14 1 efficient monolithically integrated solar flow battery

What is integrated solar flow battery (SFB)?
Here, we present the design principles for and the demonstration of a highly efficient integrated solar flow battery (SFB) device with a record solar-to-output electricity efficiency of 14.1%. Such SFB devices can be configured to perform all the requisite functions from solar energy harvest to electricity redelivery without external bias.

Is solar energy harvesting and redelivery possible with a single integrated device?
Here,we present a high-efficiency,monolithically integrated SFB device with a record average SOEE of 14.1% and demonstrate that solar energy harvest,conversion,storage,and redelivery can be completedby such a single integrated device without any external electrical energy input.

Can photoelectrochemical solar energy conversion be integrated with scalable energy storage?
Challenges posed by the intermittency of solar energy source necessitate the integration of solar energy conversion with scalable energy storage systems. The monolithic integrationof photoelectrochemical solar energy conversion and electrochemical energy storage offers an efficient and compact approach toward practical solar energy utilization.

Why is high photovoltage a key feature in integrated SFB device design?
This high photovoltage,although not specifically critical for PV cells as the panel voltage can be easily increased by series tandem,is a key beneficial feature in integrated SFB device design to enable efficient photocharging of the device without external biasand a simpler three-electrode SFB device design (as shown in Figure 1 A).

What is a monolithically integrated water-splitting system?
A monolithically integrated,intrinsically safe,10% efficient,solar-drivenwater-splitting system based on active,stable earth-abundant electrocatalysts in conjunction with tandem III-V light absorbers protected by amorphous TiO 2 films. Energy Environ. Sci. 2015; 8: 3166-3172

Does a solid-state III-V tandem solar cell perform under 1 Sun?
We then characterized the performance of the solid-state III-V tandem solar cell under 1 sun (100 mW cm -2) of AM 1.5G simulated solar illumination.

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The assembly of integrated solar redox flow batteries was originally a simple series of dye-sensitized solar cells and liquid flow cells, then the design of its flow passage and ...

There are several apparent technological advantages to using SFBs for integrated solar energy conversion and storage. First, SFBs can directly utilize photo ...

Due to the intermittent nature of sunlight, practical round-trip solar energy utilization systems require both efficient solar energy conversion and inexpensive large-scale energy storage.

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