

## Solar Energy South Africa

# Scars on the surface of photovoltaic panels



## Overview

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Does a self-cleaning nano-coating thin film improve PV panel efficiency?

Provided by the Springer Nature SharedIt content-sharing initiative Dust accumulation on photovoltaic (PV) panels in arid regions diminishes solar energy absorption and panel efficiency. In this study, the effectiveness of a self-cleaning nano-coating thin film is evaluated in reducing dust accumulation and improving PV Panel efficiency.

Can nano-coating thin film reduce dust accumulation on PV panels?

Scientific Reports 14, Article number: 23013 (2024) Cite this article Dust accumulation on photovoltaic (PV) panels in arid regions diminishes solar energy absorption and panel efficiency. In this study, the effectiveness of a self-cleaning nano-coating thin film is evaluated in reducing dust accumulation and improving PV Panel efficiency.

How effective is PV panel cleaning?

A study was conducted using three techniques for PV panel cleaning to measure the effectiveness: nano-coating, nano-coating with a mechanical vibrator, and no coating (natural cleaning). Results show that the most effective technique was nano-coating the PV panel surface and using a mechanical vibrator .

Why is dust accumulating on PV panels important?

The efficiency and power output of photovoltaic (PV) panels are vital to the solar PV plant. Apart from overheating, and natural shading, some geographical locations are more susceptible to objectionable dust accumulation on the surfaces of PV panels.

Does dust shading affect PV panel performance?

In both the  $I-V$  and  $P-V$  curves, it is observed that there is a sudden decline in the values of the current and power of the uncoated panel

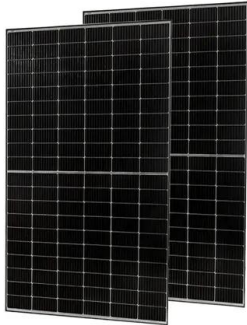
indicating the detrimental impact of the dust shading effect on PV panel performance.

Which cleaning technique is best for solar PV panels?

The TOPSIS method is employed to compare the cleaning techniques and rank them from most favored to least favored. Manual cleaning of the PV panels is the highest ranked cleaning technique according to the TOPSIS ranking. The efficiency and power output of photovoltaic (PV) panels are vital to the solar PV plant.

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### Micron-Smooth, Robust Hydrophobic Coating for ...

Photovoltaic (PV) power generation is a clean energy source, and the accumulation of ash on the surface of PV panels can lead to power loss. For polycrystalline PV panels, self-cleaning film is an economical and ...

### Experimental investigation of a nano coating efficiency ...

Dust accumulation on photovoltaic (PV) panels in arid regions diminishes solar energy absorption and panel efficiency. In this study, the effectiveness of a self-cleaning nano-coating thin film is



### Dust Accumulation on the Surface of Photovoltaic ...

This article presents an empirical review of research concerning the impact of dust accumulation on the performance of photovoltaic (PV) panels. After examining the articles published in international scientific journals, many ...

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