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## Application of Electroluminescence and Thermal Imaging in Defect Identification in Photovoltaic Modules

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In order for solar energy to become an alternative to traditional fossil fuel energy it is important that defects in photovoltaic (PV) modules can be easily identified. Typically a module is characterised by measuring the current-voltage (I-V) characteristics under standard test conditions. In addition to this electroluminescence (EL) and thermal imaging can be used to identify the location of defects in the module. A cooled Si CCD camera is used to detect the EL emitted from a forward biased PV module. The intensity of this light is related to the minority carrier concentration and the emitted EL thus provides a visual representation of defects in the cell. Infrared imaging can be used to identify irregular heating patterns which are indicative of defective cells or contacts. In this study we used both techniques in conjunction to assess the defects present in a 36 cell custom-made single crystalline silicon module. Defects that were identified in this study showed that areas around the contacts appeared very bright in EL images and this corresponded with hot areas in the infrared images. These results show that the electrical contacts in these areas are poor.

### Level (Hons, MSc, <br> &nbsp; PhD, other)?

MSc

### Consider for a student <br> &nbsp; award (Yes / No)?

Yes

### Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

Yes

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