Solliance realizes first up-scaled Perovskite based PV modules with 10% efficiency

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Solliance demonstrates a record 10 percent aperture area power conversion efficiency for its up-scaled thin-film perovskite photovoltaic modules. The efficiency was measured on an aperture area of 168 cm^2. Twenty-five cells were serial connected through an optimized P1, P2, P3 interconnection technology. The PV module was realized on a 6x6 $inch^2$ glass substrate using industrial scale-able slot die coating in combination with laser patterning. Further, the PV module was packaged by applying a flexible barrier using a lamination process.

This result could be realized due to the intensive collaboration within Solliance. Based on previous optimization on 16 cm^2 modules, the Solliance team was able to quickly transfer this to a 6x6 $inch^2$ sized glass substrate using the developed blade coating process and the optimized mechanical patterning technology. In this case a 156 cm^2 aperture area module with 10 percent efficiency was realized comprising of twenty-four interconnected cells. This was then used as starting point for the realization of above mentioned 168 cm^2 PV module.

These results demonstrate the up-scalability of this new thin film PV technology. Apart from the electrodes currently used, all layers can be processed in ambient environment and at temperatures below 120^0 C. This shows the low production cost potential of this new emerging thin film PV technology. Further, the deposition and interconnection technologies used for obtaining these results are industrially available for Sheet-to-Sheet as well as for Roll-to-Roll manufacturing. The latter allows for creating high volume production in the future.

The current world record efficiency of a small lab scale perovskite based PV cell is 22.1 percent. "The challenge is to upscale perovskite cells to larger size industrially process-able modules with high efficiency and long lifetimes at low cost. The current result, presented on an aperture area comparable to standard commercial silicon solar cells, shows that Solliance, with its in depth know how on processing of organic PV and CIGS and its vast Sheet-to-Sheet and Roll-to-Roll pilot production infrastructure, is excellently placed to realize this upscaling. These 10 percent up-scaled perovskite based PV modules are first and important steps in this development. We are confident to boost quickly the up-scaled Perovskite based PV module efficiency further above 15 percent by using very low cost materials and processes. But besides demonstrating the up-scalability of these highly efficient Perovskite based PV devices, we are also currently working hard to stabilize further the performance of these devices under real life operational conditions", explains Ronn Andriessen, Program Manager of the Perovskite based PV program at Solliance.

Solliance is conducting advanced research on the development of Perovskite based PV modules and its applications with its industrial partners Nano-C, Solartek, DyeSol and Panasonic. With this result the Solliance R&D partners and their industrial partners demonstrate the strength of their research framework for the development of industrial Perovskite based PV modules.

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