

Integrated Device For Generating And Storing Electric Energy

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ABSTRACT

An integrated device (100) for generating and storing electric energy is proposed. The integrated device comprises a glass substrate (102) with an outer surface configured for facing solar radiations and an inner surface adjacent a Transparent Conducting Oxide (TCO) layer (104). An Electron Transport Layer (ETL) (106) is adjacent to the TCO layer (104) and a perovskite layer (108). A Hole Transport Layer (HTL) (110) is sandwiched between the perovskite layer (108) and a common carbon electrode (112). A first electrode (116) of a battery is connected to the TCO layer (104) through a power management circuit. The perovskite layer generates an electron hole pair upon absorption of a photon, whereby the electron moves towards the ETL and the hole moves towards HTL. The tandem configuration of the integrated device charges the battery.

KEY APPLICATION AREAS

1. Integrated solar energy generation and storage.
2. Perovskite photovoltaic technology.
3. Building-integrated photovoltaics (BIPV).
4. Portable and off-grid power systems.
5. Energy-efficient consumer electronics.
6. Smart renewable energy systems.

POTENTIAL USES

1. Simultaneous solar power generation and battery charging.
2. Compact solar-battery modules with reduced energy loss.
3. Rooftop and façade-integrated power storage systems.
4. Portable solar chargers and backup power units.

5. Self-powered IoT and remote monitoring devices.

6. High-efficiency tandem perovskite-silicon solar systems.