

# The burn points inside the photovoltaic panel are mostly defects

Does PV module glass breakage cause defect interconnections?

This study shows a quite high rate of defect interconnections in the module and failures due to PV module glass breakage. The relative failure rate of j-box and cables (12%), burn marks on cells (10%), and encapsulant failure (9%) are comparable high. Fig. 3.2: Failure rates due to customer complaints in the first two years after delivery.

How to detect faults and failures in PV cells and modules?

There are various approaches used for detection of faults and failures in PV cells and modules. These approaches are based on visual inspection, electrical measurements, electromagnetic radiations measurements, and imaging techniques. 6.1. Visual inspection methods

Can critical degradation in PV modules cause fire?

For instance, critical degradation in some PV modules in an array system leads to mismatch, increasing the PV module's temperature and subsequently leading to fire [40, 41]. Critical degradation in PV modules was also highlighted as initiating fire in a research project based in Germany .

Are bubbles causing burn marks in PV modules?

The area affected by bubbles in the PV module operates at hotter temperatures and potentially leads to burn marks. A study by Rajput et al. analysed the degradation mechanism of 90 monocrystalline PV modules operated for 22 years in India; it was found that the PV modules affected by more bubbles had more power loss.

What happens if a PV module breaks?

In the worst-case scenario, the protective glass will be broken, with visible burn marks on the PV module's backsheets blocking the current path and initiating an electrical arc and fire, causing irreversible damage. Colvin et al. explored interconnection failures depending on cut location in the PV module and irradiance.

How do PV failures affect the I - V curve?

They also listed the effect of various PV failures on the I - V curve; ISC is affected mainly by optical failures and losses of transparency, EVA discolouration, glass breakage and shattering, and EVA delamination. It is also affected by disconnected soldering of the cells, PID, and cracked cells in the PV module.

Some visible defects in PV modules are bubbles, delamination, yellowing, browning, bending, breakage, burning, oxidization, scratches; broken or cracked cells, corrosion, discoloring, anti-reflection and misaligning (see Fig. 1).

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