

ContainerPower Energy Solutions

Solar energy storage and luminescence



Overview

Nowadays, building energy consumption accounts for more than 50% of the total energy consumption. Exploiting advanced solar energy strategy is of great significance to achieve the building energy saving.

Is luminescent solar power a low-cost thermal energy storage?

Low-cost thermal energy storage (TES) exists but relies on expensive heat engines. Here, we introduce the concept of luminescent solar power (LSP), where sunlight is absorbed in a photoluminescent (PL) absorber, followed by red-shifted PL emission matched to an adjacent PV cell's band edge.

Can luminescent solar concentrators be used for building integrated photovoltaics (BIPV)?

This review examines the application of luminescent solar concentrators (LSCs) for building integrated photovoltaics (BIPV), both in terms of opaque façade elements and as semi-transparent windows. Many luminophores have been developed for LSC applications, and their efficiencies examined in lab-scale (<25 cm²) devices.

Are luminescent solar concentrators a light harvesting solution?

In response to these limitations, luminescent solar concentrators (LSCs) have been proposed as light-harvesting solution, that collect (diffuse) light on large areas and direct it onto much less material of (precious) PV material. A standard LSC comprises a transparent host material doped with randomly distributed luminophores (Figure 1 a).

Can luminescent solar concentrators improve efficiencies?

Research on high-efficiency photovoltaic (PV) technologies has consistently improved efficiencies. Yet, laboratory-developed PVs are often far from practical applications due to high material costs. Luminescent solar concentrators (LSCs) can solve this as they use luminophores to direct light from larger areas to little cell materials.

Could luminescent solar concentrators be a solution to zero-energy office

buildings?

To realise zero-energy office buildings, a semi-transparent energy conversion technology for their large glass facades is highly desirable, while still allowing for 50% visible light transmission. Luminescent solar concentrators (LSCs) could be such a technology.

What is a luminescent solar concentrator?

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Luminescent solar concentrators are translucent photovoltaic modules
potentially used for building window.

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