

Supplementary Materials

Additively-Manufactured High-Concentration Nanocellulose Composites: Structure and Mechanical Properties

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Table S1. The composition of all prepared PVA-blended high-concentration NC pastes.

| Samples | CNF (g) | CNC (g) | PVA | | Mixing ratio CNC: CNF: PVA |
|----------|---------|---------|-----|------------|----------------------------|
| | | | wt% | weight (g) | |
| CNC-CNF | 1.22 | 24.23 | - | - | 20:1:0 |
| 10PVA-NC | 1.22 | 24.23 | 10 | 2.4 | 20:1:1 |
| 15PVA-NC | 1.22 | 24.23 | 15 | 3.63 | 20:1:1 |
| 20PVA-NC | 1.22 | 24.23 | 20 | 4.84 | 20:1:1 |

Table S2. Optimized printing parameters for high-concentration NC paste.

| Paste | Syringe (ml) | Needle diameter (mm) | Feeding rate (ml/min) | Printing speed (mm/s) | Screw speed (rpm) |
|---------|--------------|----------------------|-----------------------|-----------------------|-------------------|
| CNC-CNF | 60 | 1.51 | 1.2 | 9.37 | 150 |



Extrudability (NC-PVA).avi

Video S1. Extrudability of the prepared 15 wt% PVA-mixed NC paste and freestanding of wet structures in a layer-wise pattern.



Figure S1. The 15 wt% PVA-mixed nanocellulose paste contains the highest possible nanocellulose (25.73 wt%).

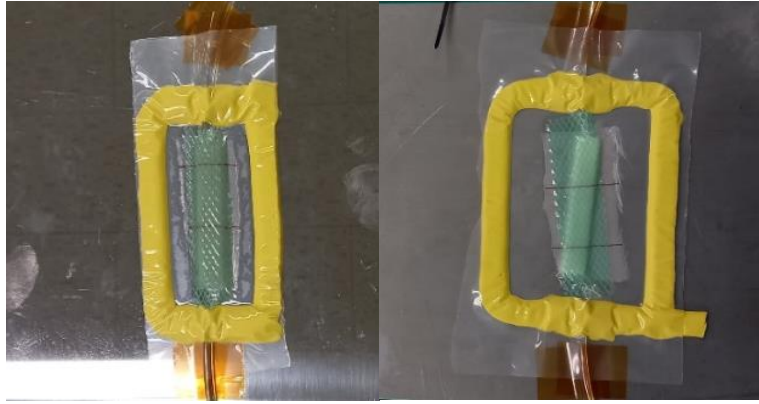


Figure S2. Infusion of Epofix resin to the freeze-dried beam-shaped samples printed with PVA-blended NC paste via the VARTM method.

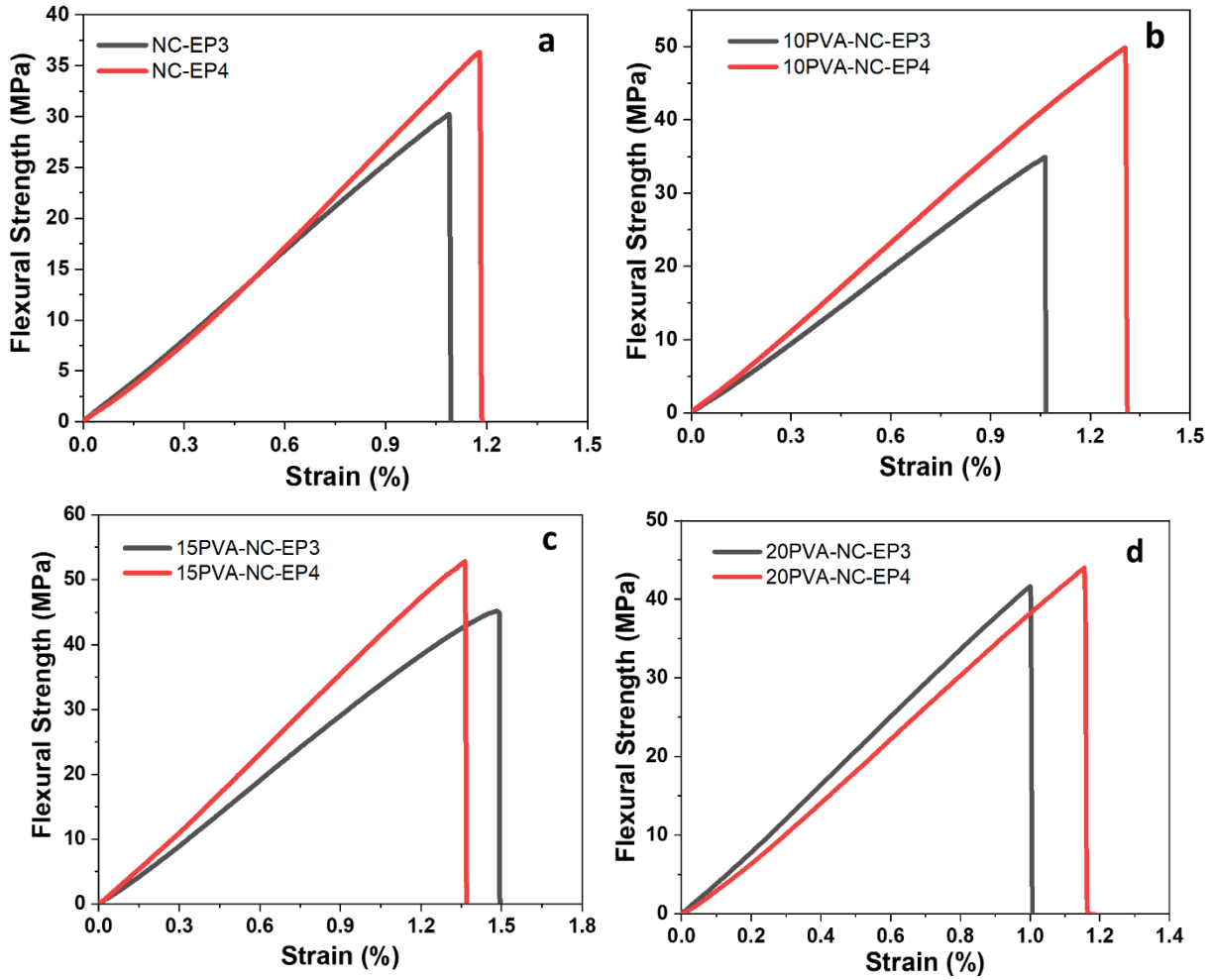


Figure S3. Stress–strain curves of (a) Pristine, (b) 10 wt% PVA-NC, (c) 15 wt% PVA-NC, and (d) 20 wt% PVA-mixed NC 3D-printed specimens followed by freeze-drying and resin infusions.

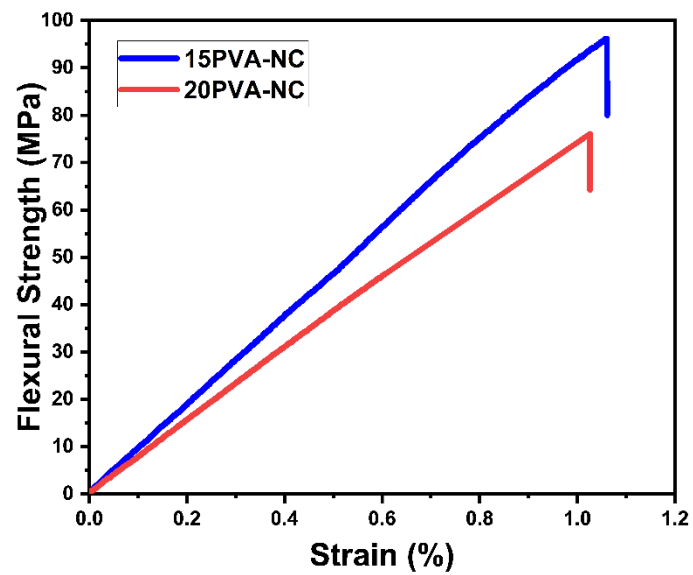


Figure S4. Stress–strain curves of PVA-NC paste samples dried in cleanroom conditions.