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日本應用物理學會展摘要標題:

Perovskite film quality controlled by blade coating process and apply for efficient perovskite solar cells

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Solar cell is one of the favorite issues in renewable energy research. Among of them, the lead-based perovskite solar cells (PSCs) has been considered as one of the most promising photovoltaic technology due to its advantages, including high efficiency, simple process, low cost, and the rapid growth of power conversion efficiency (PCE). Here we demonstrate to make high quality perovskite film by controlling blade coating speed. First, we study different ratio of PbI_2/MAI to find the best composition of perovskite precursor, and then we control different coating speed to get the best performance of PSC. Through this control process, we can get the obvious improvement of Fill factor (FF) and power conversion efficient (PCE). By Photoluminescence(PL) mapping, AFM and SEM analysis, we investigate the uniformity of the perovskite film under different blade coating speed. From Alpha step and XRD analysis show that preparation perovskite films at different coating speed have different film thicknesses and grain size. With the best process control, we can get the PSC with open current Voltage (Voc) of 0.954(V), short-circuit current density (Jsc) of 21.53 mA/cm^2, Fill Factor (FF) of 80.410% and Power Conversion Efficient (PCE) up to 16.53% under the illumination of 100 mW/cm^2 (AM1.5G).

References

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