

## INTRODUCTION

The long time experience in accredited PV module tests and means of highly-resolving electroluminescence imaging, infrared thermography and precise power measurements enable a determination of possible causes of defect (e.g. wafer defect, production process, inappropriate handling or transportation) as well as an estimation of the resulting lifetime reduction.

Typical problems like delamination, deformation, degradation, degree of crosslinking, composition faults, shrinking, as well as inhomogeneities and incompatibilities of materials and components are examined in the context of investigation services.

Revised construction designs and material compositions are validated by enhanced thermal, mechanical and electrical stress tests to ensure improved reliability at lower production costs.

## CELL

- Electroluminescence measurements
- I/V-measurements
- Photoluminescence
- Surface und layer analysis

## ENCAPSULATION MATERIALS

- Gel content
- Material analysis
- Aging tests
- Spectral analysis (e.g. reflectivity, transmission)

## BACK SHEET/ FRONT SHEET

- Life cycle determination
- Insulation tests (e.g. partial discharge test)
- Mechanical characterization
- Weatherability (e.g. damp heat testing)

## CELL INTERCONNECTIONS

- Mechanical characterization (e.g. peeling test, tensile strength)
- Thermal cycling tests

## GLASS

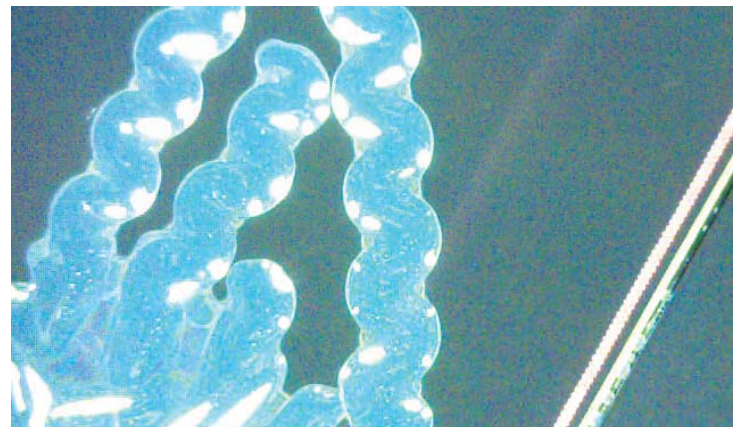
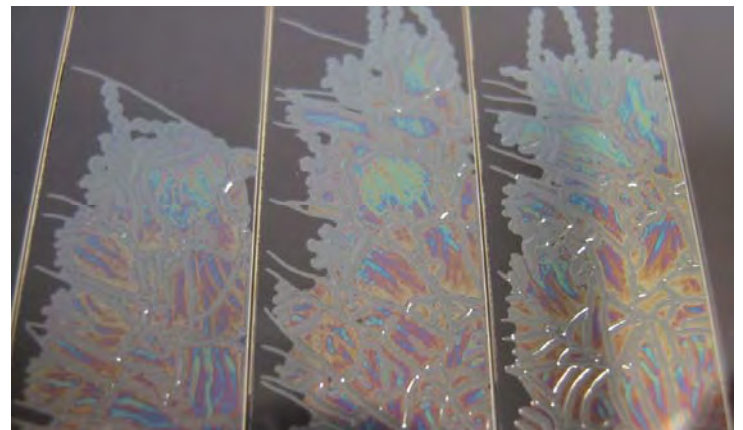
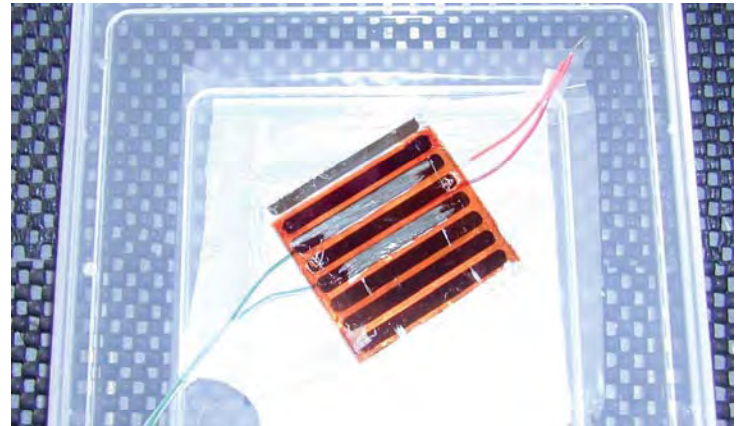
- Surface Analysis (microscopy)
- Spectral analysis (e.g. reflectivity, transmission)
- Hail test (hail stones up to  $\varnothing$  50mm)
- Module breakage test

## JUNCTION BOX INCL. DIODES AND CABLES

- Check of protection degree (e.g. IP54)
- Wet leakage current test
- Bypass diode thermal test
- Robustness of terminations test

## SEALING MATERIALS

- Aging and weathering tests (e.g. salt spray, electrochemical corrosion, etc.)
- Wet leakage current test



## CONTACTS

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