

Low defect density of Perovskites films for high efficiency Perovskites solar cells**中央大學¹, 長庚大學², 先進能源材料實驗室³ (M2) 徐明偉¹³, 李坤穆²³****National Central Univ.¹, Chang Gung Univ.², Advanced Energy Lab.³, Ming-Wei, Hsu¹², Kun-Mu, Lee¹²****E-mail: kmlee@mail.cgu.edu.tw****Abstract**

In recent years, the power conversion efficiency (PCE) of perovskite solar cells (PSCs) from 3.8% has rapidly increased to 23.7%. Our purpose is that decreasing defect of perovskite to enhance the PCE of PSCs. First, we use delay-annealing process on perovskite film, it can actually balance Marangoni effect. The PCE of PSCs from 17.36% improves to 18%. In reference, deep defect density can be easily healed by triiodide ions when PVSK phases are formed, so we add potassium iodide and iodine to form partial triiodide ions. Potassium iodide is also a proper alkali metal ion doping in perovskite, it is in interstitial site of perovskite lattice to prevent Frenkel defect of iodide ions. The Voc improves to 1.09V, FF improves to 77%, and the PCE improves to 19.36%. We investigate the crystal structure, surface morphology, absorption, photoluminescence, time-resolved photoluminescence, and space charge limited current measurement.

References

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