

Energy storage stiffness

Do elastic strain energy storage patterns influence the stiffness variation of SVS metamaterials?

The change of the elastic strain energy storage patterns further influences the stiffness variation of the SVS metamaterials. However, challenges still arise because typically fabricated SVS metamaterials inevitably contain structural irregularities, eccentricities, and defects.

Are structural composite energy storage devices useful?

Application prospects and novel structures of SCESDs proposed. Structural composite energy storage devices (SCESDs) which enable both structural mechanical load bearing (sufficient stiffness and strength) and electrochemical energy storage (adequate capacity) have been developing rapidly in the past two decades.

Does strain rate affect energy storage capacity?

Literature shows that the elastic limit will increase slightly at higher strain rates, while the elastic modulus is normally insensitive to the strain rate [28,29]. As such, a slight reduction of energy storage capacity is expected under lower strain rates.

What is self-contact variable stiffness metamaterial?

Abstract Self-contact variable stiffness (SVS) metamaterial offers specific patterns of elastic strain energy storage by changing its force-transferring path. The change of the elastic strain energy...

What are structural composite energy storage devices (SCESDs)?

Structural composite energy storage devices (SCESDs), that are able to simultaneously provide high mechanical stiffness/strength and enough energy storage capacity, are attractive for many structural and energy requirements of not only electric vehicles but also building materials and beyond.

Can SVS metamaterials achieve expected stiffness variations?

These microstructural imperfections impede the stable generation of designed strain energy storage patterns in the metamaterial, implying that the SVS metamaterials cannot achieve expected stiffness variations.

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