

A Novel Bifacial Perovskite Photovoltaics For Harvesting Energy from Artificial Indoor LED Light Sources

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ABSTRACT

Novel perovskite photovoltaics have received tremendous attention as a potential candidate for efficient light harvesting under natural solar and artificial indoor light sources. However, an ideal design for photovoltaics to harvest energy, especially from indoor light conditions, remains challenging and tempting. Herein, we designed an efficient bifacial indoor perovskite photovoltaics (i-PPVs) with a record efficiency under artificial LED illumination. The i-PPVs were fabricated by a stack of organic-inorganic hybrid perovskite material amid of transparent bottom electrode (ITO) and top Au/ITO electrode for the variable thicknesses of the intermediate Au layer varied from 5-30 nm. The transmittance with good electrical conductivity of Au/ITO electrode enables to achieve high efficiency in contrast to the monofacial conventional structure. Moreover, bifacial i-PPVs have demonstrated lower hysteresis and improved device stability that can mitigate one of the major instability issues of the perovskite devices. Overall, this work comprehensively puts forward a prospective candidature of bifacial indoor photovoltaics for developing photovoltaics applications.

KEY APPLICATION AREAS

1. Indoor perovskite photovoltaics.
2. Indoor energy harvesting.
3. Bifacial photovoltaic technology.
4. IoT power systems.
5. Smart buildings and wireless sensor networks.
6. Thin-film photovoltaic devices.

POTENTIAL USES

1. Harvesting energy from indoor LED lighting.
2. Powering IoT devices and wireless sensors.
3. Self-powered RFID tags and smart electronics.
4. Battery-free indoor monitoring systems.
5. Wearable and low-power electronic devices.
6. Energy-efficient indoor photovoltaic power generation.