

PEROVSKITE / TEXTURED SILICON HETEROJUNCTION FOR MECHANICALLY STACKED TANDEM SOLAR CELL

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In order to achieve high-efficiency solar cells, a tandem structure with perovskite and silicon solar cells was introduced and concerned, recently. However, it was difficult to form perovskite top cell on “textured” silicon solar cell due to the inhomogeneity layer of perovskite top cells by solution process. In this work, therefore, in order to combine perovskite solar cell as a top cell and “textured” silicon heterojunction (SHJ) solar cell as a bottom cell, the top and bottom cell were integrated into the two-terminal tandem solar cells by mechanically stacking as the first time. The perovskite top cell and SHJ bottom cell were fabricated separately. In order to finalize for the tandem cell, each top and bottom cell was just stacked and fixed by a spring terminal from back side. The structure of the tandem solar cell is shown in Figure 1. The mechanically stacked tandem solar cell was <perovskite for the top cell/Au (2.5 nm)/ITO (154 nm) stacked-on textured SHJ for the bottom cell (provided from Choshu Industry Co., Ltd.)>. The best efficiency of 15.0% and 21.0% as two- and four-terminal devices were confirmed, respectively. It was turned out the “textured” SHJ bottom cell could work as two terminal mechanically stacked tandem solar cell. The process is still under investigation and more high efficiencies are expected.

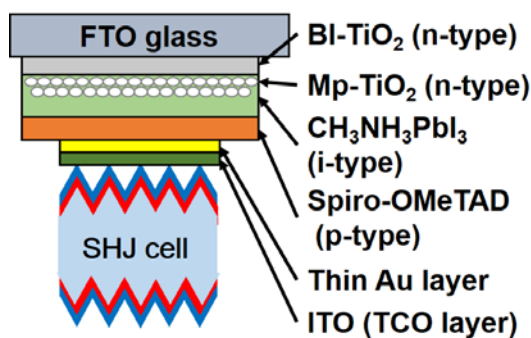


Figure 1: Structure of tandem solar cell.

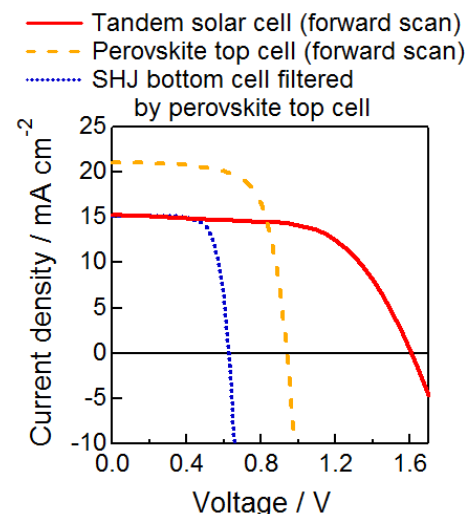


Figure 2: *I-V* curves of fabricated top, bottom and tandem solar cell.