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Analysis of degradation of Perovskite PV devices using injection dependent Photoluminescence imaging.

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Perovskite based PV devices are gaining attention due to lower predicted overall costs and high efficiency. However, the commercial viability of this technology is dependent on long term reliability and stability. This technology is more sensitive to environmental conditions such as moisture and oxygen compared to conventional PV devices. Different encapsulation methods have been proposed as plausible solutions to this issue. As moisture and oxygen ingress through the encapsulation, degradation will progress spatially through such a device, the use of spatially dependent measurements is thus an obvious choice. In this project, two separate and similar luminescence imaging systems were developed, one at Nelson Mandela University and one at the National Physical Laboratory in the UK. In this paper, results are presented based upon the quantification of degradation within Perovskite PV devices through analysis of injection dependent Photoluminescence imaging. Encapsulated perovskite devices were exposed to damp heat testing in an environmental chamber and also outdoor conditions. A method is developed based upon pixel statistics as an indicator of device degradation rather than a physical model. The results appear promising as the quantification method results appear to be correlated with the short circuit current in the trial device under test.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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