

## Solar Energy South Africa

# Solar panels reflect light pollution



## Overview

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We created two kinds of test surfaces that we exposed to wild flying aquatic insects: shiny (smooth) black, and matte (rough) black. Each shiny test surface was composed of two glass panes (smooth window glass, 400 mm × 400 mm × 3 mm) underlain with black cardboard which collectively mimics the polarization-relevant.

The shiny test surfaces in this study have nearly identical reflection-polarization characteristics as real solar panels with a shiny (smooth) black surface (Horváth et al. 2010a). The black.

Although horseflies, mayflies and non-biting midges have green-, blue- and UV-sensitive photoreceptors (Briscoe and Chittka 2001), the spectral range in which they perceive polarization.

The goal of this experiment was to test the relative attractiveness of test surfaces to mayflies and non-biting midges. Experiment 2 was conducted between 4 and 30 May 2015 on 8.

Since the distribution of our count data was non-normal (like most count data, our data were distributed in a Poisson fashion), we used non-parametric Mann-Whitney U test (Zar 2010) to compare differences.

Why are solar panels polarized light pollution?

Since the larvae of these insects develop in water/mud for a few months/years, hydration by dew or rain drops on the solar panels cannot ensure the survival of eggs. This effect is harmful for the aquatic insect populations concerned, and therefore is called polarized light pollution [ 30 ].  
Optical characteristics of photovoltaic solar panels.

Do anti-reflective solar panels reduce polarized light pollution?

Below is the link to the electronic supplementary material. Száz, D., Mihályi, D., Farkas, A. et al. Polarized light pollution of matte solar panels: anti-reflective photovoltaics reduce polarized light pollution but benefit only some aquatic insects.

What is polarized light pollution?

Polarized light pollution (PLP) associated with solar panels causes aquatic insects to prefer to oviposit on panels over natural water bodies, with potential to negatively impact their global populations as solar energy expands.

Does photovoltaic solar produce polarized light pollution?

Unlike CSP facilities, photovoltaic solar facilities create polarized light pollution by reflecting horizontally polarized light, which, in turn, negatively affects some aquatic insects (Szaz et al., 2016) and may similarly impact nonbee insect flower visitors. .

Can textured photovoltaic cover layers reduce polarized light pollution?

Reviewer #3: In their manuscript entitled „Multifunctional Rose-Petal-Mimicking Light-Harvesting Layers for Solar Panels Nearly Eliminate Polarised Light Pollution“, Fritz et al present new ‘textured photovoltaic cover layers’ for reducing ‘polarized light pollution’ (PLP) emanating from solar panels.

Are solar panels bad for the environment?

Although solar expansion would benefit the integrity of the ecosphere by reducing global greenhouse gas emissions, it may also lead to unintended ecological impacts. Photovoltaic solar panels are strong sources of a form of photopollution known as polarized light pollution (PLP, Horváth et al. 2009, 2010a ).

## Solar panels reflect light pollution

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### Polarized light pollution of matte solar panels: anti-reflective

Abstract Photovoltaic solar panels represent one of the most promising renewable energy sources, but are strong reflectors of horizontally polarized light. Polarized light pollution (PLP) ...

### Bioreplicated coatings for photovoltaic solar panels nearly ...

Száz D, Mihályi D, Farkas A, Egri Á, Barta A, Kriska G, et al. Polarized light pollution of matte solar panels: anti-reflective photovoltaics reduce polarized light pollution but ...

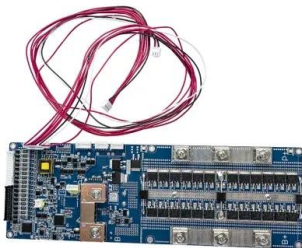


### Polarized light pollution of matte solar panels: anti-reflective

ARCs are most likely to reduce PLP and benefit aquatic insects under sunny skies and when used in conjunction with white non-polarizing gridding, but may actually exacerbate the severity of ...

### Polarized light pollution of matte solar panels: anti-reflective

Photovoltaic solar panels represent one of the most promising renewable energy sources, but are strong reflectors of horizontally polarized light. Polarized light pollution (PLP) associated ...



## Bioreplicated coatings for photovoltaic solar panels ...

Introduction. A properly textured front surface of photovoltaic solar panels should allow the following characteristics: (i) A low sunlight reflectance irrespective of the illumination conditions and a high absorption of ...

## Polarized Light Pollution of Fixed-Tilt Photovoltaic Solar Panels

polarimetry, in a solar panel farm, we measured the reflection-polarization patterns of fixed-tilt photovoltaic panels from the viewpoint of flying polarotactic aquatic insects, which are the ...



## Reflection & Polarization Characteristics of ...

Using drone-polarimetry above a solar panel farm, Takács et al. measured the reflection-polarization characteristics of fixed-tilt photovoltaic panels from the viewpoint of flying polarotactic aquatic insects. They found ...

## (PDF) Reducing the Maladaptive Attractiveness of Solar Panels ...

1646 Polarized Light Pollution from Solar Panels. Horváth et al. [32] found that PV panels can reflect horizontally polarised light, which is often used by aquatic insects as a cue to detect



## Reflecting on Solar Energy with Mirrors and Their Impact

The reflective surface of a parabolic mirror is designed to minimize the absorption of light energy, allowing for maximum reflection and concentration and the behavior of urban wildlife. It can also lead to ...

## Polarized light pollution of matte solar panels: anti-reflective

Bioreplicated coatings for photovoltaic solar panels nearly eliminate light pollution that harms polarotactic insects. Many insect species rely on the polarization properties of object ...



## Polarized Light Pollution of Fixed-Tilt Photovoltaic ...

Inspired by the high polarized light pollution  $plp \leq 58\%$  of the studied smooth (shiny) photovoltaic solar panels, we suggest reducing the degree of linear polarization  $d$  of panel-reflected light by either covering the panel's ...

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