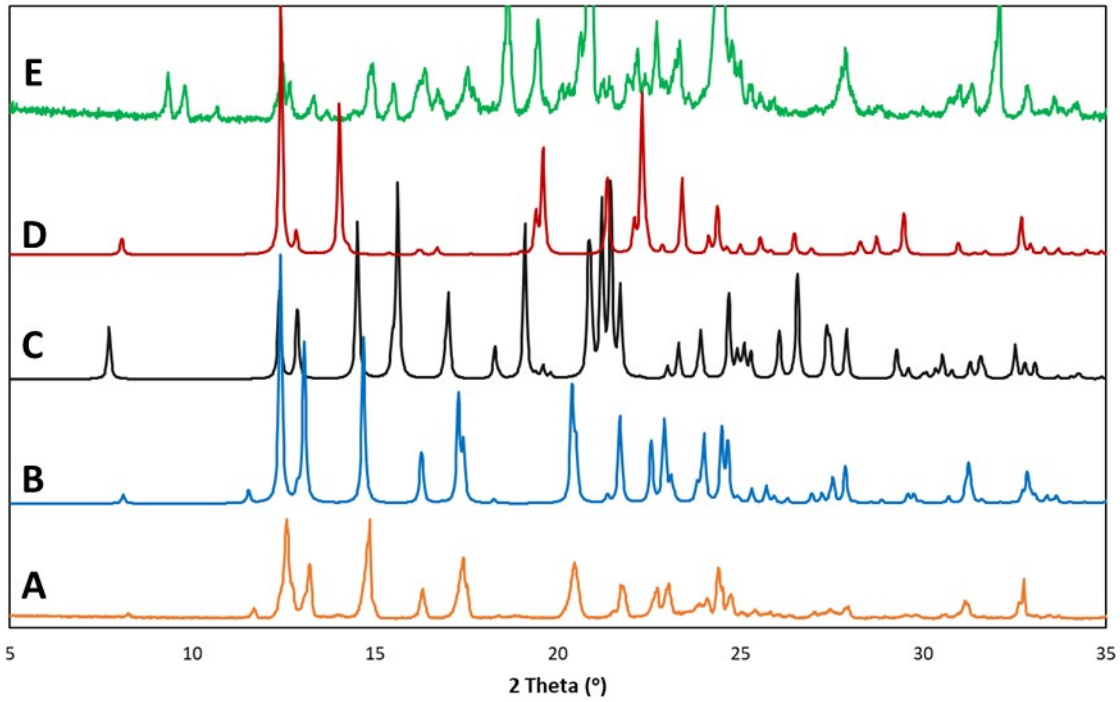


**Figure S16: Powder XRD Patterns for SMZ a. as received SMZ, b. polymorph I (SLFNMA04), c. polymorph II (SLFNMA01), d. polymorph P $2_1/c$ (SLFNMA03) e. recovered SMZ from gel**

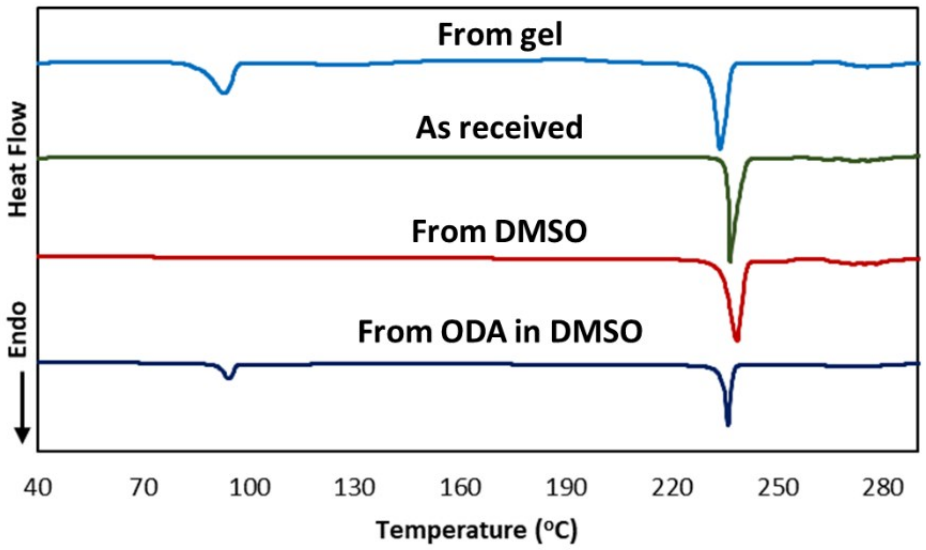


**Figure S17: DSC thermograms of the difference SMZ samples for comparison**

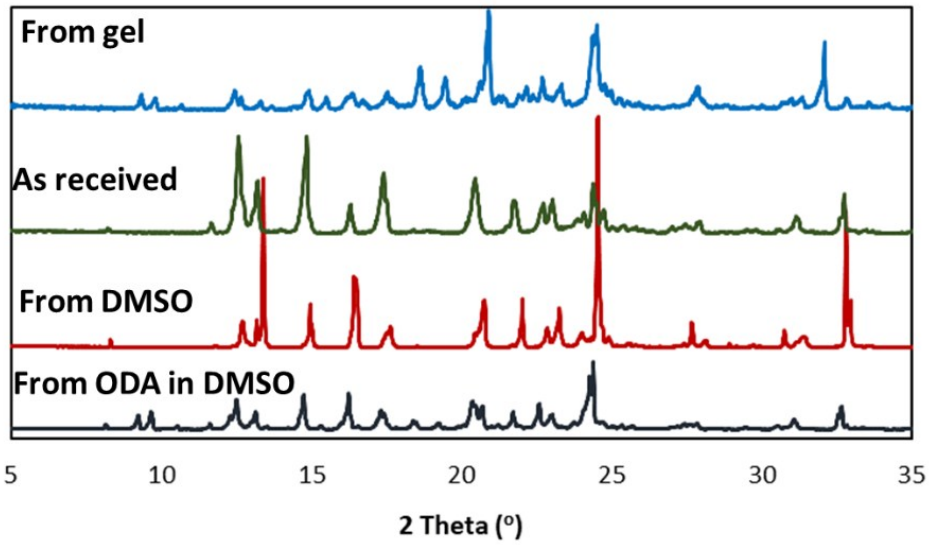


**Figure S18: Powder XRD patterns for SMZ from gel, from DMSO, from ODA-DMSO mixture, and the as-received SMZ from Alfa Aesar**