

Abstract Submitted
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Tunable photonic multilayer sensors from photo-crosslinkable polymers MARIA CHIAPPELLI, RYAN HAYWARD, University of Massachusetts Amherst — The fabrication of tunable photonic multilayer sensors from stimuli-responsive, photo-crosslinkable polymers will be described. Benzophenone is covalently incorporated as a pendent photo-crosslinker, allowing for facile preparation of multilayer films by sequential spin-coating and crosslinking processes. Copolymer chemistries and layer thicknesses are selected to provide robust multilayer sensors which can show color changes across nearly the full visible spectrum due to the specific stimulus-responsive nature of the hydrated film stack. We will describe how this approach is extended to alternative sensor designs by tailoring the thickness and chemistry of each layer independently, allowing for the preparation of sensors which depend not only on the shift in wavelength of a reflectance peak, but also on the transition between Bragg mirrors and filters. Device design is optimized by photo-patterning sensor arrays on a single substrate, providing more efficient fabrication time as well as multi-functional sensors. Finally, radiation-sensitive multilayers, designed by choosing polymers which will preferentially degrade or crosslink under ionizing radiation, will also be described.

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