



Laser Material Processing

By William M. Steen, Jyotirmoy Mazumder

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This text moves from the basics of laser physics to detailed treatments of all major materials processing techniques for which lasers are now essential. New chapters cover laser physics, drilling, micro- and nanomanufacturing and biomedical laser processing.

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Editorial Review

Review

From the reviews of the third edition:

"Written in a style that includes both technical detail and humor, Bill Steen's book on laser material processing is the standard by which others are judged. It is the text in my graduate-level course on the subject." C.E. Albright, The Ohio State University "I have used two previous editions for my class. The third edition has included some of the more recent applications. It is easy to read and explanations are lucid. I expect it will receive wide acceptance in class rooms world wide." J. Mazumder, University of Michigan "It is the great merit of this book to offer a compact survey on laser material processing. A useful and fascinating book, pleasant to read with many useful figures and examples of industrial applications. It is a textbook for advanced students in this field, but also a reference book for engineers." H. Weber, Technische Universität Berlin "A clear and instructive textbook for students who will become the next generation of laser specialists, and it is a good source of updated knowledge for practicing engineers and technicians in optoelectronics, laser processing, materials treatment, and advanced manufacturing. The book also will be helpful as a reference source. The chapters are largely independent of one another, and a reader interested in only one topic may be satisfied by reading all of parts of the relevant chapter without going to other chapters. Well written, with many useful diagrams and examples of industrial applications, Steen's book is a good guide in the field.."The Industrial Physicist

"Material processing is one of the most important applications of lasers. ... Laser Material Processing gives a compact survey and can be used as university or industrial course material The book will guide the reader smoothly from the basics of laser physics to the detailed treatment of all major material processing techniques for which lasers are essential. ... I can recommend this book as an authoritative source of information on the rapidly expanding use of industrial lasers in material processing." (Roland Baur, Optik, Vol. 117, 2006)

From the Back Cover

Lasers play a major part in the processing of the disparate materials used in engineering and manufacturing. The range of procedures in which they are involved is ever increasing. The informal style of *Laser Material Processing* (4th Edition) will guide you smoothly from the basics of laser physics to the detailed treatment of all the major materials processing techniques for which lasers are now essential.

- Helps you to understand how the laser works and to decide which laser is best for your purposes.
- New chapters on laser physics, drilling, micro- and nanomanufacturing and biomedical laser processing reflect the changes in the field since the last edition, updating and completing the range of practical knowledge about the processes possible with lasers already familiar to established users of this well-known text.
- Provides a firm grounding in the safety aspects of laser use.
- Now with end-of-chapter exercises to help students assimilate information as they learn.

- The authors' lively presentation is supported by a number of original cartoons by Patrick Wright and Noel Ford which will bring a smile to your face and ease the learning process.

Laser Material Processing (4th Edition) will be of use as university or industrial course material for senior undergraduate, graduate and non-degree technical training in optoelectronics, laser processing and advanced manufacturing. Practising engineers and technicians in these areas will also find the book an authoritative source of information on the ever- expanding use of industrial lasers in material processing.

Praise for the third edition:

"It is the great merit of this book to offer a compact survey on laser material processing. A useful and fascinating book, pleasant to read with many useful figures and examples of industrial applications. It is a textbook for advanced students in this field, but also a reference book for engineers."

H. Weber, Technische Universität Berlin

"Laser Material Processing is a clear and instructive textbook for students who will become the next generation of laser specialists, and it is a good source of updated knowledge for practicing engineers and technicians in optoelectronics, laser processing, materials treatment, and advanced manufacturing. The book also will be helpful as a reference source. The chapters are largely independent of one another, and a reader interested in only one topic may be satisfied by reading all of parts of the relevant chapter without going to other chapters. Well written, with many useful diagrams and examples of industrial applications, Steen's book is a good guide in the field."

The Industrial Physicist

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Optik

About the Author

Professor William Steen was, until his retirement in 2000, the Chair of Mechanical Engineering at the University of Liverpool.

He started one of the first University-based research schools in laser material processing in the world at Imperial College, London in 1968. Since then he and his group have played a leading role in developing many of the processes discussed in this book, processes that are making the laser a manufacturing tool of great importance.

Professor Steen is one of the founder members of the Association of Industrial Laser users (AILU) of which he was the first President. He was also a Director of the Laser Institute of America.

Jyoti Mazumder is the Robert H. Lurie Professor of Mechanical Engineering, a Professor of Materials Science and Engineering, the Director of the Center for Laser-Aided Intelligent Manufacturing, and the Director for the NSF I/UCRC for Lasers and Plasmas for Advanced Manufacturing at the University of Michigan. He was an early student of Professor Steen's and obtained his PhD at Imperial College in 1978.

Professor Mazumder's research interests include: transforming the field of materials processing by laser from a technological art to scientifically based-engineering; laser aided manufacturing; atom to application; technical approach including on-line optical diagnostics, transport phenomena modeling, non-equilibrium synthesis of materials with tailored properties, and their evaluation and characterization. He has used earlier editions of this book in his class teaching for many years. He was the author of *Laser Processing: Surface Treatment and Film Deposition*.

Professor Mazumder is a fellow and ex-President of the Laser Institute of America and the Editor-in-Chief of the *Journal of Laser Applications*. He has numerous awards and honours to his name. Jyoti Mazumder's research group operates on funding from TRW (automotive safety systems); Defense Advanced Research Project Agency; National Science Foundation; Office of Naval Research; GE-AEBG; Delphi-Packard; and Ford.

Professor Mazumder's authorial input will ensure that the content of the book continues to represent the most up-to-date knowledge in the field and keeps abreast of teaching trends in the subject.

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