

Solar Energy

Perovskite solar cells: The new epoch in photovoltaics

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<https://www.sciencedirect.com/science/article/pii/S0038092X19312393>

Abstract

Perovskite-based solar cells (PSC) is the fastest growing solar technology to date since inception in 2009. This technology has revolutionized the photovoltaic (PV) community. While it has taken 15–42 years for traditional PV technologies to achieve maturity, PSC technology has accomplished the same within 10 years. In this article, we explore the latest developments in respect of material profile, pathways for crystallization and device architectures. Related to this are lifetime and stability which are detected as the vital issues that need to be solved before the PSC technology can be commercialized on a wider scale. In addition, we critically elucidate the key degradation mechanisms and strategies for improvement of stability. The fact that most of the perovskite elements are not optimized suggests that there's still room for enhancement- especially in relation to the hole transport materials (HTMs) used and the organic component of the perovskite materials. Lastly, we discuss future outlook and necessary updates for PV community.