Contribution ID: **197** Type: **not specified**

Computational study of environmentally friendly CsSnBr3 perovskite solar cells has achieved a power conversion efficiency of 31.62%.

Tuesday, 19 November 2024 10:00 (15 minutes)

In this study, we conducted a computational optimization of four designs for CsSnBr3 perovskite solar cells using the SCAPS-1D simulation tool. We explored how variations in the thicknesses of the electron transport layer (ETL), hole transport layer (HTL), and perovskite layer, as well as changes in temperature, series and shunt resistances, and the acceptor doping density of the HTL, influenced key performance metrics such as short-circuit current (Jsc), open-circuit voltage (Voc), fill factor (FF), and power conversion efficiency (PCE). The highest optimized PCE achieved was 31.62%. Moreover, our findings indicated that the PCE values of all CsSnBr3-based solar cell designs developed in this research exceeded those of the previously reported ITO/WS2/CsSnBr3/Cu2O/Au cell, which had the highest recorded PCE for similar devices. Our best-performing structure demonstrated a 9.19% increase in efficiency over the previous record.

Primary author: KHESWA, Vincent (University of Johannesburg)

Presenter: KHESWA, Vincent (University of Johannesburg)

Session Classification: AfPS Contribution

Track Classification: AfPS