Phase change materials for enhancing the performance of solar photovoltaic panels: A review

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**Abstract**—

Although solar photovoltaic panels play a major role in renewable energy sources, operation under temperature fluctuation conditions significantly decreases their efficiency. For this reason, phase change materials (PCMs) are a useful material in applications for thermal management because of the ability of such materials to absorb and release latent heat due to phase transitions. This paper aims to review how adding PCMs will improve the sustainability and efficiency of solar PV systems. The paper gives an overview of the current developments based on PCM material selection, system design, and performance evaluation. The main conclusions are that it shows that PCMs in photovoltaic systems display greater thermal stability, increased duration, and an increased efficiency for PV systems. It also explains some of the difficulties, like the enhancement of the thermal conductivity, durability, and economic sustainability. To conclude, this paper makes recommendations for future work to maximize the integration of PCM and facilitate the development of more efficient solar energy systems.

Index Terms**— solar photovoltaic (PV) panels, performance, literature review**

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