Master Thesis:

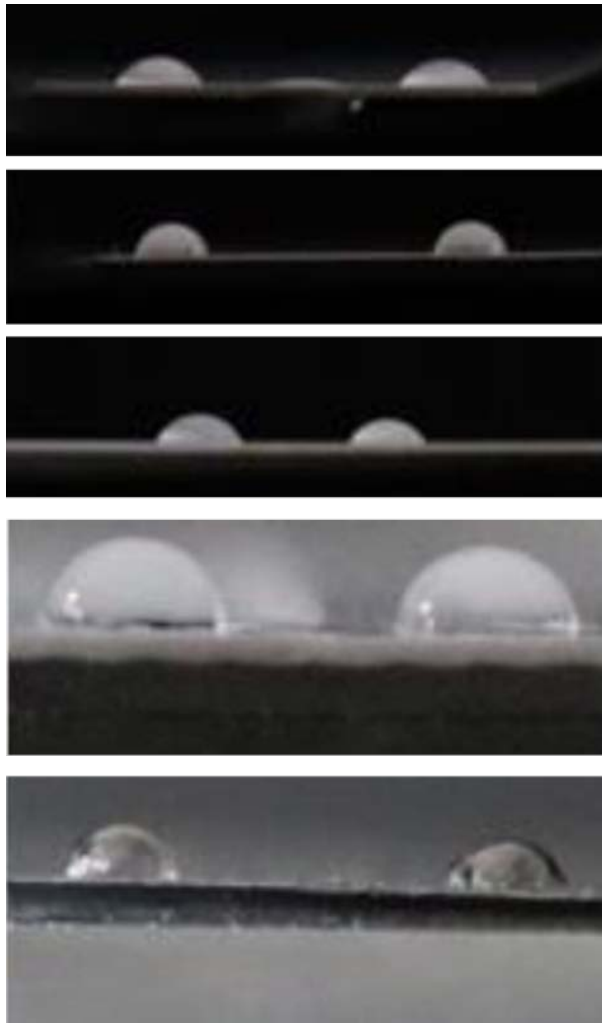
Investigation the impact of backsheet (BS) types and degradation level on contact angle in solar modules

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 examine the impact of BS type and degradation level on the contact angle between a water droplet and the BS surface in solar modules. This study aims to correlate these findings with spectral data gathered from diverse spectroscopic analyses to better understand the interactions and their implications for module performance.

Project Steps:

1. Measurement of Contact Angles in Encapsulants During Artificial Degradation:
   - Objective: To measure the contact angles between water droplet and pure encapsulants (EVA, POE) both in their initial state and after specific periods under artificial degradation.
   - Methodology: Encapsulants will be subjected to controlled degradation processes using climate chambers (temperature/humidity) and harsh ultraviolet irradiation or combinations of those methods. The study will analyze how contact angles vary with time and degradation method(s).
   - Additional Analysis: Each measurement interval will include NIR (Near Infrared), Raman and FTIR/IR (Fourier Transform Infrared) spectroscopic analyses to support the findings.
2. Contact Angle Measurements of Aged Solar Modules Coupons with Various BS and Encapsulants:
   - Objective: To measure the contact angles between water droplets and the surfaces of different aged BS and encapsulants used in solar modules.
   - Analysis Goals: To explore how the type of solar module BS affects the contact angle. For encapsulants, additionally evaluate the carbonyl index against the contact angle values.
   - Spectroscopic Data Collection: Collect and process spectral data for BS and BS using Raman and FTIR spectroscopies to complement the physical measurements.



Qualifications:

- Student of Materials 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 examinor from their department.

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