

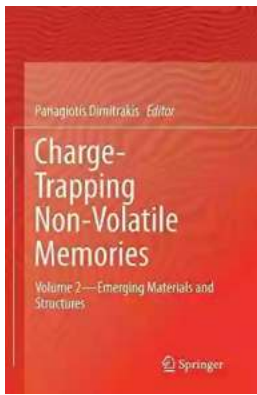
Exploring the Exciting World of Volume Emerging Materials and Structures



When it comes to design and construction, the world is constantly evolving. New materials and structures are pushing the boundaries of what is possible in architecture and engineering. One fascinating trend that has emerged in recent years is the use of volume emerging materials and structures.

The Rise of Volume Emerging Materials

Volume emerging materials refer to a group of materials that have the ability to change or adapt their shape, volume, or other properties in response to external stimuli. These stimuli can be physical forces, temperature changes, or even chemical reactions. The concept behind volume emerging materials is to create structures that can self-adjust and optimize their performance based on environmental conditions.



Charge-Trapping Non-Volatile Memories: Volume 2--Emerging Materials and Structures

by Panagiotis Dimitrakis(1st ed. 2017 Edition, Kindle Edition)

★★★★★ 5 out of 5

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Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 216 pages

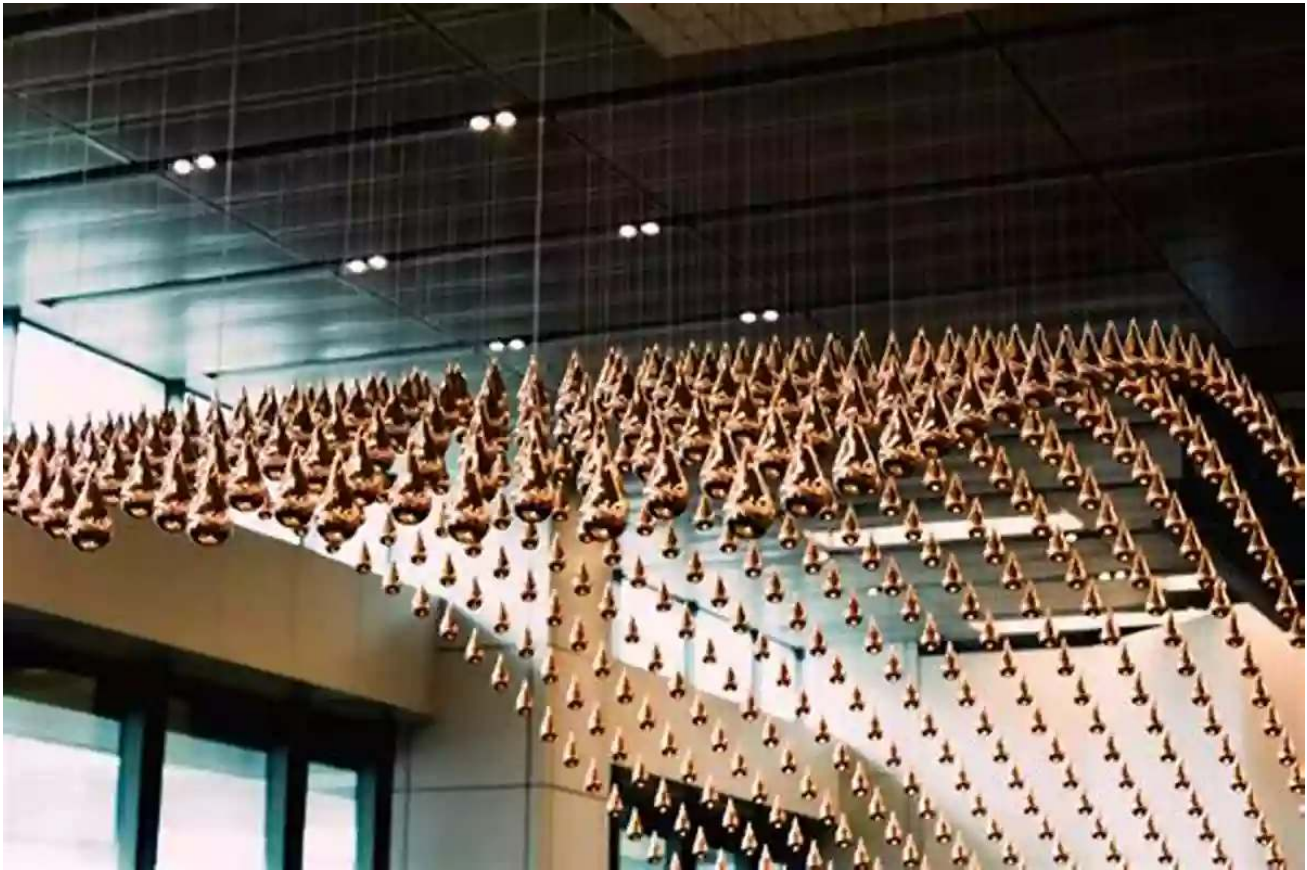


One example of a volume emerging material is shape-memory alloys. These alloys can "remember" their original shape and return to it after being deformed. This property makes them ideal for applications such as actuators in buildings that can adapt to changes in temperature or structural loads. Another example is smart concrete, which contains embedded sensors that can detect cracks and self-heal using bacteria or other mechanisms.

Revolutionary Structures

Volume emerging materials enable the creation of structures that were once only imaginable in science fiction. Architects and engineers are now able to design buildings and bridges that can transform their shape, appearance, or functionality.

Take, for example, the Kinetic Rain sculpture at Singapore's Changi Airport. This mesmerizing installation consists of 1,216 individual raindrop-shaped aluminum droplets suspended from thin wires. Through a carefully orchestrated dance, the droplets move together to form various shapes and patterns, creating an ever-changing spectacle for travelers passing through the airport.



Another notable example is the Dynamic Tower in Dubai. This visionary skyscraper, designed by architect David Fisher, features floors that can rotate individually, giving the building a constantly changing appearance. Not only does this design enhance aesthetics, but it also offers practical benefits such as self-shading and generating electricity through wind turbines installed between floors.

Applications in Various Industries

The potential applications of volume emerging materials and structures extend beyond architecture. These innovative solutions are finding their way into industries such as aerospace, automotive, and healthcare, among others.

In the aerospace industry, for instance, researchers are exploring the use of shape-shifting materials to improve aerodynamic efficiency. By adapting their

shape during flight, aircraft wings could optimize performance at varying speeds and altitudes, reducing fuel consumption and emissions.

In the automotive sector, volume emerging materials are being considered for use in self-repairing car bodies. Imagine a vehicle that can automatically fix scratches or dents, reducing the need for costly repairs and improving its lifespan.

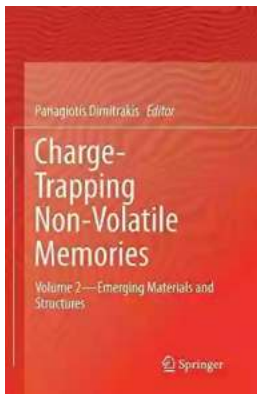
Even in healthcare, volume emerging materials are making an impact. Researchers are developing smart implants that can adapt to the body's changes, enhancing patient comfort and reducing the need for additional surgeries.

Challenges and Future Outlook

While volume emerging materials and structures hold tremendous potential, there are still challenges that need to be overcome. Developing these materials at a large scale and ensuring their durability and reliability over time remain crucial tasks for researchers and engineers.

However, as advancements in materials science and technology continue, we can look forward to a future where volume emerging materials and structures become commonplace. These remarkable innovations promise to revolutionize various industries, offering buildings that respond to their surroundings, transportation systems that adapt to different conditions, and healthcare solutions that better serve patients.

So, next time you come across a building that seems to change its shape, or hear about a breakthrough material that can heal itself, remember that you are witnessing the exciting world of volume emerging materials and structures unfolding before your eyes.



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This book describes the technology of charge-trapping non-volatile memories and their uses. The authors explain the device physics of each device architecture and provide a concrete description of the materials involved and the fundamental properties of the technology. Modern material properties, used as charge-trapping layers, for new applications are introduced.

- Provides a comprehensive overview of the technology for charge-trapping non-volatile memories;
- Details new architectures and current modeling concepts for non-volatile memory devices;
- Focuses on conduction through multi-layer gate dielectrics stacks.



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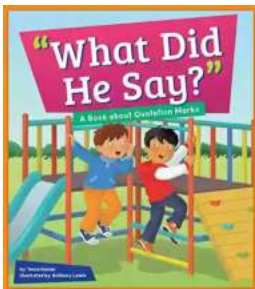
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