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Polymerizable ionic liquids for fixed junction light-emitting electrochemical cells ILYA KOSILKIN, University of Washington, MATT MARTENS, MICHAEL MURPHY, JANELLE LEGER, Western Washington University — Fixed junction light-emitting electrochemical cells (LECs) have been shown to offer several advantages over traditional dynamic junction LECs. Recently we have reported fixed junction LECs that use ion-pair monomers (IPMs) in order to eliminate counterionic mobility. However, the materials presented in our previous work had poor miscibility of IPMs with electroluminescent polymers and poor ion dissociation/mobility. Here we report on the synthesis and performance of polymerizable ionic liquids (PILs) as candidates for ionic charge carriers in LEC device structures. PILs are advantageous since they combine the improved materials properties of ionic liquids with the fixed-junction functionality of IPMs. Devices employing PILs had uniform film morphology and showed diode-like behavior. In addition, brightness was improved by an order of magnitude compared to IPM based devices reported earlier. The materials developed here, besides having advantages in LECs, may also find utility in additional applications in which control over ionic mobility or electrochemical doping is crucial.

Janelle Leger
Western Washington University

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