

Principle of cooling and efficiency improvement of photovoltaic panels



Overview

This paper conducts a comprehensive review of various cooling technologies employed to enhance the performance of PV panels, encompassing water-based, air-based, and phase-change materials, alongside novel cooling approaches. Given the depletion of limited fossil fuel resources and the urgent need to reduce carbon gas emissions, scientists and researchers are actively exploring innovative strategies to enhance photovoltaic panel efficiency through advanced cooling methods. Passive and active PV materials (PCMs) and nanofluids as working agents. A review analysis showed that water cooling is better than air cooling. This paper involves discussion of newly developed cooling methods such as cooling by nanofluids, heat sink by thermoelectric modules and radiative. Therefore, a variety of cooling techniques have been carried out to make the system more efficient by avoiding the issue of temperature rise., air and water circulation, phase change material, phase change material with additive materials, heat.

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Review of cooling techniques used to enhance the efficiency of

This research represents a comprehensive review of the different cooling techniques used in PV cooling, such as active cooling, passive cooling, PCM cooling, and PCM with additives.

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Cooling techniques for PV panels: A review

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