

Scribing Isolation: A Shade Tolerant Panel Design for Thin Film Photovoltaics

A novel manufacturing method for thin film solar panels allows for easy detection and repair of electrical shorts by altering layer formation and scribing curves, which confines power loss and heating while minimizing area reduction and utilizing existing equipment.

Thin film photovoltaic panels generate electric current when exposed to light. The photovoltaic cells in thin film panels are separated from each other and connected in series by conductive layers in order to increase the energy output of the panel. However, this type of panel allows for many defects during the manufacturing process. The small defects can cause electrical shorts between the cells, which would significantly decrease the power output and overall module efficiency. Although current methods exist to reduce or repair these defects, either they consume a great deal of manufacturing time or require mechanically altering the panel, which reduces the area available to generate current.

Researchers at Purdue University have developed a novel method of producing thin film photovoltaic panels that allows for easy detection and repair of shorts. This method involves altering the layer formation, dividing existing cells into subcells, and scribing a plurality of curves onto the layer. When a short is detected, another curve can be easily scribed onto the layer in order to separate the shorted cell from the adjacent cells, and therefore, confining the short to that one cell. This method limits the area where power loss and localized heating occur without significantly reducing the area available to generate power. Furthermore, this method provides such features with a small, fixed additional time at manufacturing or on site and utilizes readily available equipment.

Advantages:

- Easy detection and repair of shorts
- Uses existing equipment
- Streamlines manufacturing process

Technology ID

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Category

Semiconductors/Fabrication &
Process Technologies
Energy & Power Systems/Power
Generation

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-Does not significantly reduce panel area or efficiency

Potential Applications:

-Solar industry

-Solar panel manufacturers

TRL: 7

Intellectual Property:

Utility Patent, 2013-02-07, United States

Keywords: Thin film photovoltaic panels, electrical shorts detection, solar panel defect repair, module efficiency improvement, photovoltaic cell subcells, scribing method for short repair, solar manufacturing process, localized heating reduction, power loss confinement, thin film solar repair, Electrical Engineering, Green Technology, Photovoltaics, Solar, Solar Cells, Solar Panel, Thin Films