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Explanatory note

Our recent paper on the long-term stability testing of dye-sensitized solar cells (DSC) [1] has raised concern within the R&D community engaged in this new type of solar cell technologies. It is generally felt that the paper gives a too negative presentation of the stability potential of DSC for outdoor application. Since ECN has dedicated research to DSC for almost a decade and has firm belief in the potential and stability of this technology, we want to correct this view in the interest of the DSC community.

Admittedly, the abstract and some paragraphs in the concluding section of this paper give, unintentionally, a somewhat pessimistic view on DSC stability potential in general. Nevertheless, we feel that our publication has been misinterpreted since we did not intend to produce and demonstrate the most stable DSC possible, but rather to learn from potential degradation and recovery mechanisms of DSC under extreme (non-standard) test conditions.

Our paper was concerned with the liquid junction version of DSC, for which most materials can now be obtained commercially. It has been shown by a number of companies and institutes active in the field that large numbers of liquid junction devices can be manufactured in a controlled and reproducible way (see for instance in [2]). Several R&D laboratories have developed their own DSC manufacturing and stability test protocols, using materials of different origin and purity. Our DSC cells were made using commercial dye (N719) as received. A better stability can be obtained from dyes optimized for elevated temperatures (such as, e.g., Z907) reported by EPFL [3]. For reasons outlined in the foregoing, results on stability issues reported by a particular group may not be representative for what can be obtained potentially in present or future mass/commercial DSC production in general terms.

Internationally accepted (accelerated) ageing tests have not yet been established for organic-based solar cells, such as the liquid-junction dye-sensitized cell, which is understandable considering the stage of development of these cells. In fact, the only thin film technology for which accelerated ageing tests have been developed into an IEC standard is amorphous silicon. For our research, we therefore adapted these test protocols from existing IEC test for amorphous silicon thin-film photovoltaic modules, which include heat treatment at 85 °C in the dark. The experiment done under heat and light at 85 °C as reported in our paper, however, is not a prescribed test in the standard IEC protocol. It is noted that this high temperature is not far from the temperatures that may be reached in roof-integrated crystalline silicon PV panels even in The Netherlands (measured values are >70 °C at full sun). One may rightfully argue that other forms of application bring along other operating conditions and thus require a different approach towards testing. The stability tests described in this paper were only performed with the intention to study DSC performance as a function of materials, compositions and processing schemes in our baseline, and *not* to define the potential lifetime that can be obtained with DSC devices under outdoor conditions. We used the low boiling solvent acetonitrile mainly to study and improve our hot-melt polymer sealing procedure. Such low boiling solvents are used only in high-efficiency research cells and will most likely not be employed in practical DSC.

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