



**XXVII INTERNATIONAL SCIENTIFIC AND PRACTICAL
ONLINE CONFERENCE**

**RENEWABLE ENERGY AND ENERGY
EFFICIENCY OF THE XXI CENTURY**

20-22 MAY 2026

**INVESTIGATION OF THE PHOTOELECTRIC
PARAMETERS OF A MONOCRYSTALLINE SILICON
SOLAR CELL UNDER DIFFERENT COLORED
BACKGROUNDS USING THE SINTON SUNS-VOC
MEASUREMENT**

Speaker: Xojixon Xolmatova

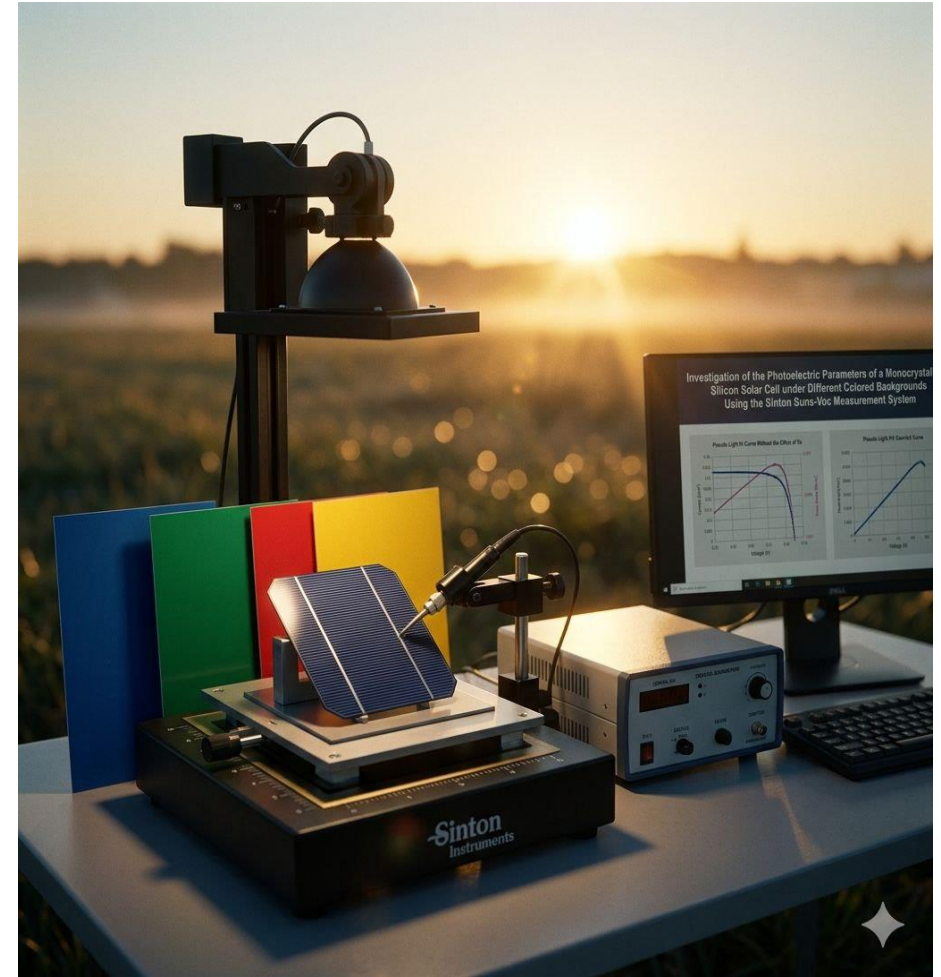
Authors: N.Mirzaalimov, R.Aliev, X. Xolmatova, M.Komilov, Abdulazizov T,





Ukraine

In this study, the photoelectric parameters of a monocrystalline silicon solar cell were experimentally investigated under different colored background conditions using the Sinton Suns-Voc measurement system. The incident light spectrum was modified using colored backgrounds, and changes in the I–V characteristics, open-circuit voltage, and short-circuit current were analyzed. The results demonstrate the influence of spectral conditions on photoelectric processes.





$$\beta = \frac{T_2 - T_1}{t_{\text{BAQT}}}$$




Politechnika
Warszawska

$$\beta = \frac{T_2 - T_1}{t_{\text{BAQT}}}$$



Ukraine

3. Results and Discussion

The experimental results showed that the photoelectric parameters of the monocrystalline silicon solar cell change significantly under different colored background conditions.

The use of colored backgrounds modifies certain components of the incident light spectrum, which can lead to charge carrier generation at different depths within the semiconductor material. Analysis of the I–V characteristics indicates that the open-circuit voltage increases when colored backgrounds are applied. The highest values were observed under a silver background (reflector), which can be explained by the reflection of incident light and the resulting increase in radiation intensity reaching the solar cell. The results obtained under red, yellow, green, and blue backgrounds demonstrate the influence of spectral composition on charge carrier generation and recombination processes.

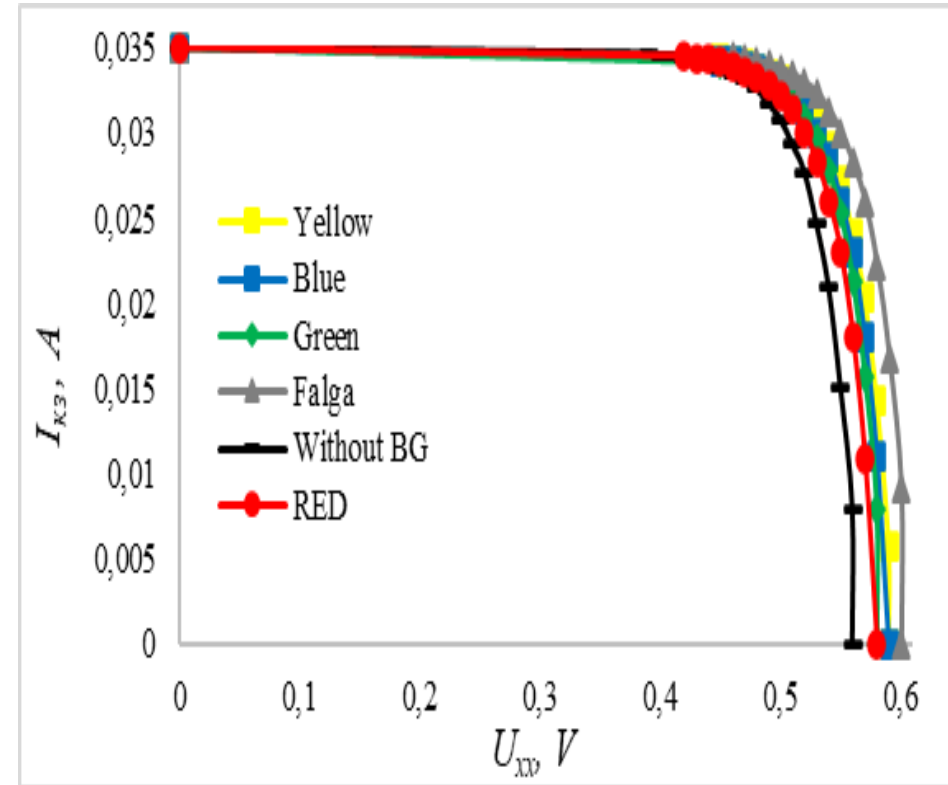


Figure 1. Comparison of the I–V characteristics of a monocrystalline silicon solar cell under different colored background conditions. Measurements were performed using the Sinton Suns-Voc measurement system.



4. Conclusion

In this study, the photoelectric parameters of a monocrystalline silicon solar cell were experimentally investigated under different colored background conditions using the Sinton Suns-Voc measurement system.

The experimental results showed that the application of colored backgrounds significantly affects the current–voltage (I–V) characteristics of the solar cell. In particular, an increase in the open-circuit voltage was observed when a silver foil used as a reflector was applied. This effect can be explained by the increase in the intensity of incident radiation and the enhanced generation of charge carriers in the semiconductor material.

In addition, modification of the spectral composition of the incident light by different colored backgrounds leads to charge carrier generation at different depths within the semiconductor. This, in turn, affects the photoelectric response of the solar cell.

The obtained results demonstrate that the use of colored backgrounds allows comparative analysis of the spectral re-sponse of solar cells and enables evaluation of photoelectric processes occurring in semiconductor materials. This approach can be applied as an additional experimental method for studying the performance characteristics of solar cells.



Kyiv Representative Office
Polish Academy of Sciences



Politechnika
Warszawska



Ukraine



THANK YOU FOR YOUR ATTENTION.