

Abstract Submitted  
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**In-Situ X-Ray Diffraction Study of the Elongation Behavior of a Main Chain Liquid Crystal Elastomer**<sup>1</sup> SONAL DEY, D.M. AGRA-KOOIJMAN, LEELA JOSHI, SATYENDRA KUMAR, Kent State University, WANTING REN, WHITNEY M. KLINE, ANSELM C. GRRIFIN, Georgia Institute of Technology — We studied the structural evolution of a main chain smectic elastomer under uniaxial stress and during strain recovery. At low strains, both the alkyl chains and the smectic layers are oriented on average parallel to the strain direction. At higher strains, the development of layer undulations is observed at  $\sim 50\%$  which gradually evolve into chevron-like smectic structures as revealed by the four diffuse spots in small angle x-ray diffraction patterns. This is accompanied with an enhancement of the smectic order as inferred from higher intensity of small angle peaks and larger orientational order parameter,  $S$  [for example,  $S(20\%) = 0.33$ ;  $S(110\%) = 0.86$ ]. During strain recovery, two relaxation rates of 6.5 min and 38.5 min are observed which are associated with relaxations of the mesogenic part and the elastomer network, respectively.

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