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Nota di contenuto	Self-Healing Composites: Shape Memory Polymer Based Structures; Contents; Preface; 1 Introduction; 1.1 Thermosetting Polymers; 1.2 Thermosetting Polymer Composites in Structure Applications; 1.3 Damage in Fiber Reinforced Thermosetting Polymer Composite Structures; 1.3.1 Damage in Laminated Composites; 1.3.2 Damage in Sandwich Composites; 1.3.3 Damage in 3-D Woven Fabric Reinforced Composites; 1.3.4 Damage in Grid Stiffened Composites; 1.4 Repair of Damage in Thermosetting Polymer Composite Structures; 1.5 Classification of Self-Healing Schemes; 1.6 Organization of This Book; References 2 Self-Healing in Biological Systems2.1 Self-Healing in Plants; 2.2 Seal-Healing in Animals; 2.2.1 Self-Healing by Self-Medicine; 2.2.2 Self-Healing Lizard; 2.2.3 Self-Healing Starfish; 2.2.4 Self-Healing of Sea Cucumbers; 2.2.5 Self-Healing of Earthworms; 2.2.6 Self-Healing of Salamanders; 2.3 Self-Healing in Human Beings; 2.3.1 Psychological Self-Healing; 2.3.2 Physiological Self-Healing; 2.4 Summary; 2.5 Implications from Nature; References; 3 Thermoset Shape Memory Polymer and Its Syntactic Foam; 3.1 Characterization of Thermosetting SMP and SMP Based Syntactic Foam

3.1.1 SMP Based Syntactic Foam; 3.1.2 Raw Materials and Syntactic Foam Preparation; 3.1.3 DMA Testing; 3.1.4 Fourier Transform Infrared (FTIR) Spectroscopy Analysis; 3.1.5 X-Ray Photoelectron Spectroscopy; 3.1.6 Coefficient of Thermal Expansion Measurement; 3.1.7 Isothermal Stress-Strain Behavior; 3.1.8 Summary; 3.2 Programming of Thermosetting SMPs; 3.2.1 Classical Programming Methods; 3.2.2 Programming at Temperatures Below  $T_g$  - Cold Programming; 3.3 Thermomechanical Behavior of Thermosetting SMP and SMP Based Syntactic Foam Programmed Using the Classical Method; 3.3.1 One-Dimensional Stress-Controlled Compression Programming and Shape Recovery; 3.3.2 Programming Using the 2-D Stress Condition and Free Shape Recovery; 3.3.3 Programming Using the 3-D Stress Condition and Constrained Shape Recovery; 3.4 Thermomechanical Behavior of Thermosetting SMP and SMP Based Syntactic Foam Programmed by Cold Compression; 3.4.1 Cold-Compression Programming of Thermosetting SMP; 3.4.2 Cold-Compression Programming of Thermosetting SMP Based Syntactic Foam; 3.5 Behavior of Thermoset Shape Memory Polymer Based Syntactic Foam Trained by Hybrid Two-Stage Programming; 3.5.1 Hybrid Two-Stage Programming; 3.5.2 Free Shape Recovery Test; 3.5.3 Thermomechanical Behavior; 3.5.4 Recovery Sequence and Weak Triple Shape; 3.5.5 Summary; 3.6 Functional Durability of SMP Based Syntactic Foam; 3.6.1 Programming the SMP Based Syntactic Foam; 3.6.2 Environmental Conditioning; 3.6.3 Stress Recovery Test; 3.6.4 Summary; References; 4 Constitutive Modeling of Amorphous Thermosetting Shape Memory Polymer and Shape Memory Polymer Based Syntactic Foam; 4.1 Some Fundamental Relations in the Kinematics of Continuum Mechanics; 4.1.1 Deformation Gradient; 4.1.2 Relation Between Deformation Gradient and Displacement Gradient

Sommario/riassunto

"We hope this book will provide some background information for readers who are interested in using SMPs for self-healing"--