

Abstract Submitted
for the FWS17 Meeting of
The American Physical Society

Exploring the roles of morphology and lead halide precursors in hybrid perovskite luminescent solar concentrators¹ BENAZ MENDEWALA, KATERINA NIKOLAIDOU, SOM SARANG, CHRISTINE HOFFMAN, VINCENT TUNG, BOAZ ILAN, SAYANTANI GHOSH, Univ of California - Merced — Hybrid metal-halide perovskite thin films have recently emerged as highly suitable candidates for broadband luminescent solar concentrators (LSCs) due to their broad absorption, large Stokes shift, and high quantum yield, but device design remains yet to be optimized. We examine the correlation between film thickness, lead halide source utilized in the precursors, morphology, and optical efficiency of planar perovskite LSCs. After synthesizing and testing sixteen different types of PVSK samples, we report a maximum optical efficiency of 34.7%, which is close to the highest value reported in any type of LSC to date. Correlating scanning electron microscopy with spatially-resolved photoluminescence measurements and 3D Monte Carlo simulations, we accurately estimate self-absorption, surface losses, and scalability, providing a route toward optimizing thin film PVSK materials for these and other optoelectronic and photovoltaic applications.

¹This research was supported by National Aeronautics and Space administration (NASA) grant no: NNX15AQ01A

Benaz Mendewala
Univ of California - Merced

Date submitted: 28 Sep 2017

Electronic form version 1.4