Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Fixed Junction Light Emitting Electrochemical Cells based on Polymerizable Ionic Liquids ERIN BROWN, AUSTIN LIMANEK, JAMES BAUMAN, JANELLE LEGER, Department of Physics and Astronomy, Western WA University — Organic photovoltaic (OPV) devices are of interest due to ease of fabrication, which increases their cost-effectiveness. OPV devices based on fixed-junction light emitting electrochemical cells (LECs) in particular have shown promising results. LECs are composed of a layer of polymer semiconductor blended with a salt sandwiched between two electrodes. As a forward bias is applied, the ions within the polymer separate, migrate to the electrodes, and enable electrochemical doping, thereby creating a p-n junction analog. In a fixed junction device, the ions are immobilized after the desired distribution has been established, allowing for operation under reverse bias conditions. Fixed junctions can be established using various techniques, including chemically by mixing polymerizable salts that will bond to the polymer under a forward bias. Previously we have demonstrated the use of the polymerizable ionic liquid allyltrioctylammonium allysulfonate (ATOAAS) as an effective means of creating a chemically fixed junction in an LEC. Here we present the application of this approach to the creation of photovoltaic devices. Devices demonstrate higher open circuit voltages, faster charging, and an overall improved device performance over previous chemically-fixed junction PV devices.

Erin Brown
Department of Physics and Astronomy, Western WA University

Date submitted: 11 Nov 2016 Electronic form version 1.4