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Progress Toward Tunable White Light-Emitting Electrochemical Cells TYKO SHOJI, Western Washington University, AMANDA NORELL BADER, University of Colorado - Boulder, JANELLE LEGER, Western Washington University — The high photoluminescence efficiency, narrow emission peaks, and size-tunable band gaps of quantum dots (QDs) make them attractive for application to light emitting devices. However, charge injection barriers due to the insulating surface ligands of QDs often result in undesired emission from the polymer host material. Additionally, typical QD devices have also suffered from voltage-dependent emission color, most likely caused by shifts in the emission zone under different applied voltages. One promising approach to addressing these issues is through the incorporation of QDs in a single layer light-emitting electrochemical cell (LEC). In the generally accepted model of LEC operation, an analog of a self-assembled pin junction forms under an applied bias. The homogenous blend of QDs throughout the polymer ensures a consistent concentration of QDs in the emission zone despite recombination zone shifts during operation. Light emission occurs within a thin intrinsic region, facilitating QD emission and limiting emission from the polymer host. Our group has demonstrated precise color-tunable emission in QD LECs by adjusting the mass ratios of two different quantum dots blended in a single LEC. We discuss our progress in extending these results to the development of white light-emitting QD LECs.

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