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Polyurethanes as solid-solid phase change materials for thermal energy storage

Is polyurethane a solid-solid phase change material for thermal energy storage?
Phase change temperature between 20 °C-36 °C and latent heat between 76-103 J/g. Crosslinked PCM can be reduced into powder thanks to specific physical properties. PCMs show excellent long-term stability through 500 cycles. In this study polyurethanes (PU) are considered as solid-solid phase change material(s-s PCM) for thermal energy storage.

What are polyurethane polymers?
Polyurethane polymers (PUs) have been synthesized as solid-solid phase change materials for thermal energy storageusing three different kinds of diisocyanate molecules and polyethylene glycols (PEGs) at three different molecular weights.

Can polyurethane be used in thermal energy storage systems?
The produced PUs with a solid-solid phase transitions have potential to be used in thermal energy storage systems. Content may be subject to copyright. ... This method is widely used by previous works,such as polyurethane (PU) .

What is hyperbranched polyurethane solid-solid phase change material (hbpupcm)?
Hyperbranched polyurethane solid-solid phase change material (HBPUPCM) was synthesized through reaction of isocyanate terminated prepolymer(A 2) with trimethylolpropane (B 3). Fourier transform infrared spectroscopy and 1 H nuclear magnetic resonance were used to confirm the prepared HBPUPCM.

What are the different types of polyurethane phase change material?
According to dimensional shapes, polyurethane solid-solid phase change material is usually divided into three types: linear PUPCM , cross-linking PUPCM and hyperbranched PUPCM (HBPUPCM) . Using 1,4-butane diol as chain extender, Meng et al. prepared linear PUPCM with phase change enthalpy about 100 J/g .

Are flexible polymeric solid-solid phase change materials suitable for flexible/wearable devices?
Flexible polymeric solid-solid phase change materials (PCMs) have garnered continuous attention owing to their potential for thermal managementin flexible/wearable devices and their non-leakage characteristics. However,it is still a big challenge to obtain polymeric solid-solid PCMs with both flexibility and high latent heat.

The interaction between PCMs materials and porous carbon was also investigated using carbon aerogels as supporting materials for octadecanol PCMs, which show distinct ...

DOI: 10.1016/J RPOLYMJ.2006.07.020 Corpus ID: 93095038; Hyperbranched polyurethane as novel solid-solid phase change material for thermal energy storage ...

Polyurethanes as solid-solid phase change materials for thermal energy storage

Thermal energy, as a critical form of energy supply in human production and life, has been underutilized due to its temporal and spatial mismatches in its availability and ...

Polyurethanes as solid-solid phase change materials for thermal energy storage Author ALKAN, Cemil 1 2 ; GÜNTHER, Eva 1 ; HIEBLER, Stefan 1 ; ENSARI, Omer F 2 ; KAHRAMAN, Derya ...

Polyurethane polymers (PUs) have been synthesized as solid-solid phase change materials for thermal energy storage using three different kinds of diisocyanate molecules and polyethylene glycols...

Phase change materials (PCMs) have attracted tremendous attention in the field of thermal energy storage owing to the large energy storage density when going through the ...

Hence, Alkan et al. [15] synthesized a series of polyurethanes for thermal energy storage applications showing solid-solid phase transition by using three different kinds of ...

High-performance thermal energy storage materials lie at the core of the thermal energy storage technology. Among available materials, phase change materials (PCMs) [17], ...

Phase change materials (PCMs) are a class of promising materials for actively cooling asphalt pavements, due to their capacity for absorbing large amounts of thermal ...

At present, the shortage of energy resources has become a universal problem. Regarded as the most effective way of utilizing traditional energy [1,2,3,4,5,6], the thermal ...

A novel solid-solid phase change heat storage material with polyurethane block copolymer structure. Energy Convers. Manag., 47 (2006) ... (PEG) based hyperbranched ...

Hyperbranched polyurethane solid-solid phase change material (HBPUPCM) was synthesized through reaction of isocyanate terminated prepolymer (A 2) with ...

DOI: 10.1016/J.SOLMAT.2014.07.036 Corpus ID: 97370372; Linear polyurethane ionomers as solid-solid phase change materials for thermal energy storage @article{Kai2014LinearPI, ...

In this study polyurethanes (PU) are considered as solid-solid phase change material (s-s PCM) for thermal energy storage. ... Review on solid-solid phase change ...

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Polyurethanes as solid-solid phase change materials for thermal energy storage

Thermal energy storage material has become a focus of study because of the environment deterioration and fossil energy depletion. Phase change material (PCM) is ...

Flexible polymeric solid-solid phase change materials (PCMs) have garnered continuous attention owing to their potential for thermal management in flexible/wearable ...

Novel crosslinking bio polyurethane based polymeric solid-solid phase change materials (SSPCM) were synthesized using castor oil (CO) based hyperbranched polyols as ...

A series of polyurethane phase change materials (PUPCMs) with different structures were successfully synthesized using polyethylene glycol (PEG), polycarbonate (PCDL), or polytetramethylene...

Phase Change Materials (PCMs) have been receiving considerable attention for various thermal energy storage applications. PCMs provide much higher thermal energy ...

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