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Quantum Dot Light-emitting Electrochemical Cells AMANDA NORELL BADER, JANELLE LEGER, Western Washington University — Semiconducting polymers have enormous potential to expand the applications of electronic and optoelectronic technologies. While polymer optoelectronic devices have been successful, they typically suffer from poor performance and stability. Quantum dots (QDs) boast size-tunable band-gap energies and improved stability over organic emitters , but their efficacy in a typical hybrid LED structure is limited by an insulating surface ligand layer that increases the charge tunneling barrier and leads to unwanted emission from the polymer host. Typically, hybrid LEDs are constructed with a monolayer of QDs in order to overcome this limitation. A polymer light-emitting electrochemical cell (LEC) structure, however, presents an alternative solution by limiting the thickness of the emissive region of the polymer/QD film. Emission spectra of novel LEC structures incorporating QDs as the active emitter show better color purity than polymer-only devices, as well as pure emission from the QDs, regardless of operation voltage. This device structure has the potential to improve a number of issues currently limiting the performance of polymer based optoelectronic devices.

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