

Editorial

IEEE Journal of Photovoltaics July 2023 Introduction

Dear Photovoltaic Specialists,

The July 2023 issue of the IEEE JOURNAL OF PHOTOVOLTAICS (J-PV) contains a number of articles that I think you will find interesting. In particular, I draw your attention to a paper from First Solar titled “Arsenic-doped $\text{CdSe}_x\text{Te}_{1-x}$ Solar Cells Achieve World Record 22.3% Efficiency.” This appears in the thin films area. The most important result is the U.S. National Renewable Energy Laboratory (NREL)-measured 22.3% efficiency record. However, the article also includes a report of a device measured at First Solar with an open-circuit voltage of 917 mV, 17 mV above the voltage of the new record cell. The record cell shows a quantum efficiency curve that is almost flat at $\sim 95\%$ between 450 and 830 nm, indicating nearly zero loss of carrier collection in this range. This will be an important reading for anyone in the CdTe community and well worth a read for the entire PV community.

In addition, this issue includes an interesting review article entitled “On the conversion between recombination rates and electronic defect parameters in semiconductors.” This article reviews data on the behavior of defects in silicon and their characterization. The behavior of these defects is compared to the Shockley-Reed-Hall recombination theory, and a discussion

is provided about the correct way to understand the temperature dependence and improved accuracy of the defect analysis. The review will be useful to anyone studying defects in any semiconductor as the discussion is broadly applicable. As someone who uses capacitance methods to understand semiconductor defects, I think this is a must-read for proper interpretation of results.

I hope you enjoy the July 2023 issue of J-PV. Please write to me with any suggestions, questions, or comments.

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APPENDIX: RELATED ARTICLES

- [A1] “Reducing Indium Consumption in Silicon Hetero Junction Solar Cells with [Transparent Conducting Oxide] Stack Systems of [Indium Tin Oxide] and [Aluminum-doped Zinc Oxide].”
- [A2] M. K. Juhl et al., “On the conversion between recombination rates and electronic defect parameters in semiconductors,” *IEEE J. Photovolt.*, early access, Apr. 27, 2023, doi: [10.1109/JPHOTOV.2023.3267173](https://doi.org/10.1109/JPHOTOV.2023.3267173).