

Energy-saving Russian tunable optical modules for smart buildings



Overview

This review provides an overview of recent advancements in hydrogel-based thermochromic smart windows, focusing on fabrication strategies, chromic mechanisms, and improvements in responsiveness, stability and energy-saving performance. Electrochromic windows provide a sustainable solution for use in energy-efficient buildings as their varying optical properties in changing weather conditions allow the optimization of solar radiation heat gain and indoor thermal comfort. However, Arutjunjan, Ruben; Markova, Tatiana; Halopenen, Ilya; Tutunnikov, Anatolii Thermochromic laminated glazing (TLG) aids in reducing the energy needs of a building and providing indoor comfort. The polymeric interlayer of TLG is doped with transition metal (Fe, Cr, W, etc.) complexes, which change. pared using a scalable deposition technique on standard glass at a low substrate temperature of 320 °C and without any substrate bias voltage. 7% (low-temperature state) and 60.

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This review offers a comprehensive and unified perspective on thermoresponsive building envelope technologies, bridging transparent and ...



Compared to ordinary windows, the HBPEC/PNIPAM smart window offers excellent and stable indoor temperature regulation, leading to an effective ...



The energy modeling of the heat transfer in ventilated facades showed that TLG can provide a 15-30% decrease of the building energy consumption during the winter heating time in the ...



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This study provides a novel approach to developing advanced thermochromic materials for smart windows, potentially improving the building energy efficiency and sustainability.



It is expected that our device can achieve greater annual energy savings in comparison with commercial glass anywhere in the world and promote the progress of thermochromic windows ...



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Design and Scalable Synthesis of Thermochromic VO₂-Based Coatings for Energy-Saving Smart Windows with Exceptional Optical Performance



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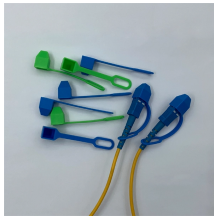
Thermochromic smart windows (TSWs) exist passive regulation for building energy conservation, which are challenging to be artificially manipulated. The electrothermal stratagem has ...



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Here we present an electrochromic design that combines radiative cooling of mid-infrared light and maximized utilization of both visible and near-infrared light.



A series of SPCM@PNIPAm-PAM hydrogels were used to fabricate novel energy-saving smart windows and were tested by a series of microscopic, thermal, optical and energy-saving ...



This review offers a comprehensive and unified perspective on thermoresponsive building envelope technologies, bridging transparent and opaque components—including thermochromic ...

Contact Us

For more information, pricing, or custom energy solutions, please contact us:

Website: <https://www.gdroofing.co.za>

Email: sales@gdroofing.co.za

Phone: +27 72 418 9365

Address: 22 Electron Avenue, Isando, Johannesburg, 1600, South Africa

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