



Process Modeling in Composites Manufacturing, Second Edition

By Suresh G. Advani, E. Murat Sozer

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There is a wealth of literature on modeling and simulation of polymer composite manufacturing processes. However, existing books neglect to provide a systematic explanation of how to formulate and apply science-based models in polymer composite manufacturing processes. **Process Modeling in Composites Manufacturing, Second Edition** provides tangible methods to optimize this process ? and it remains a proven, powerful introduction to the basic principles of fluid mechanics and heat transfer.

Includes tools to develop an experience base to aid in modeling a composite manufacturing process

Building on past developments, this new book updates the previous edition's coverage of process physics and the state of modeling in the field. Exploring research derived from experience, intuition, and trial and error, the authors illustrate a state-of-the-art understanding of mass, momentum, and energy transfer during composites processing. They introduce computer-based solutions using MATLAB® code and flow simulation-based analysis, which complement closed-form solutions discussed in the book, to help readers understand the role of different material, geometric, and process parameters.

This self-contained primer provides an introduction to modeling of composite manufacturing processes for anyone working in material science and engineering, industrial, mechanical, and chemical engineering. It introduces a scientific basis for manufacturing, using solved example problems which employ calculations provided in the book. End-of-chapter questions and problems and fill in the blanks sections reinforce the content in order to develop the experience base of the manufacturing, materials, and design engineer or scientists, as well as seniors and first-year graduate students.

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Editorial Review

About the Author

Murat Sozer is Associate Professor of the Mechanical Engineering Department, Koc University, Istanbul, Turkey. His research interests are in manufacturing of composite materials and fluid dynamics. He and his co-authors S. Bickerton and S. G. Advani received The Outstanding Technical Paper Award by the Composites Manufacturing Association (CMA) of the Society of Manufacturing Engineers (SME) in recognition of outstanding contribution to the composites manufacturing body of knowledge for the technical paper at the Composites Manufacturing and Tooling 2000 Conference, Newport Beach, California, February 23-25, 2000. Before joining Koc University in 2000, he worked as a post-doctoral researcher at the Center for Composite Materials, University of Delaware between 1997 and 2000, and as a technical editor for Prentice-Hall Publishers between 1996 and 1997.

Suresh G. Advani is the George W. Laird Professor of Mechanical Engineering and Associate Director of Center for Composite Materials at the University of Delaware. He received his Bachelor of Technology Degree in Mechanical Engineering from I.I.T. Bombay in 1982 and his Ph. D in Mechanical Engineering from University of Illinois at Urbana-Champaign in 1987. His research interests are in rheology; fluid mechanics and heat transfer as applied to composite processing and alternate energy sources such as fuel cells and hydrogen storage. Advani is a Fellow of American Society of Mechanical Engineers and is the North American Editor for the journal Composites A: Applied Science and Manufacturing. Professor Advani serves also on the Scientific Advisory Committee of Computer Methods in Engineering Science and International Conference on Flow Processes in Composites Manufacturing. He is a author or co-author of over 200 archival journal papers.

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