

Abstract Submitted
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Flexible Integrated Concentrator Lenses for Colloidal Quantum Dot Solar Cells GARRETT UNG, GARY QIAN, YIDA LIN, SUSANNA M. THON, Johns Hopkins University — Colloidal quantum dot (CQD) solar cell research is a growing field due to the solution processability and band gap tunability of CQD materials. However, most device performance results reported to date have come from very small-area solar cell demonstrations due to the difficulty in fabricating uniform large-area CQD films. We will discuss a method for the fabrication of low-cost integrated concentrator lenses for CQD solar cells made from polydimethylsiloxane (PDMS). The concentrators allow a larger area of sunlight to be collected by a smaller area CQD solar cell, offering the benefits of a large-area cell while maintaining low material utilization and high efficiency. The lens fabrication process utilizes a 3D-printed acrylonitrile butadiene styrene (ABS) mold to allow for inexpensive creation of the lens. We will discuss optimal shapes and treatments for the mold used to improve lens quality, optical modeling of the lens system, and device performance results.

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