

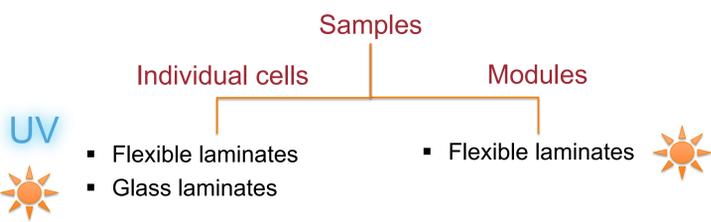
Effect of long-term light soaking on shunts and P_{max} in CIGS solar cells and modules

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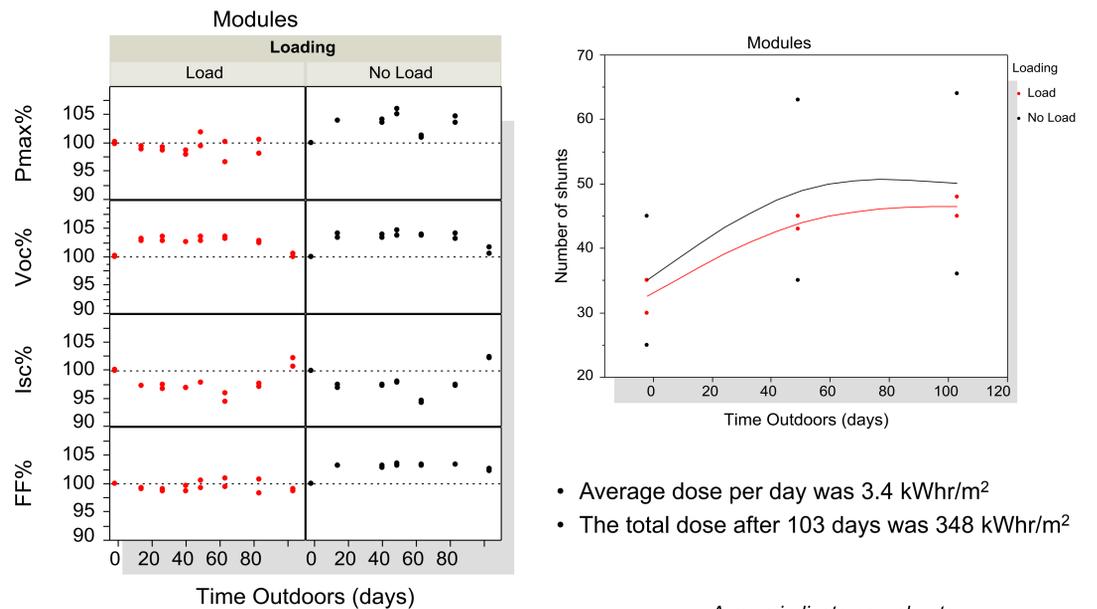
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Goal of the Study

- Understanding the effect of prolonged light soaking on P_{max} , V_{OC} , FF and J_{SC}
- Shunt generation with prolonged light soaking

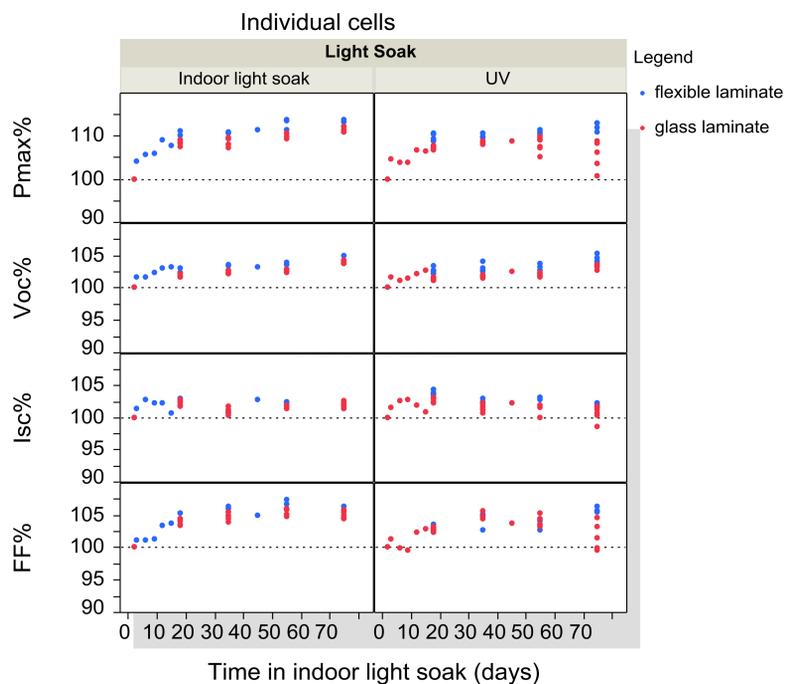


Effect of light soaking on P_{max} , V_{OC} , FF and I_{SC} and shunts of flexible modules



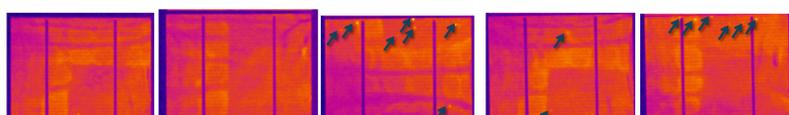
- Average dose per day was 3.4 kWhr/m²
- The total dose after 103 days was 348 kWhr/m²

Effect of light soaking on P_{max} , V_{OC} , FF and I_{SC} and shunts of individual cells

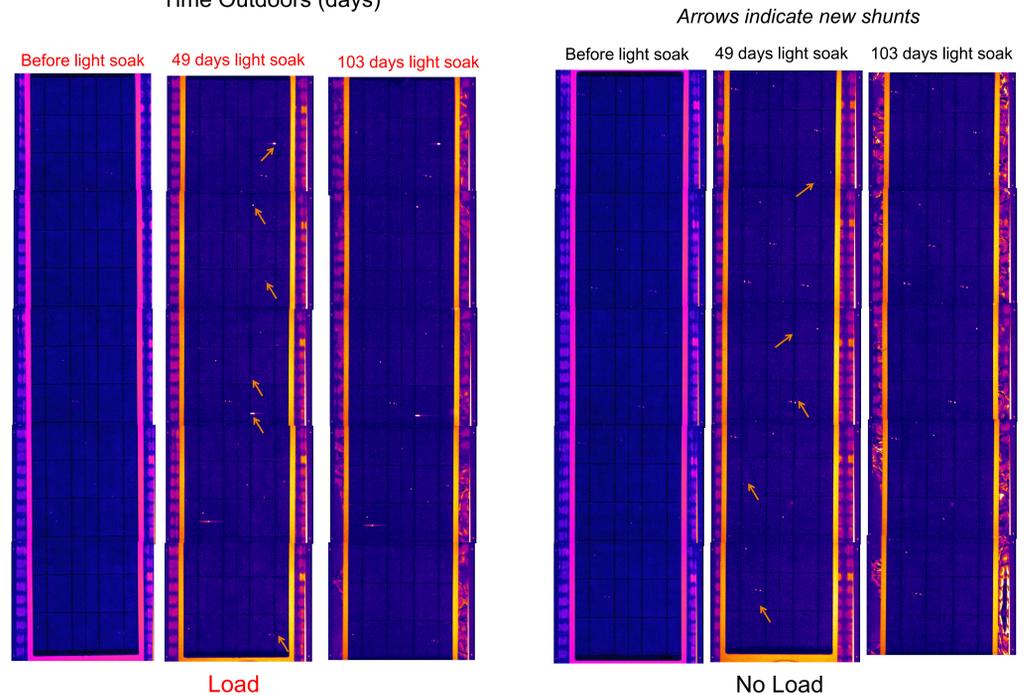
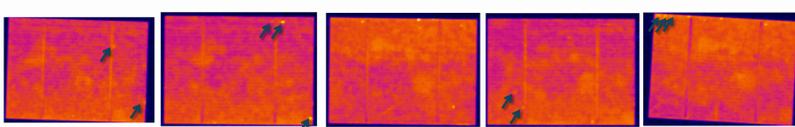


- The cells were loaded in the last 40 days
- Average dose per day was 14.4 kWhr/m²
- The total dose 75 days was 1080 kWhr/m²

Before light soak



After 45 days indoor light soak



Conclusion

Panels (100 days light soaking, 350 kWhr/m²)

- Light soaking of unloaded, flexible panels increased P_{max} by ~ 5%
- Loaded panels retained their initial P_{max} value within 3%
- New shunts were generated in the first few days of light soaking
- The number of shunts stayed constant for more than 3 months
- Shunt generation did not degrade panel performance

Individual cells (75 days light soaking, 1080 kWhr/m²)

- New shunts were created
- No performance degradation was observed with or without loading
- Individual cell data supported the results from the module light soaking data