ESRF	**Experiment title:** Chameleon-like elastomers with molecularly encoded strain-adaptive stiffening and coloration	**Experiment number**: SC-4863
Beamline: ID02	**Date of experiment**: ID02 14/09/2018 - 17/09/2018	**Date of report**:
Shifts: 6	**Local contact(s)**:	*Received at ESRF:*

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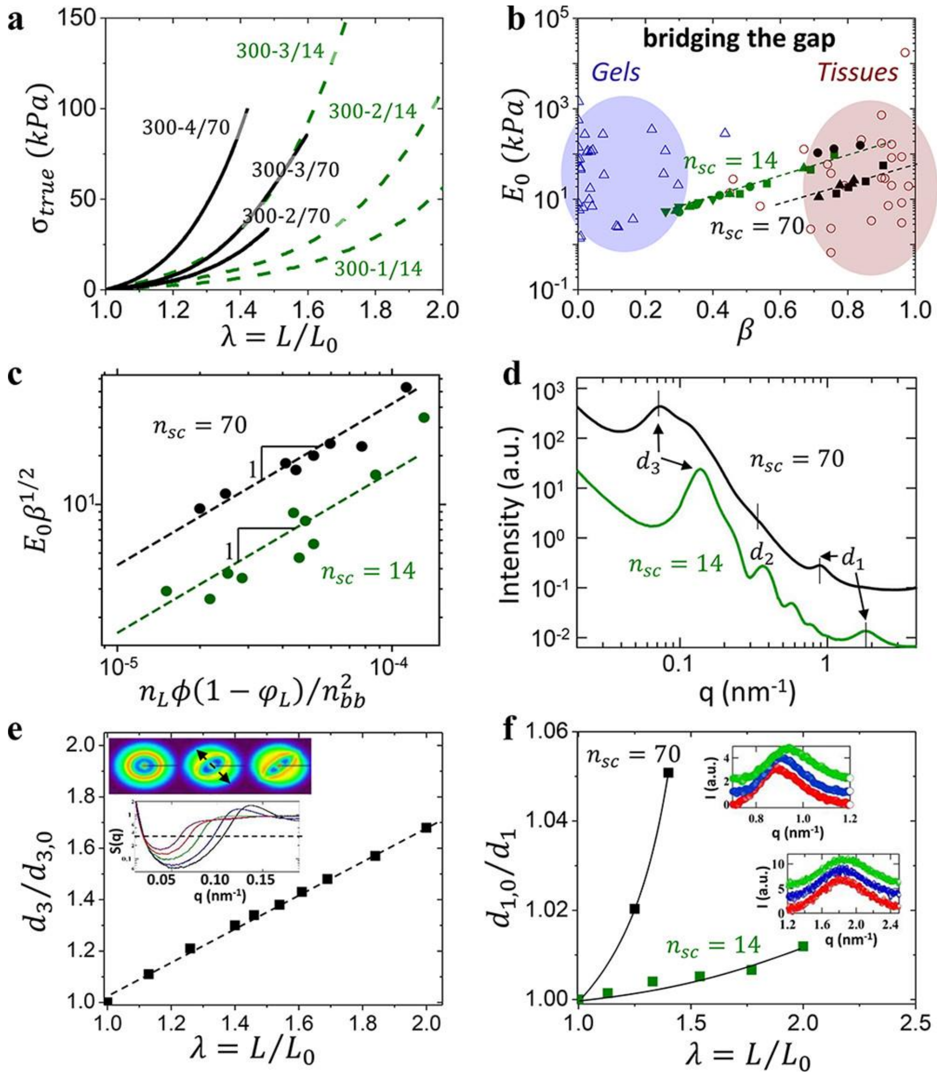
Report:

Keith, A. N., Vatankhah-Varnosfaderani, M., Clair, C., Fahimipour, F., Dashtimoghadam, E., Lallam, A., … Sheiko, S. S. (2020). Bottlebrush Bridge between Soft Gels and Firm Tissues. *ACS Central Science,* (2). https://doi.org/10.1021/acscentsci.9b01216

X-ray curves obtained during these experiments allowed address the tissue challenge through the self-assembly of linear−bottlebrush−linear (LBL) block copolymers into thermoplastic elastomers. This hybrid molecular architecture delivers a hierarchical network organization with a cascade of deformation mechanisms responsible for initially low moduli followed by intense strain-stiffening. By bridging the firmness gap between gels and tissues, we have replicated the mechanics of fat, fetal membrane, spinal cord, and brain tissues.



Azimuthal variations in the 2D USAXS pattern suggest network topology restructuring during deformation. Relative decrease of the d_1 spacing during elongation was deduced from the high-q shifts of the bottlebrush peak (insets) with n_sc=70 plastomers exhibiting stronger dependence consistent with enhanced strand firmness.