DIGITAL IMAGING TO STUDY DEVICE LIFETIMES IN DYE SENSITIZED DEVICES

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(This Abstract is for an oral presentation to be delivered by Dr Leo Furnell – l.w.furnell@swansea.ac.uk)

Due to the vast number of available dyes for dye sensitized solar cells [1] there is a need for quick and repeatable method to compare the relative stability of dyes in devices. To achieve this, devices have been fabricated with each dye then exposed to the same conditions. The devices were monitored during exposure using digital imaging and RGB analysis [2] to track any changes in colour. We have established a strong correlation between changes in RGB values and device degradation [3].

This process is not only limited to the dyes but can also be used to monitor the stability of the electrolyte. This has been demonstrated with N719 devices to show the poor stability of iodine based electrolyte without UV-filtration which is concordant with previous literature [4]. This method opens up the possibility of testing a wide range of variables simultaneously, eliminating the need for multiple experiments and reducing the time taken for analysis.

Fig.1 (Left) Sensitized photo electrodes with a range of dyes during exposure to artificial light and (right) dye solution under exposure to natural light.

References

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