

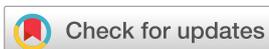
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Polymer-assisted crystal growth regulation and defect passivation for high-performance flexible solar-blind photodetectors based on copper-based halides †



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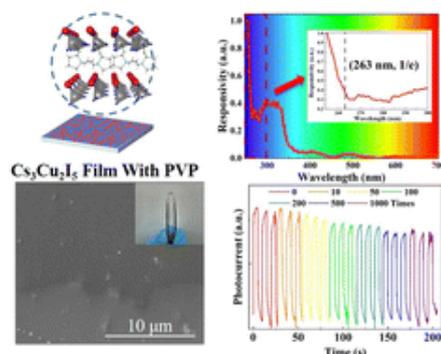
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Abstract

Solar-blind ultraviolet photodetectors have attracted great attention owing to the low background noise and high reliability in operating environments. In this work, we regulated the crystallization of the Cs₃Cu₂I₅ film and passivated defects using a polyvinyl pyrrolidone (PVP) assisted method. As a result, high-quality Cs₃Cu₂I₅ films with compact surfaces, high carrier mobility and fewer defects are obtained. On this basis, the PVP–Cs₃Cu₂I₅ photodetector exhibits a high specific detectivity and responsivity of 1.85 × 10¹² Jones and 0.52 A W⁻¹, along

with a superior EQE of 45%. Moreover, the flexible PVP–Cs₃Cu₂I₅ device can retain 86.7% of its initial photocurrent after 1000 times bending, benefitting from the enhancement of the mechanical ductility of the Cs₃Cu₂I₅ film by PVP doping. This work provides a promising method for modulating the properties of the Cs₃Cu₂I₅ film for flexible solar-blind photodetectors by suitable polymer additives.



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