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Photovoltaic behavior of polymerizable ionic liquid based fixed-junction light-emitting electrochemical cells AVALON HAYES, CORBIT SAMPSON[1], ARIEL GARCIA[2], JANELLE LEGER[3], Western Washington University — Although silicon solar cells dominate the solar power market, polymer solar cells (PSCs) are a subject of recent study, and show potential for easier fabrication and wider application than silicon cells. One type of PSC, first proposed in 1994, uses a light-emitting electrochemical cell (LEC) structure, in which an applied electrical bias causes mobile ions within a polymer layer to separate towards opposing electrodes. Most LECs have dynamic junctions, meaning that ion separation disappears as soon as the bias is removed, which prohibit functionality as a solar cell; however, fixed-junction LECs maintain their ion separation and thus produce a notable photovoltaic response. Our group has developed a chemically fixed junction LEC by blending a light-emitting polymer with a polymerizable ionic liquid (PIL). It is hypothesized that ions from the PIL bind to the polymer after separation, preventing deterioration of the junction. PIL-based LECs have shown improvements, in general metrics such as light output, over other chemically-fixed junctions. We are presently testing the photovoltaic response of these devices, by measuring current during light application, in order to reveal more about their microscopic behavior and create a foundation for further study.

[1]Alumnus
[2]Alumnus
[3]Supervisor

Avalon Hayes
Western Washington University

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