Philosophy, Strategy, Activities and Plans of Task Group #8: Thin Film PV Module Reliability

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Task Group Focus and Activities

☼ Task Group #8 Thin Film PV Module Reliability focuses on thin film specific issues that are not covered by c-Si related task groups are provided in the next slide.

☼ The group is trying to develop an appropriate accelerated stress test or test sequence for predicting and assuring long term field performance.
Thin Film Specific Issues

🌞 Semiconductor Junction: Diode quality degradation by diffusion of impurities.

🌞 Microdelamination: “micro” delamination of TCO / Mo films as well as macroscopic delamination of structural components such as encapsulant, edge seal etc.

🌞 Monolithic Integration: Increased shunting at scribe lines, poor edge delete leading to ground faults.

🌞 Flexible Modules: Front transparent polymer coversheet, etc.
Strategy

1. **Field Inspection:** Identify field failure modes, Use I-V measurements, visual inspection and EL/IR imaging whenever possible.

2. **Failure Mode Analysis:** Statistical analysis of field inspection data to understand impact of each failure mode on module degradation.

3. **Failure Mechanism Determination:** Probing down to the materials level to decipher the failure mechanism.

4. **Development of Accelerated Tests:** Based on the failure mechanisms, designing accelerated tests to replicate the observed field failure modes.
IEC Ratings System Proposal

It is essential to determine whether the newly defined IEC test sequences will require modifications to cover thin films specific stressors that would influence the failure modes.

Therefore, subgroups have been assigned to investigate various failure modes specific to thin-film module.
Collection of Field Data

An effort to collect field data from thin-film PV systems is essential to identify the significance and occurrence of various failure mechanisms.

Detailed analysis is required to allow for a quantitative analysis. This includes visual inspection, I-V characteristics and if possible electroluminescence and thermal imaging.
IEC Qualification Tests

The recent proposal to develop replacement of the IEC61636 should not be based initially on cell materials such as CdTe, a-Si:H and CIGS.

It should be based on thin film specific issues such as Semiconductor Junction, Microdelamination, Monolythic Interconnection, and Flexible Modules.

Material specific issues would be considered in the second iteration.
Thank You!

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提问和评论吗？