

Bachelor Thesis: Time series of drying of different types of solar module backsheets

The Helmholtz Institute Erlangen-Nuremberg for Renewable Energies (HI ERN), part of the Forschungszentrum Jülich, researches and develops material- and process-based solutions for climate-neutral, sustainable and cost-effective utilization of renewable energies.

Aim: To conduct an investigation of water diffusion in the backsheets of solar modules, focusing on how different types of backsheet materials and the aging degree of the modules influence this process. This study will aim to correlate as well the relationship between wet leakage resistance and NIR (Near-Infrared) spectroscopy.

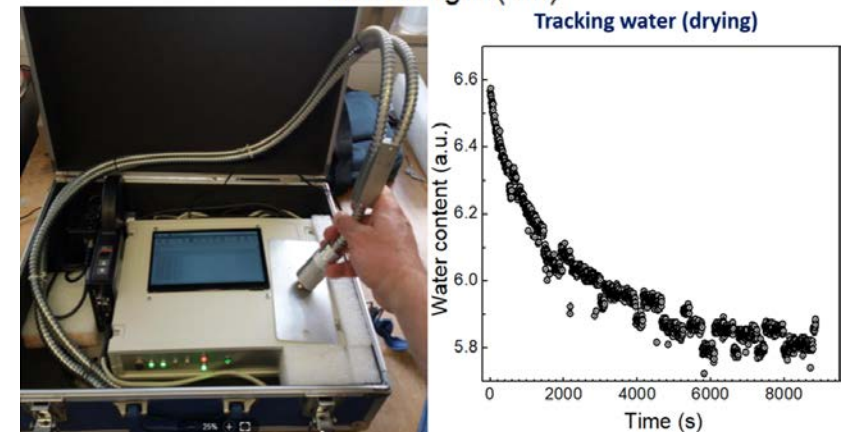
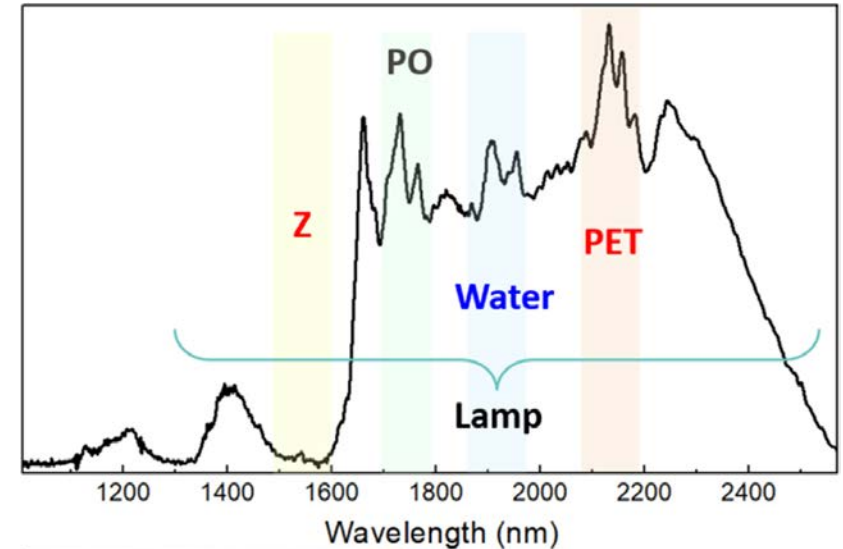
Project Steps:

1. Measurement of Water Evaporation Rates Using NIR Spectroscopy. Conduct measurements at short time intervals (e.g., every 1-5 seconds) and at multiple points along each module to capture spatial variability in drying rates.
2. Measurement of Wet Leakage Resistance. Perform leakage resistance tests on the same modules used in the NIR spectroscopy study, ensuring consistency in experimental conditions.
3. Construction of Kinetic Curves and Determination of Diffusion Coefficients. Use the collected data from the NIR spectroscopy and leakage resistance measurements to construct kinetic curves that describe the rate of moisture movement through different backsheet materials. Analyze the curves to calculate diffusion coefficients at different points across the modules. This involves applying mathematical models that describe diffusion processes to the empirical data.

Qualifications:

- Student of Bachelor Science, Chemistry or Physics (spectroscopy)
- Profound technical knowledge
- Experience in a programming language (Python) and data analysis is beneficial

Note: Students of MWT, NT, Energy Technology, Advanced Materials & Processes (MAP) can be directly examined. Students from other disciplines require an examiner from their department.



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