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Chemical Analysis of the Interface between CsPbBr3 and Al2O3 deposited by ALD as Protector Layer.

All inorganics halide lead perovskites have emerged as promising candidates for optoelectronic devices due to their exceptional properties, including high absorption coefficients, tunable bandgaps, and superior charge carrier mobilities. These attributes make them ideal for applications in solar cells, light-emitting diodes, and photodetectors. However, a significant challenge limiting their practical application is their instability under environmental conditions such as moisture, oxygen, and thermal stress. To address this issue, the implementation of Al2O3 directly on the top of the perovskite has been studied as a protective layer. This protective mechanism is crucial for extending the operational lifespan of CsPbBr3-based optoelectronic devices, potentially making them more viable for commercial use. Further analysis and optimization of the interface could lead to significant advancements in the development of stable, high-performance perovskite-based optoelectronics. This work focuses on the detailed in-situ deposited and chemical analysis of the Al2O3/ CsPbBr3 interface, where the perovskite has been deposited by Close Space Sublimation (CSS) and the Al2O3 deposited by Atomic Layer Deposition (ALD) and employing X-ray photoelectron spectroscopy (XPS), and others characterization techniques. A plausible growth mechanism of ALD Al2O3 on top of perovskite is presented.

Keywords

All-Inorganic perovskite, Atomic Layer Deposition, Al2O3, X-ray photoelectron spectroscopy, In-Situ

Reference

N/A

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