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Structural Properties of Hybrid Nanoparticle/Polymer Composites for Solar Energy Devices ELAINE CHAN, Advanced Light Source, Lawrence Berkeley National Laboratory, BRYAN MCCULLOCH, Department of Chemical Engineering, University of California, Berkeley, RACHEL SEGALMAN, Department of Chemical Engineering, University of California, Berkeley and Materials Sciences Division, Lawrence Berkeley National Laboratory, ALEXANDER HEXEMER, Advanced Light Source, Lawrence Berkeley National Laboratory — Hybrid nanoparticle/polymer composites are promising materials for solar energy applications, because the structural properties of these materials can be manipulated at the relevant nanometer length scales to improve device performance. X-ray scattering measurements coupled with modeling and computer simulation present a powerful framework for characterizing the self-assembled morphologies of these nanostructured materials at the appropriate length scales. We examine herein nanoscale structure and ordering in candidate hybrid nanoparticle/polymer photovoltaics using modeling and simulation. Simulations based closely on X-ray scattering data of these nanocomposite films are performed to probe the underlying structure in these materials. The resulting structural models and aspects of the simulations will be discussed.

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