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Block copolymer photonic crystal gels for mechanochromic sensing EDWIN CHAN, NIST, JOSEPH WALISH, EDWIN THOMAS, MIT, CHRISTOPHER STAFFORD, NIST — Block copolymer based photonic crystal gels (BCPG) have been previously demonstrated for chemical sensing by taking advantage of dynamic changes in structural color upon interactions with their environment. With their high degree of tunability in structural color and mechanical properties, these materials can function as mechanochromic sensors with the potential application for measuring local mechanical deformation such as cell adhesion and mechanics. In this work, we demonstrate the application of a BCPG for local mechanical sensing by investigating the changes in structural color in response to mechanical deformation. The BCPG consists of a hydrophobic block (polystyrene) – hydrophilic polyelectrolyte (poly(2-vinyl pyridine)) block copolymer that self-assembles into a one- dimensional periodic lamellar structure and functions as a one dimensional Bragg reflector. Contact adhesion testing is used to measure and relate the changes in structural color of the BCPG films as a function of mechanical deformation. We explore the effects of solvent conditions and applied mechanical deformation in determining the relationships between structural color changes and mechanical strain.

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