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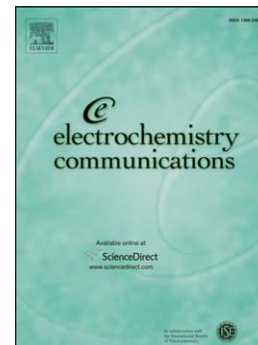
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Compact layer influence on hysteresis effect in organic–inorganic hybrid perovskite solar cells

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Abstract:

Organic–inorganic hybrid perovskite solar cells have attracted great attention due to their high power conversion efficiency and low cost. However, an anomalous hysteresis effect exists in the perovskite solar cells, especially with TiO₂ as the n-type electron extraction layer. In this communication, we prepare two kinds of TiO₂ compact layers using Atomic Layer Deposition (ALD) and Spin-Coating (SC) methods and compare their influences on the hysteresis effect. By efficiency comparison and AC impedance spectroscopy study, we find that the thickness and morphology of compact layer have a significant influence on the hysteresis effect. Compared to the SC approach, the ALD prepared compact layer is ultra-thin with uniform morphology and show small interfacial capacitance and large recombination resistance, meaning reduced interfacial charge accumulation and accelerated electron transport, which would relieve the hysteresis effect.

Keywords: Perovskite solar cells; Compact layer; ALD; Spin-coating; Hysteresis effect

1. Introduction

In the past few years, organic–inorganic hybrid perovskite solar cells have achieved rapid development and significant progress with certified power conversion efficiency (PCE) over 20% [1-5]. High efficiency and low cost make them very

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