Patent Search

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Abstract:

The invention relates to a deep learning based system and method for the rapid and accurate estimation of bandgap and efficiency in perovskite solar cells. By training convolutional or recurrent neural network models on comprehensive datasets encompassing perovskite properties and corresponding performance metrics, the invention enables precise prediction of key parameters crucial for solar cell optimization. Through rigorous validation and seamless integration into existing workflows, this approach promises to expedite materials discovery, process optimization, and quality control in perovskite solar cell manufacturing, thereby advancing the transition towards sustainable and efficient renewable energy technologies.

Complete Specification

Description:The present invention relates to the field of renewable energy technology, particularly to methods and systems for enhancing the efficiency and performance of solar cells. More specifically, the invention pertains to utilizing deep learning approaches for accurate estimation of bandgap and efficiency in perovskite solar cells. Perovskite solar cells have emerged as a promising alternative to traditional silicon-based solar cells due to their potential for higher efficiency and lower manufacturing costs.

BACKGROUND OF THE INVENTION

The following description of related art is intended to provide background information pertaining to the field of the disclosure. This section may include certain aspects of the art that may be related to various features of the present disclosure. However, it should be appreciated that this section be used only to enhance the understanding of the reader with respect to the present disclosure, and not as admissions of prior art.

Solar energy is an abundant and renewable source of power with the potential to significantly reduce dependence on fossil fuels and mitigate climate change. Solar photovoltaic (PV) technology, in particular, has experienced rapid growth in recent years, driven by advancements in materials, manufacturing processes, and efficiency improvements.

Perovskite solar cells have emerged as a promising candidate for next-generation PV technology due to their high efficiency, low-cost fabrication, and tunable optoelectronic properties. Perovskite materials exhibit exceptional light-absorption characteristics and can be easily synthesized using solution-processing techniques

View Application Status