

Preface

Experimental Mechanics of Composite, Hybrid, and Multifunctional Materials, Volume 6: Proceedings of the 2013 Annual Conference on Experimental and Applied Mechanics represents one of eight volumes of technical papers presented at the SEM 2013 Annual Conference & Exposition on Experimental and Applied Mechanics organized by the Society for Experimental Mechanics and held in Lombard, IL, June 3–5, 2013. The complete Proceedings also includes volumes on: *Dynamic Behavior of Materials; Challenges in Mechanics of Time-Dependent Materials and Processes in Conventional and Multifunctional Materials; Advancement of Optical Methods in Experimental Mechanics; Mechanics of Biological Systems and Materials; MEMS and Nanotechnology; Fracture and Fatigue; Residual Stress, Thermomechanics & Infrared Imaging, Hybrid Techniques and Inverse Problems.*

Each collection presents early findings from experimental and computational investigations on an important area within Experimental Mechanics, Composite, Hybrid, and Multifunctional Materials being one of these areas.

Composites are increasingly the material of choice for a wide range of applications from sporting equipment to aerospace vehicles. This increase has been fueled by increases in material options, greater understanding of material behaviors, novel design solutions, and improved manufacturing techniques. The broad range of uses and challenges requires a multidisciplinary approach between mechanical, chemical, and physical researchers to continue the rapid rate of advancement.

New materials are being developed from natural sources or from biological inspiration leading to composites with unique properties and more sustainable sources, and testing needs to be performed to characterize their properties. Existing materials used in critical applications and on nanometer scales require deeper understanding of their behaviors and failure mechanisms. New test methods and technologies must be developed in order to perform these studies and to evaluate parts during manufacture and use. In addition, the unique properties of composites present many challenges in joining them with other materials while performing multiple functions.

This volume on the Experimental Mechanics of Composite, Hybrid, and Multifunctional Materials presents new research on the wide-ranging topics connected by the composites thread. Topics include: Failure Behavior of Polymer Matrix Composites, Microvascular and Natural Composites, Nanocomposites for Multifunctional Performance, Composite/Hybrid Characterization Using Digital Image Correlation, Joints/Bonded Composites, Non-Destructive Testing of Composites, Characterization of Energy Storage Materials, and Composite Test Methods.

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