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**Fixed Junction Photovoltaic Devices Based On Polymerizable Ionic Liquids**<sup>1</sup> AUSTIN LIMANEK, DR. JANELLE LEGER, Western Washington University — Recently, polymer-based photovoltaic devices (PPVs) have received significant attention as a possible affordable, large area and flexible solar energy technology. In particular, research on chemically fixed p-i-n junctions in polymer photovoltaic devices has shown promising results. These devices are composed of ionic monomers in a polymer matrix sandwiched between two electrodes. When a potential is applied, the ionic monomers migrate towards their corresponding electrodes, enabling electrochemical doping of the polymer. This leads to the formation of bonds between the polymer and ionic monomers, resulting in the formation of a chemically fixed p-i-n junction. However, early devices suffered from long charging times and low overall response. This has been attributed to the low phase compatibility between the ionic monomers and the polymer. It has been shown for light-emitting electrochemical cells, replacing the ionic monomers with polymerizable ionic liquids (PILs) mitigates these challenges. We will present the use of PILs as the dopant in fixed junction PPV devices. Preliminary devices demonstrate significantly improved performance, decreased charging times, and high open circuit voltages.

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