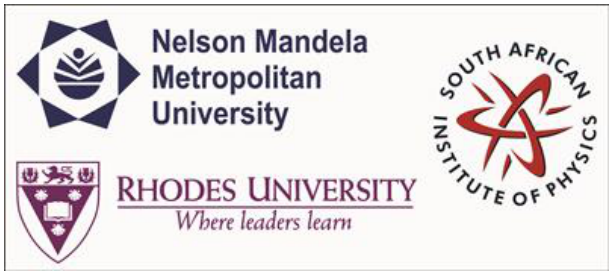

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Analysis of homogeneity in thin film photovoltaic modules using large area light beam induced current (LA-LBIC) measurements.

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Abstract content
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Thin film Photovoltaic (PV) modules are made from a thin layer of semiconductor material deposited over a large area on a transparent material. As a consequence of the large area deposition process, the deposited layer may be prone to inhomogeneities that can cause a reduction in performance of the module. In this study the use of the large area light beam induced current (LA-LBIC) measurement technique is evaluated as a method to investigate the performance homogeneity of thin film PV modules. The accurate interpretation of the LBIC data depends on knowledge of the operating bias voltage of each cell. The inhomogeneities in the deposited semiconductor layers result in variations in the electrical performance of individual cells during scanning at a particular module voltage in the dark. The series connected cells will thus not operate at a fixed multiple of the applied constant module voltage. This unknown bias level of each cell complicates the interpretation of the results. In this work the cell that is being scanned is placed under a limiting condition using bias lighting to offset the effects of non-uniformity of the module cells. In this paper the experimental setup used is presented and LA-LBIC results discussed. Electroluminescence imaging of the scanned modules is also used to verify the results of the LA-LBIC mapping. In addition, the limitations of the LA-LBIC technique are highlighted and possible solutions to obtain meaningful results from the LA-LBIC technique are presented.

Key words: LA-LBIC, Thin film, PV modules, Homogeneity

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