

Preparation of the CsPbBr₃ perovskite film for using as the light absorber in the hole-free transport materials for perovskite solar cells

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CsPbBr₃ perovskite films were prepared by using two-step method and using as an active material in the hole-free transport materials for perovskite solar cells. The CsPbBr₃ perovskite films were coated on the F-SnO₂ (FTO) conductive substrate by the spin coating technique. To prepare CsPbBr₃ perovskite film by the two-step method, firstly, the PbBr₂ film was coated on the FTO substrate by spin coating technique and then PbBr₂ film was immersed in CsBr solution at 50 °C for 20 min. Finally, the CsPbBr₃ film was annealed at 300 °C in air for 10 min. The surface morphology and the film thickness of CsPbBr₃ perovskite films were characterized by the scanning electron microscope (SEM). The crystalline structure and light absorption properties of the CsPbBr₃ film were investigated by the x-ray diffraction (XRD) and UV-visible spectroscopy. The XRD result shows that the CsPbBr₃ crystals are pure perovskite phase. The energy bandgap (E_g) of CsPbBr₃ film investigated by the UV-visible technique is found about 2.3 eV. The CsPbBr₃ perovskite solar cell sample shows the solar cell efficiency of 1.4%.

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