

What are the photochromic properties of microcapsules?

Photochromic properties of color-matching, double-shelled microcapsules covalently bonded onto cotton fabric and applications to outdoor clothing Preparation and photoluminescence properties of red-emitting SrMoO₄:Eu nanophosphor microcapsules Development of photochromic wood material by microcapsules

How to make photochromic Pu microcapsules?

Fabrication of photochromic PU microcapsules Photochromic dye (0.06 g) was dissolved in butyl stearate (20 g) at 120 °C thermostatic oil bath for 10 min and then the homogeneous oil phase was obtained, which was used as core materials of microcapsules.

What is the discoloration mechanism of photochromic microcapsules?

The discoloration mechanism of photochromic microcapsules was shown in Fig. 11 (b), the photochromic dye of spirooxazine transformed from colorless state to the isomeric merocyanine form accomplished by a photoinduced ring-opening reaction of C-O bonds after a UV irradiation.

Inorganic photochromic (PC) materials have attracted considerable attention in non-volatile two-photon, multi-wavelength, super-resolution and other optical memory devices [1, 2]. Two states before and after PC reactions correspond to the "0" or "1" binary codes in optical data storage devices [3] compared with traditional solid-state and magnetic information ...

Reversible photochromic microencapsulated phase change materials (RP-PCMs) not only possess color-changing performance under sunshine/UV, but also can adsorb, store ...

The SEM images of KNEN are shown in Fig. 3 (a)-(c). The physical properties of the ceramics, including the crystal structure and the ferroelectric, piezoelectric, dielectric, and optical properties, are significantly affected by the grain distribution and ceramic density. ... Photochromic and energy storage properties in K0.5Na0.5NbO₃-based ...

This switchable nature can be exploited in different applications such as data storage, optics, and chemical sensors. Organic photochromic molecules are critical for photoresponsive functional materials, such as switches and memories. Researchers have focused on incorporating photoresponsive molecules into metal systems in the past decade.

In this study, reversible photochromic polyurea (PU) microcapsules had been innovatively designed and prepared by in-situ polymerization successfully, which exhibited ...

Download scientific diagram | Schematic illustration of the photochromic and energy storage properties in Eu³⁺ doped KNN materials from publication: Photochromic and energy storage ...

The photochromic fabrics with good energy storage and thermal regulation. Abstract. ... From the images of Fig. 4 (a-c) with different magnifications, it can be seen that the microcapsules are sub-circular with smooth and full surfaces, well-defined contours and uniform particle sizes. Such microcapsule particles tend to better protect the core ...

However, it is still a challenge to achieve excellent photochromic properties and energy storage performances in a ferroelectric material at the same time. Here, a novel photoelectric multifunctional material of (K 0.5 Na 0.5)NbO₃:0.05Eu is obtained.

In comparison, our synthesized photochromic microcapsules with energy storage also achieved an energy storage efficiency of 45.5%, while ΔH_m and ΔH_c reached 72.0 J/g and -58.0 J/g ...

SEM images of cotton fabrics treated with polyurethane (a) and chitosan (b) microcapsules. ... Cotton fabric containing photochromic microcapsules combined thermal energy storage features. *Colloids Surf A Physicochem Eng Asp*, 648 (2022), Article 129249. Google Scholar ... Reversible photochromic energy storage polyurea microcapsules via in-situ ...

We propose a high-voltage driven photo-charging storage device by integrating series-connected perovskite solar cell and an supercapacitor. The photo-charging storage device exhibits superior...

Surface morphology and microstructure of MPCM-Ag and MPCM-Cu were observed by SEM and images are shown in Fig. 4. ... Reversible photochromic energy storage polyurea microcapsules via in-situ polymerization. *Energy*, 219 (2021), Article 119630, 10.1016/j.energy.2020.119630.

Photochromic materials with reversible optical properties induced by light have always been a research hotspot in the field of optoelectronics. In this work, a novel type of smart photochromic fabric is manufactured by covalent bonding of 3-mercaptopropyltrimethoxysilane (MPTMS) modified cotton fabric and spirooxazine (SO).

This study successfully prepared four kinds of eco-friendly epoxy resin microcapsules both with reversible photochromic and energy storage properties via in-situ polymerization. For the microcapsules, methyl palmitate (MP), which dissolves photochromic dyes (spiropyran), was used as the core material, and four epoxy resins (EP) with various molecular ...

Eco-friendly reversible photochromic epoxy resin microcapsules with strong acid and alkali resistance for energy storage via facile in-situ microencapsulation Article Apr 2023

Photochromic energy storage pictures energy storage efficiency, excellent thermal stability and thermal cycling durability. Finally, the reversible photochromic microcapsules ... Reversible photochromic energy storage polyurea microcapsules via in-situ polymerization. Shaofeng Sun, Yan Gao, Na Han, XingXiang Zhang and Wei Li.

The SEM images corresponding to the prepared microcapsules are named (a), (b), (c), and (d). After selecting 100 EP microcapsules randomly, the particle sizes for these 100 EP microcapsules were measured using Nano Measurer software. ... Dual-functional Microcapsules with phase change energy storage and photochromic UV absorption properties ...

Here, a novel photoelectric multifunctional material of (K 0.5 Na 0.5)NbO 3:0.05Eu is obtained. Under visible light irradiation, the sample can effectively absorb and store visible ...

Chemically modified ceramics show promise for high-energy-density capacitors with the potential to store electrical energy longer. The team seeks to modify the nanostructure of the ceramics to improve energy density and ...

For molecular solar thermal (MOST) systems, the energy storage density, energy conversion efficiency, and energy storage time are the major figures of merit, which can be optimized by the judicious molecular designs and fine-tuning their optical and thermal properties (Figure 1 B). A large energy storage density can be acquired by designing switches of small ...

1 Supplementary Information Non-Photochromic Solar Energy Storage in Carbon Nitride Surpassing Blue Radicals for Hydrogen Production Pei-Shan Wu a, Tzu-Jen Linb, Sheng-Shu Houa, Chih-Chia Chen, Dai-Ling Tsaia, Kuan- Hsiang Huang, and Jih-Jen Wu a,* aDepartment of Chemical Engineering, National Cheng Kung University, Tainan 70101, Taiwan

Abstract: A microcapsule with intelligent photochromic and energy storage temperature adjustment function has been prepared with melamine-formaldehyde as wall material via an in situ polymerization method, and the photosensitive color material which has been dissolved in phase change materials of fatty acid ester was chosen as the core material. DSC, ...

The conversion and efficient storage of solar energy is recognized to hold significant potential with regard to future energy solutions. Molecular solar thermal batteries based on photochromic ...

The RP-PCMs were prepared by interfacial polymerization reaction between CS and HMDI which exhibited energy storage capacity and excellent photochromic performance. The photochromic & thermo-regulated cotton fabric/WPU/10 wt% RP-PCMs showed appreciable latent heat performance ($\Delta H_m = 11.6 \text{ J/g}$, $\Delta H_c = -8.8 \text{ J/g}$). Therefore, the photochromic &

The photochromic nature, thermal stability, and cascade ring-opening reaction of the closed form isomers of eight photochromic terarylenes are studied, and energy storage efficiencies at a single wavelength, λ , as high as 23% are ...

Downloadable (with restrictions)! In this study, reversible photochromic polyurea (PU) microcapsules had

been innovatively designed and prepared by in-situ polymerization successfully, which exhibited good latent heat storage and release properties. For the microcapsules, butyl stearate containing photochromic dye (spirooxazine) was used as the ...

After the energy crisis in the 1970s, scholars conducted a lot of exploration of energy-saving glass. The most mature energy-saving glass in the market is low-emissivity (LowE) glass, 9, 10 but its adjustability is poor, and its application scenarios are limited. In the 1980s, the concept of "smart windows" was proposed by Svensson and Granqvist. 11 A smart window is ...

1.1 General introduction to photochromism. The term "photochromism" or "photochromic" is believed to originate from the Greek words ????? (photos) and ???u? (chroma), which mean light and color, respectively. The photochromism can thus be simply defined as the feature to undergo a reversible change of color induced by light [1]. ...

Reversible photochromic energy storage polyurea microcapsules via in-situ polymerization. Energy (IF 9 Submission Guide >) Pub Date: 2021-03-01, ... In addition, the PU microcapsules exhibited high energy storage efficiency, excellent thermal stability and thermal cycling durability. Finally, the reversible photochromic microcapsules also ...

Multi-functional microcapsule considered as a promising technique is attracting more and more attention with social development. This study successfully prepared four kinds of eco-friendly epoxy resin microcapsules both with reversible photochromic and energy storage properties via in-situ polymerization. For the microcapsules, methyl palmitate (MP), which ...

In particular, the photon energy storage in solid-state photoswitching materials requires high gravimetric density of energy (J/g) for thermal applications [9], which indicates the importance of facile switching of photoactive moieties at high density. It is indeed a significant challenge to balance the molecular density with the free space ...

The development of new optical storage media capable of achieving bit-by-bit optical data write-in and read-out in a photon trapping/detrapping mode, is significant for information preservation technology, both in large storage capacity and advanced security. 94, 97, 154 Photochromic storage media with a reversible optically coloring and ...

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