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Supporting Information

3D Printing of High Viscosity Reinforced Silicone Elastomers

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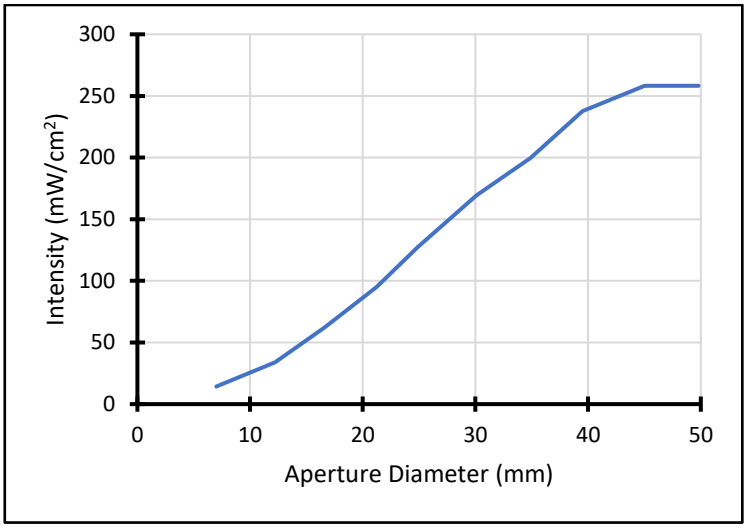

Figure S1. Measured intensity at the build plate as a function of aperture diameter. An aperture diameter of 12.2 mm was used for the curing discussed in this research with a resulting maximum intensity of 34 mW/cm² at the build plane.

Table S1. Solubility of photo-initiator components in TEMQ-1. Compounds were dissolved in 0.25 mL THF and added to 2.5 grams of TEMQ-1 and mixed via planetary centrifugal Thinky mixing. The resulting mixture was left open to the atmosphere to allow the THF to escape and solubility was checked after seven days. A lack of solubility was noted for samples that either turned cloudy or formed a noticeable precipitate.

Reagent	Role	Solubility in PDMS (wt%)
Isopropylthioxanthone (ITX)	Sensitizer	0.15
2-ethylhexyl 4-(dimethylamino)benzoate (EHDA)	Initiator	2.4
2-(2H-benzotriazol-2-yl)-4,6-di-tert-pentylphenol (BTA)	Absorber	0.24
2,5-Bis(5-tert-butyl-benzoxazol-2-yl)thiophene	Absorber	0.003
4-methoxyhydroquinone (MEHQ)	Inhibitor	0.20
Ethyl (2,4,6-trimehylbenzoyl) phenylphosphinate	Initiator	0.12
9,10-diethoxyanthracene	Sensitizer	0.06
Camphorquinone	Sensitizer	1.2

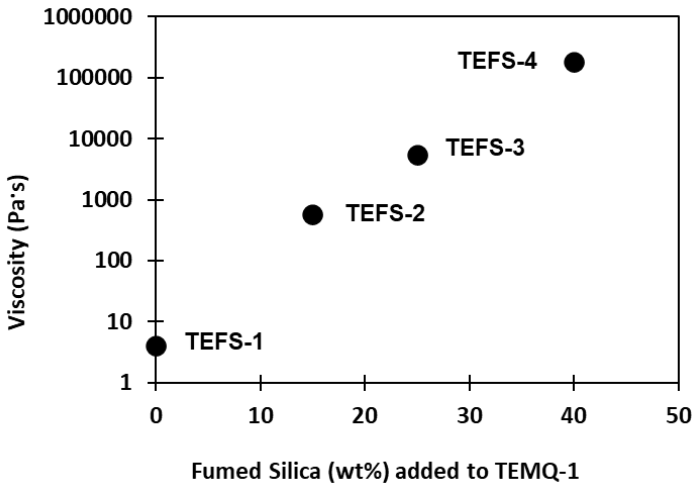

Figure S2. Viscosity of VTS-2 + MFS-1 as a function of silica content. TEMQ-1 = 0 phr. TEMQ-2 = 10 phr. TEMQ-3 = 25 phr. TEMQ-4 = 33 phr.

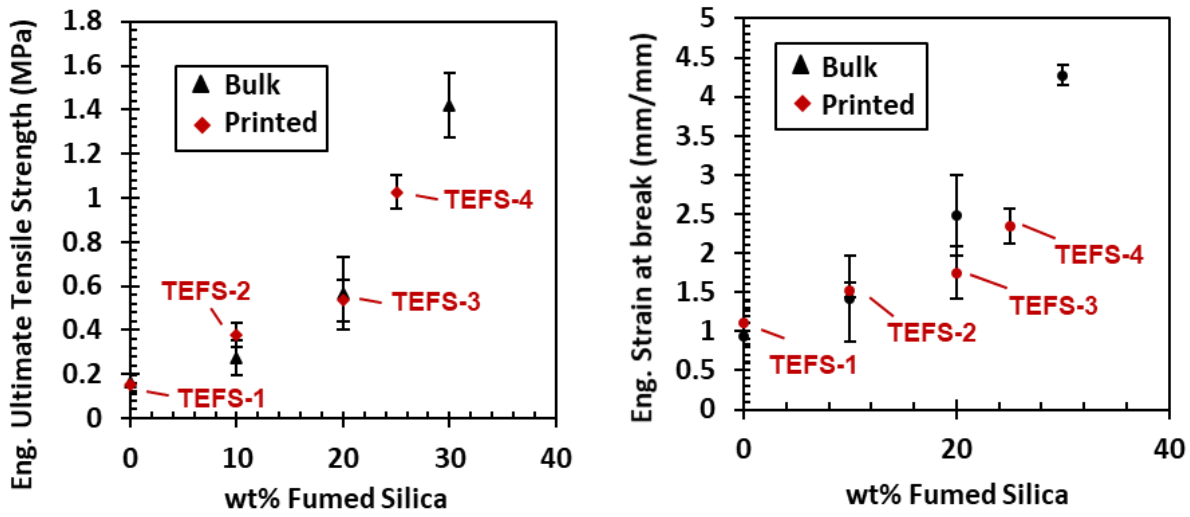

Figure S3. ASTM D638 tensile testing for TEFS-1 through TEFS-4 compared to 'bulk' specimen. TEFS samples were 3D printed (red diamond) in the XY orientation at 405 nm 34 mW/cm². Bulk samples from which ASTM D638 specimen were die-cut, were cast in 3 mm thick sheet and cured under a 405 nm 250 mW/cm² LED flood lamp.

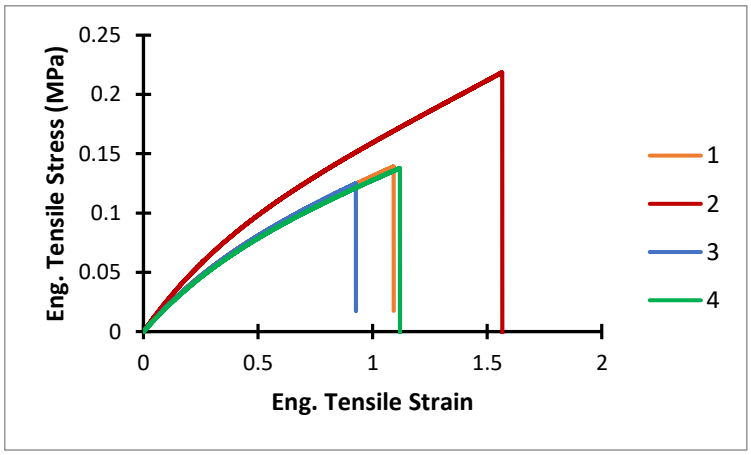

Figure S4. Tensile data for TEFS-1 specimens.

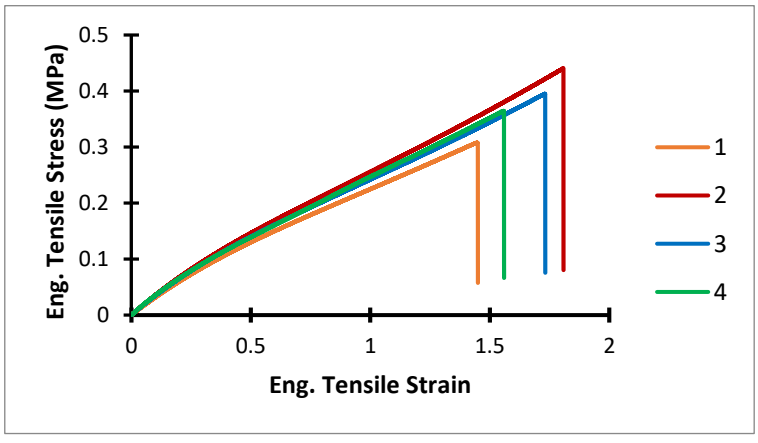

Figure S5. Tensile data for TEFS-2 specimens.

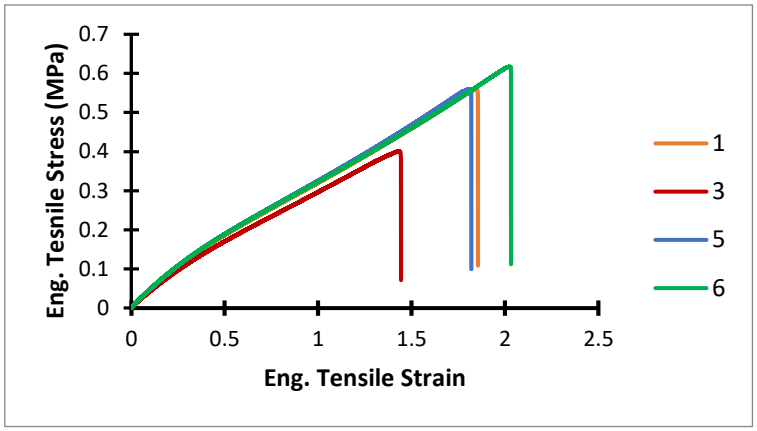

Figure S6. Tensile data for TEFS-3 specimens.

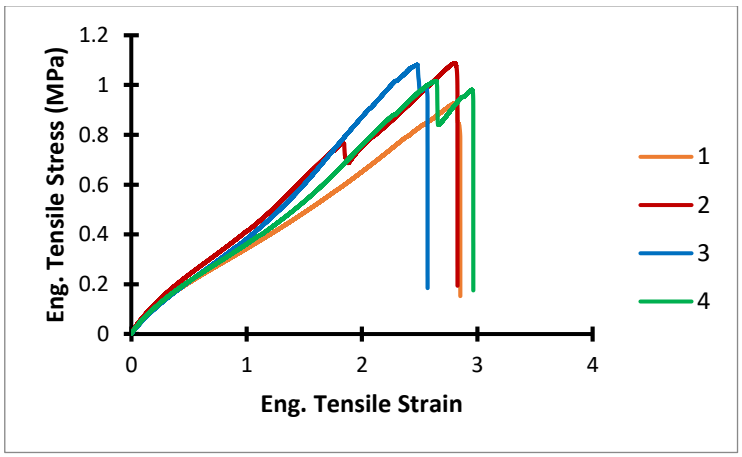

Figure S7. Tensile data for TEFS-4 specimens.

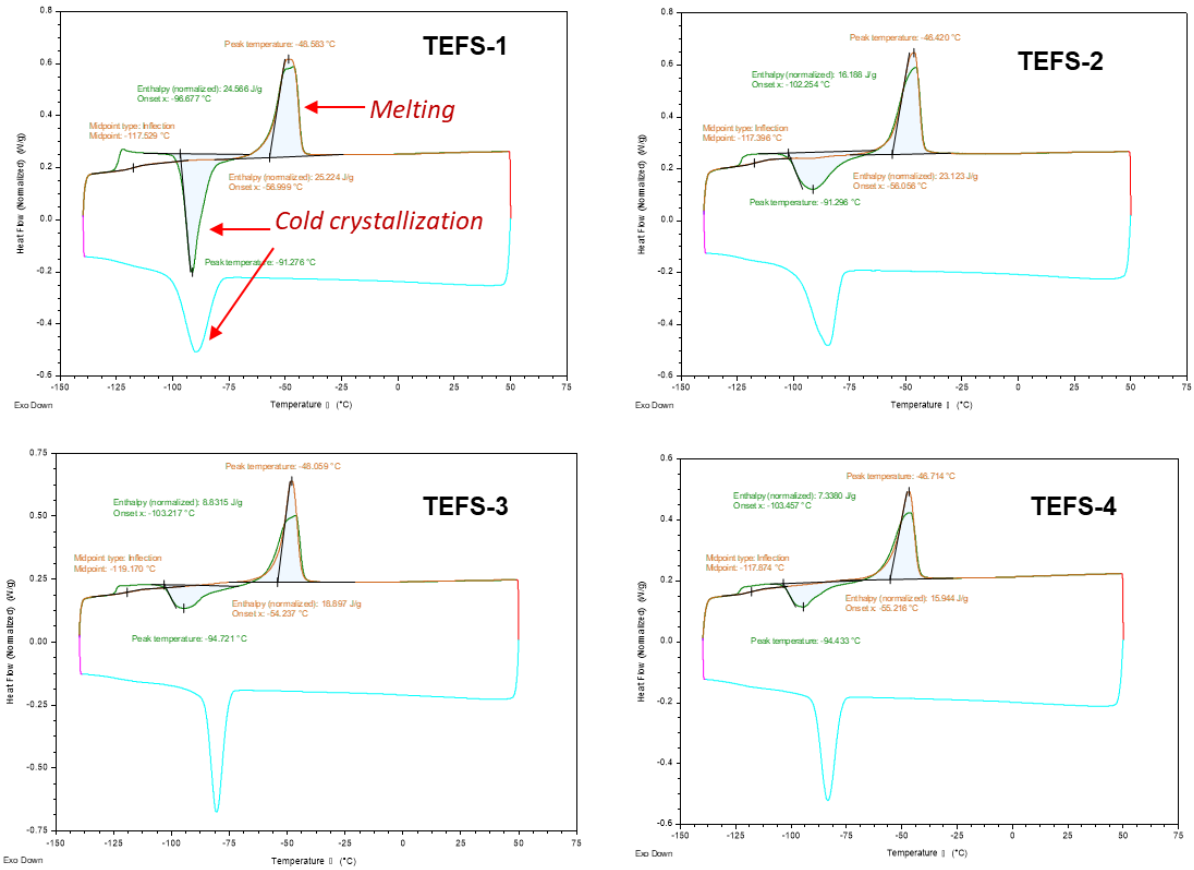

Figure S8. DSC analysis of TEFS1-4. Green trace corresponds to heating from -147 °C to 50 °C at 10 °C per min following quench freezing for one minute. The Light blue trace corresponds to cooling from 50 °C to -147 °C at 10 °C per min. The orange trace corresponds to a final heat through the entire range of temperatures observed.

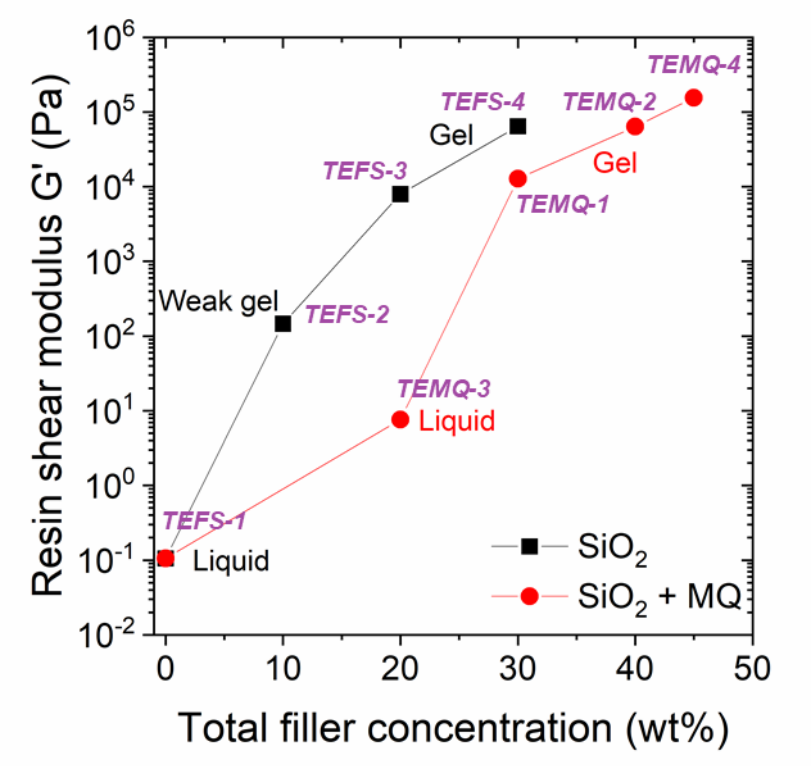

Figure S9. Resin shear modulus as a function of filler concentration (wt%).

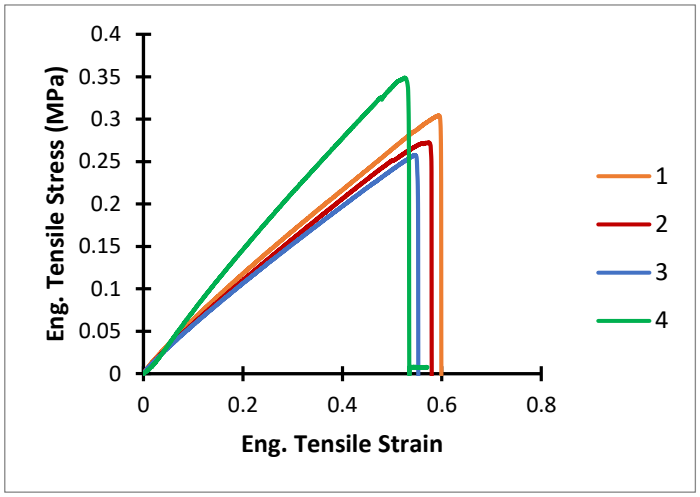

Figure S10. Tensile data for TEFS-5 specimens.

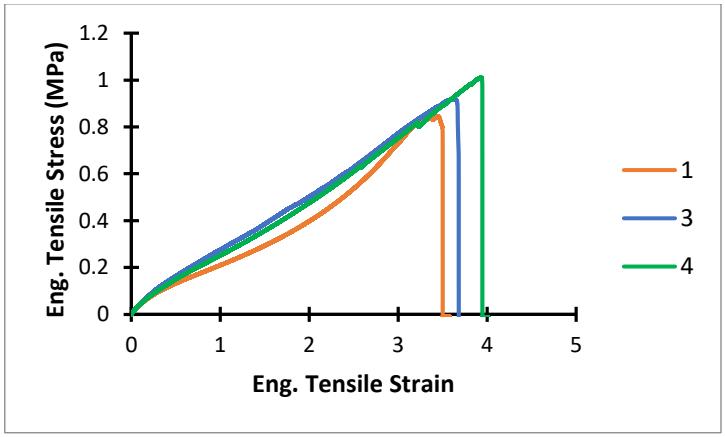

Figure S11. Tensile data for TEFS-6 specimens. Specimen 2 slipped during the course of the experiment—no conclusive data was recorded.

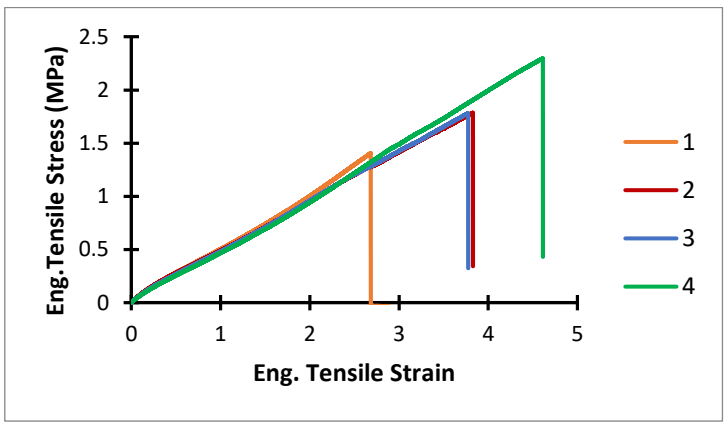

Figure S12. Tensile data for TEMQ-1 specimens.

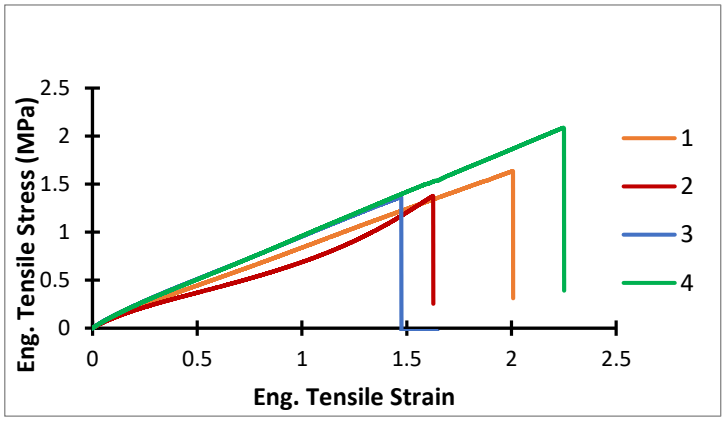

Figure S13. Tensile data for TEMQ-2 specimens.

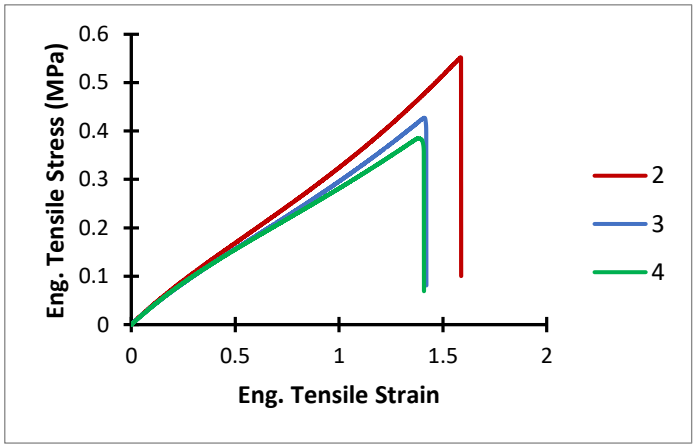

Figure S14. Tensile data for TEMQ-3 specimens. Specimen 1 slipped during the course of the experiment—no conclusive data was recorded.

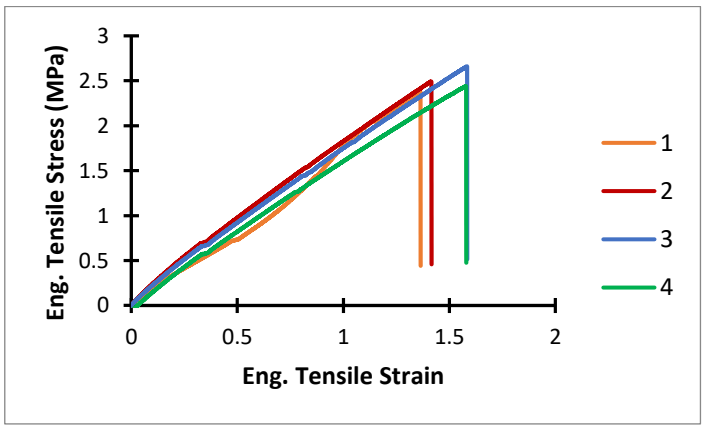

Figure S15. Tensile data for TEMQ-4 specimens.

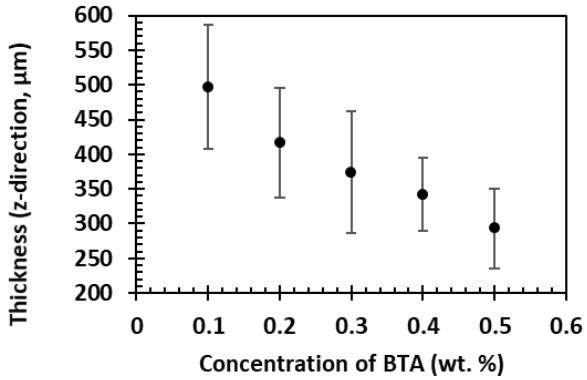

Figure S16. Layer thickness as a function of photo-absorber. BTA concentration was varied in order to decrease layer thickness. Higher concentrations decreased layer thickness by approximately 200 µm.

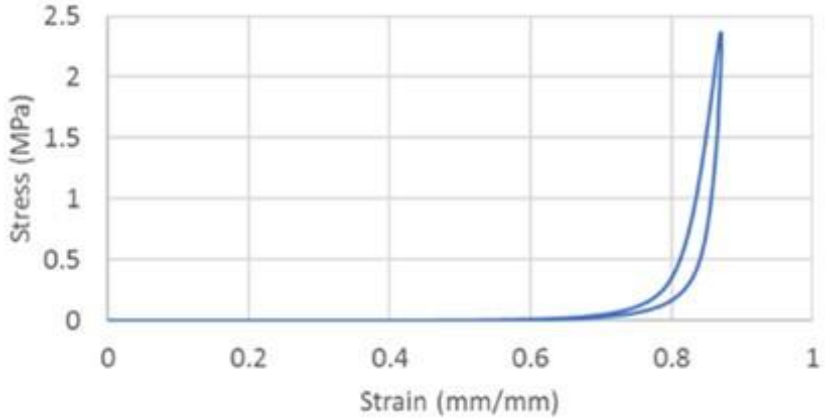

Figure S17. Stress vs strain data for a TEFS-3 octet truss lattice compressed to 87% strain.