

Abstract Submitted  
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**Photo-crosslinkable polymers for fabrication of photonic multilayer sensors** MARIA CHIAPPELLI, RYAN C. HAYWARD, University of Massachusetts Amherst — We have used photo-crosslinkable polymers to fabricate photonic multilayer sensors. Benzophenone is utilized as a covalently incorporated pendent photo-crosslinker, providing a convenient means of fabricating multilayer films by sequential spin-coating and crosslinking processes. Colorimetric temperature sensors were designed from thermally-responsive, low-refractive index poly(*N*-isopropylacrylamide) (PNIPAM) and high-refractive index poly(*p*-methyl styrene) (PpMS). Copolymer chemistries and layer thicknesses were selected to provide robust multilayer sensors which show color changes across nearly the full visible spectrum due to changes in temperature of the hydrated film stack. We have characterized the uniformity and interfacial broadening within the multilayers, the kinetics of swelling and de-swelling, and the reversibility over multiple hydration/dehydration cycles. We also describe how the approach can be extended to alternative sensor designs through the ability to tailor each layer independently, as well as to additional stimuli by selecting alternative copolymer chemistries.

Maria Chiappelli  
University of Massachusetts Amherst

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