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Photonic multilayer sensors from photo-crosslinkable polymer films MARIA CHIAPPELLI, RYAN C. HAYWARD, University of Massachusetts Amherst — Photo-crosslinkable copolymers containing pendent benzophenone (BP) groups provide a convenient means to fabricate multilayer polymer films. We describe the preparation of alternating multilayers of photo-crosslinkable poly(N-isopropylacrylamide) (PNIPAM), a water-swellable, temperature sensitive polymer, and poly(para-methylstyrene) (PpMS), a non-swellable polymer, by sequential spin-coating and photo-crosslinking. This route provides well-defined layered structures with minimal interfacial broadening between layers and uniformity of thickness from layer to layer as determined by dynamic secondary ion mass spectrometry (d-SIMS). Appropriate choices of layer thicknesses yield 1-D photonic gel sensors. The reflectance peak is shifted through the visible spectrum upon swelling or de-swelling of the PNIPAM layers in water, providing an accessible means for colorimetric temperature sensing.

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