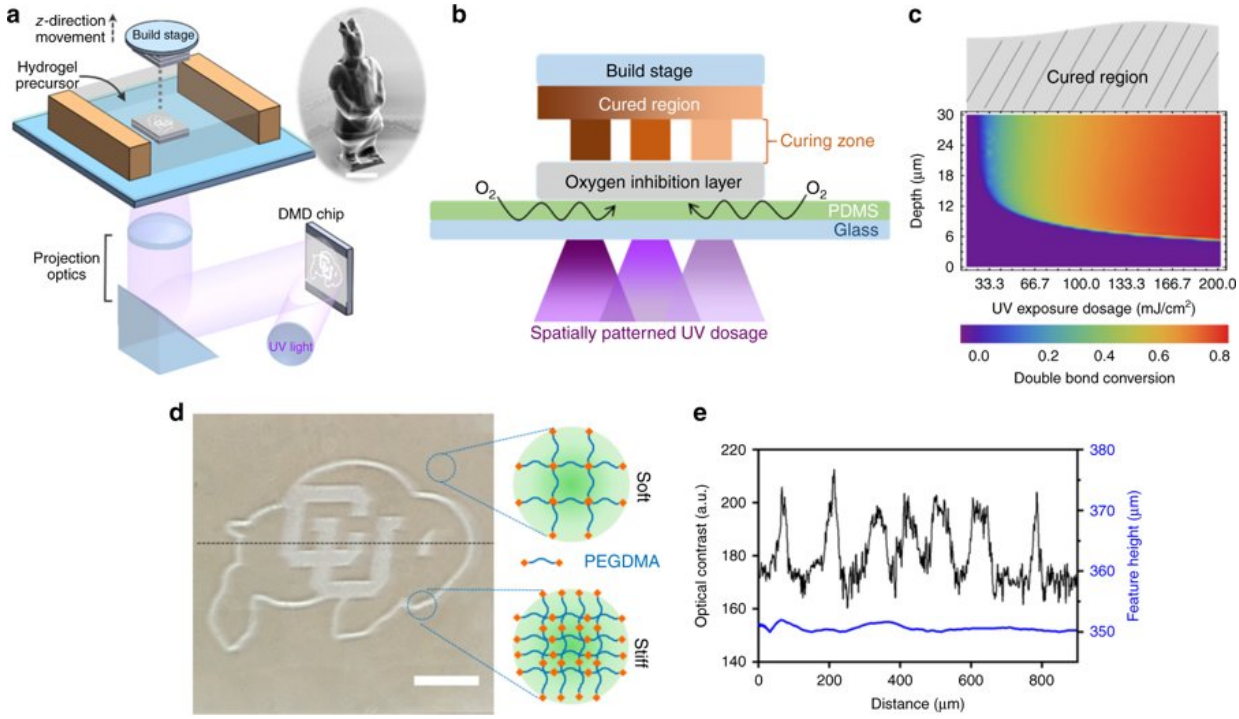
3-D bioprinting technique could create artificial blood vessels, organ tissue

October 22 2018



Orthogonal programming of matrix stiffness and geometry via oxygen inhibition-assisted stereolithography. a Schematic set-up of digital projection stereolithographic 3D printing system where hydrogel precursor solution is cured layer-by-layer through UV exposure. Inset is a SEM image of a 3D-printed complex object. Scale bar is 500 μm. b Schematic of oxygen inhibition-assisted printing, in which the curing zone is physically limited between the cured region and the oxygen inhibition layer. c Depth profile of double bond conversion rate under different UV exposure dosages. The thickness of oxygen inhibition layer is weakly dependent to the exposure dosages, and so does the curing thickness. The double bond conversion rate rapidly increases with the dosage when dosage is

above the threshold. d Bright-field optical image of a printed buffalo logo with independently patterned stiffness and geometry (binary stiffness but flat surface). High optical contrast indicates the strong differences in crosslink density and, therefore, the stiffness. Scale bar is 200 μm. e Quantification of optical contrast (black line) and geometry (blue line) variation along the dotted line in b reveals sharp differences in contrast (stiffness) but little feature height variation (