

# Perovskite cells decompose when exposed to light

Does UV light degrade perovskite solar cells?

Although the power conversion efficiency of perovskite solar cells has increased from 3.81% to 22.1% in just 7 years, they still suffer from stability issues, as they degrade upon exposure to moisture, UV light, heat, and bias voltage. We herein examined the degradation of perovskite solar cells in the presence of UV light alone.

Does white light decompose perovskite?

The perovskite decomposition under white light illumination is explored under ultrahigh vacuum conditions. In-situ compositional analysis reveals the perovskite decomposition with the appearance of metallic Pb. A light-induced degradation mechanism is proposed. Perovskite is photosensitive, and a light-induced degradation mechanism is proposed. 1.

How does light affect the degradation of a perovskite?

However, even in the absence of  $\text{TiO}_2$  and/or UV-light, the combined action of molecular oxygen and light also induces a rapid degradation of organic-inorganic perovskites. Bryant et al. found that  $\text{CH}_3\text{NH}_3\text{PbI}_3$  underwent a complete degradation to  $\text{PbI}_2$  under a continuous illumination over 48 h in dry air [14].

How does UV exposure affect perovskite decomposition?

With increasing UV exposure time, the ratio between the  $\text{PbI}_2$  (12.6%) and  $\text{CH}_3\text{NH}_3\text{PbI}_3$  (14.1%) peaks increased and this means  $\text{CH}_3\text{NH}_3\text{PbI}_3$  perovskite decomposing to  $\text{PbI}_2$  continuously 34, 44, 45. Figure 3 and Table 1 show multiple light I-V measurements acquired during 1,000 h UV exposure under open circuit conditions.

How do metal halide perovskite solar cells degrade?

This review article examines the current state of understanding in how metal halide perovskite solar cells can degrade when exposed to moisture, oxygen, heat, light, mechanical stress, and reverse bias.

Is perovskite degradation induced by charge accumulation?

Perovskite degradation induced by charge accumulation a) Device stability test under AM 1.5G  $1\text{ sun}$  illumination for perovskite solar cells employing  $\text{C}_{60}$  (black) and  $\text{TiO}_2$  (blue) as an electron transporting layer (ETL), exhibiting significant differences in performance decay time depending on ETL.

multiple-barrier for light-heat stable perovskite solar cells Jing Zhou<sup>1,6</sup>, Zonghao Liu<sup>1,2,6</sup>, Peng Yu<sup>1,3,6</sup>, ... perovskite decomposition products in the above reactions (1-4), and

In just over a decade, metal halide perovskite solar cells (PSCs) have gained significant attention in the photovoltaic community. Through intensive research efforts, the ...

# Perovskite cells decompose when exposed to light

In this review, we summarize the main degradation mechanisms of perovskite solar cells and key results for achieving sufficient stability to meet IEC standards.

The performance of the solar cells was monitored with exposure to light in dry air and N<sub>2</sub> environments and in dark dry conditions. ... perovskite/mp-TiO<sub>2</sub> solar cells are still ...

This review article examines the current state of understanding in how metal halide perovskite solar cells can degrade when exposed to moisture, oxygen, heat, light, mechanical stress, and reverse ...

The chemical composition, electronic structure, surface morphology, and crystal structure of CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> perovskite films exposed to white light illumination in UHV ...

Recently, perovskite solar cells (PSCs) have achieved extraordinary progress in reaching high record power conversion efficiency (PCE) of 25.7%<sup>5</sup> for single-junction ones, ...

also leads to enhanced ion migration and further deteriorates the solar cell performance.<sup>18</sup> However, it was also reported that upon exposure to either light or moisture alone, no ...

The most commonly used perovskite MAPbI<sub>3</sub> poses an issue due to the relative volatility of the methylammonium iodide (MAI), which evolves out of the film during the heating ...

The partial Pb<sup>2+</sup> substitution with Cu<sup>+</sup> ions has been thoroughly applied as an approach to produce new absorber materials with enhanced light and radiation hardness ...

Perovskite solar cells (PSCs) demonstrate excellent power conversion efficiencies (PCEs) but face severe stability challenges. One key degradation mechanism is ...

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