

Advances in stability of perovskite solar cells

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ABSTRACT

Perovskite Solar Cells (PSCs) with efficiency greater than 25% have shown promising prospects for future green technology. However, exposure to moisture, along with thermal and photo instability are critical issues limiting commercialization of the PSC devices. Indeed, perovskite-provoked instability of PSCs together with decomposition of hole transport layer (HTL) and electron transport layer (ETL) contribute to overall degradation process and hence affecting the performance of the device. Herein, we discuss instability of PSCs in various operating conditions such as UV light, humidity, environmental ingredients and temperature. Furthermore, we report the recent progress towards improvement in long-term stability of PSCs and those efforts include but not limited to introducing new HTLs, engineering of perovskite materials, interfacial modification, electrodes and novel device configurations and behavior of the device under encapsulation and un-encapsulation conditions. Moreover, we also discuss the researcher's efforts to improve the optical, electrical and chemical properties of different layer of PSCs. Additionally, to address the future research directions such as the need to improve the intrinsic stability of the perovskite absorber layer, design architecture of the device, and search for new durable materials are also proposed.

KEYWORDS

Renewable energy; Future technology; Portable devices; Emerging technology; Perovskite solar cells

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