

In-situ, long-term operational stability of organic photovoltaics for off-grid applications in Africa - DTU Orbit (08/11/2017)

In-situ, long-term operational stability of organic photovoltaics for off-grid applications in Africa

This paper presents a field-trial of organic photovoltaic (OPV) technology used within a practical application for rural electrification in Rwanda. Fourteen, large area, flexible, ITO-free, roll-to-roll processed OPV modules, encapsulated with low-cost materials, were installed on corrugated steel roofs at two sites in a rural village in Southern Rwanda and subject to continuous monitoring. This field-trial exposed modules to very high levels of insolation, in particular in the UV, high temperatures and heavy rainfall. Results show that the modules exhibit practical lifetimes (to degrade by 20% of their initial capacity) of between 2 and 5 months, a value 5-6 times lower than control modules kept both in the dark and outdoors in Roskilde, Denmark. Degradation was primarily the result of extensive delamination caused by failure of the non-UV stable encapsulation, which led to decay in the FF, Voc and Isc of the module.

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