**Soft Microstructures via Direct Laser Writing**

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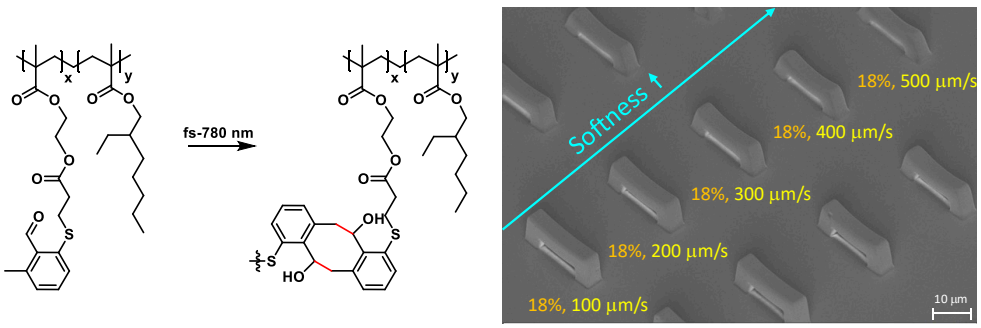
Herein, an additive- and photoinitiator-free photoresist formulation is introduced to fabricate three-dimensional (3D) soft microstructures via the self-dimerization reaction of visible light active *o*-methyl benzaldehydes bound to a polymeric backbone, employing commercially available direct laser writing (DLW) technology based on a 780 nm fs-laser. The photoresist consists solely of a methacrylate copolymer carrying *o*-methyl benzaldehyde (*o*-MBA) thioether units. The mechanical properties measured for the 3D microstructures exhibit similar softness compared to the commercial IP-PDMS resist, with a Young's modulus ranging from 15 to 20 MPa [1]. The 3D microstructures are characterized via scanning electron microscopy (SEM). Our initial experiments indicate that the mechanical properties of the 3D structures can be vastly altered by varying the writing parameters within the writing window. This trend suggests the potential for achieving multi-material properties from a single resist by finely tuning the mechanical properties through careful adjustment of the writing parameters (i.e., laser power, scan speed).




**Scheme 1**. A polymer network is generated based on the self-dimerization of *o*-MBA thioether units using DLW. SEM images of the 3D microstructures visually demonstrate the gradual alteration in mechanical properties resulting from variations in the writing parameters (laser power:18% (laser power @100% ≈ 50 mW), scan speed range: 100-500 µm/s).

References:

[1] Nanoscribe GmbH & Co. KG. IP-PDMS Photoresin. Elastic Biocompatible Printing Material for Various Applications. Available online: https://www.nanoscribe.com/en/products/ip-photoresins/ip-pdms/.