

Advances in Shape Memory Polymers: Applications in Textiles (Woodhead Publishing in Textiles 146)

Shape memory polymers (SMPs) are a class of smart materials that have the ability to remember their original shape and return to it after being deformed or heated. This unique property makes SMPs ideal for a wide range of applications, including textiles. In recent years, there has been a growing interest in the use of SMPs in textiles, as they offer the potential to create new and innovative materials with unique properties.

This book provides a comprehensive overview of the advances in shape memory polymers (SMPs) and their applications in textiles. It covers the fundamentals of SMPs, including their synthesis, characterization, and properties. It also discusses the various methods used to incorporate SMPs into textiles, and the resulting properties and applications of these materials.



Advances in Shape Memory Polymers (Woodhead Publishing Series in Textiles Book 146) by Angela J Dawson

★★★★☆ 4.5 out of 5

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Text-to-Speech : Enabled
Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 366 pages

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Fundamentals of Shape Memory Polymers

SMPs are typically made from a blend of two or more polymers, one of which is a hard, glassy polymer and the other is a soft, rubbery polymer. The hard polymer provides the SMP with its shape memory, while the soft polymer gives it its flexibility. When the SMP is heated above its glass transition temperature (T_g), the hard polymer becomes soft and the SMP becomes deformable. When the SMP is cooled below its T_g , the hard polymer becomes hard again and the SMP recovers its original shape.

The T_g of an SMP can be controlled by the composition of the polymer blend. By varying the ratio of hard to soft polymer, the T_g of the SMP can be adjusted to meet the desired application. For example, an SMP with a low T_g can be used for applications that require a low activation temperature, while an SMP with a high T_g can be used for applications that require a high activation temperature.

Applications of Shape Memory Polymers in Textiles

SMPs have a wide range of potential applications in textiles, including:

- **Shape-changing garments:** SMPs can be used to create garments that can change shape in response to changes in temperature or other stimuli. This could be used to create garments that can adapt to different body shapes or to create garments that can change color or pattern.
- **Medical textiles:** SMPs can be used to create medical textiles that can provide support or compression to different parts of the body. This could be used to create bandages, braces, and other medical devices that can be tailored to the individual patient.

- **Industrial textiles:** SMPs can be used to create industrial textiles that can sense and respond to changes in their environment. This could be used to create textiles that can be used for protective clothing, sensors, and other industrial applications.

SMPs are a promising new class of materials with a wide range of potential applications in textiles. By understanding the fundamentals of SMPs and their properties, researchers and engineers can develop new and innovative materials that can meet the needs of a variety of applications.

References

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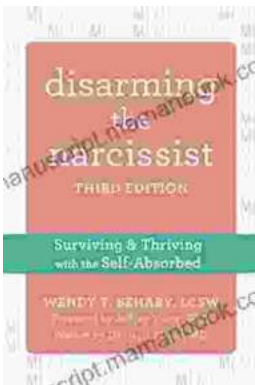
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