

Bachelor / Master Thesis

Lamination for long-term stability of Perovskite Solar Cells

Motivation

Though a relatively recent technology in the field of photovoltaics (PV), perovskite solar cells have taken a giant leap in the last decade with regard to improvements in efficiency. However, in terms of stability the field still lags behind current commercial PV materials. It is of utmost importance that perovskites prove their stability to standard testing procedures commonly used for testing commercial PV technologies. The International Summit on Organic Photovoltaics Stability (ISOS) protocols, are designed to check the stability and lifetime of thin film PV devices under various conditions (dark storage, dry or damp heating, thermal cycling, etc.). Parameters such as temperature, humidity and light are varied in order to replicate the extreme conditions the solar cells will face when exposed to real world environments. Encapsulation is a proven method to prevent or delay the extrinsic factors of degradation from damaging the performance of devices. Before exposing the devices to these harsh conditions, they are hermetically sealed using a laminator and an edge sealant, which prevents degassing of volatile by-products and isolates the devices from oxygen or moisture.

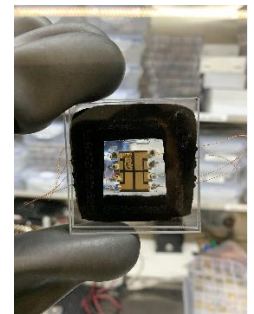
Objective

The projects aims towards fulfilling the following objectives:

1. Implementation of a previously developed lamination recipe to perovskite solar cells.
2. Testing of laminated cells under standard testing conditions in a climatic chamber and studying the response of the devices under constant measurement in presence of light.
3. Determining the T_{80} lifetime of the measured devices, a term that indicates the time taken by the devices to degrade to 80% of the initial power conversion efficiency.
4. Delamination of the devices post measurement to develop further understanding of degradation mechanisms through materials characterization like XRD, SEM, etc.

Specification

Candidates with a background in Electrical Engineering/Materials Science/Physics, with a zeal for working in the laboratory may apply. A prior knowledge on solar cells and materials characterization would be advantageous but not required.



Research Area

Photovoltaics

Locations IMT (KIT, C. North)

Focus

Experimental

Courses

Electrical Engineering
Materials Science
Physics

Kontakt

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