



Laser Processing of Engineering Materials: Principles, Procedure and Industrial Application

By John Ion

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The complete guide to understanding and using lasers in material processing!

Lasers are now an integral part of modern society, providing extraordinary opportunities for innovation in an ever-widening range of material processing and manufacturing applications. The study of laser material processing is a core element of many materials and manufacturing courses at undergraduate and postgraduate level. As a consequence, there is now a vast amount of research on the theory and application of lasers to be absorbed by students, industrial researchers, practising engineers and production managers. Written by an acknowledged expert in the field with over twenty years' experience in laser processing, John Ion distils cutting-edge information and research into a single key text.

Essential for anyone studying or working with lasers, Laser Processing of Engineering Materials provides a clear explanation of the underlying principles, including physics, chemistry and materials science, along with a framework of available laser processes and their distinguishing features and variables. This book delivers the knowledge needed to understand and apply lasers to the processing of engineering materials, and is highly recommended as a valuable guide to this revolutionary manufacturing technology.

- The first single volume text that treats this core engineering subject in a systematic manner
- Covers the principles, practice and application of lasers in all contemporary industrial processes; packed with examples, materials data and analysis, and modelling techniques

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Editorial Review

Review

"This is a truly comprehensive text in its coverage of the many diverse ways in which lasers are now used in manufacture, in the depth with which each of these is explored and in the vision for the future with which it coincides. It is a volume of lasting value."

- M.F. Ashby, University of Cambridge, UK

"Well John Ion has gone and done it. "It" being the writing of an excellent book, "Laser Processing of Engineering Materials" Not to take away from Ion's work, but countless others, this reviewer included, have been approached to write a text on laser material processing that could be used by both undergraduate students and others interested in this the largest of commercial laser applications. And for the most part we have turned publishers down because of the sheer magnitude and difficulty of the task. To undertake it would require fantastic resources and unlimited time, factors that mitigated the undertaking by many of us.

But Ion persisted and the result is a nice piece of work that is both enlightening and useful. It took him more than 550 pages to do it but his volume is a first-class review of laser technology and the many material processing applications that this technology serves so admirably. I applaud Ion for a neat summary that serves as an introduction to laser material processing and an interesting history of the technology.

Chapters 3-17 follow the traditional outline used in other books on laser material processing except that Ion uses a more basic tutorial approach coupled with many practical examples and he ends each chapter with a very useful bibliography. And, finally, appendices include a needed glossary, designations for metal and alloys, properties of materials, analytical equations, and standards.

All in all John Ion has done a remarkable job of compiling useful information into a text that's both educational and instructional, plus it reads well. I strongly recommend this book to those who are contemplating a serious involvement with lasers for material processing. You don't have to be an undergraduate to get great value from this book."

- David Belforte, Industrial Laser Solutions July, 2005

"John Ion's book is a uniformly excellent treatise on the laser processing of materials. His deep knowledge of the subject has led to a text which is easy to follow and yet is a state of the art assessment which will be exploited by researchers...I am delighted that this book has been written. It is a work of scholarship which will undoubtedly serve us well for the decades to come."

- John Powell, The Industrial Laser User, September 2005

"John Ion has produced a very readable book which covers the whole subject of laser materials processing. There are chapters on everything from the history of laser processing to future opportunities and, of course,

plenty of coverage of cutting, welding and surface treatments...Judging from the size and scope of the book I expected it to carry a hefty price tag - so I was pleasantly surprised by its actual cost...if you are only going to have one laser processing book in your office this would be a good one to choose."

"The complete guide to understanding and using lasers in material processing...the book is catered to various audiences, including design, manufacturing and applications engineers in industries including electronics fabrication, aerospace, automotive, tool-and-die, biomedical devices, marking and materials joining."

- Metal Forming Magazine

"This is a powerful book that every scientist, engineer, manager, and technician working in this field should possess. The book is easy to read, and the theoretical sections are separate from the more general discussions, so the reader can pick which sections to focus on. This reviewer was impressed with the conciseness of the writing and the wealth of information, all contained in a book of this length. Bravo!"

- Wayne Reitz, Reitz Consulting, The Minerals, Metals and Materials Society's JOM Book Review

"John Ion has done an excellent job in covering the exciting field of laser processing of engineering materials in this book. It will serve as an excellent undergraduate textbook as well as a very useful reference handbook for the practicing engineer...the book has a wealth of information and is an indispensable handy reference volume." - Sudhi Sant, MRS Bulletin, Dec 2005

"Laser technology is now part of any industrial environment where precision, quality and speed are required. This book would be an excellent companion for those who intend to or are working in such an environment"

- Mohammad Jahazi, Canadian Aeronautics and Space Journal

From the Back Cover

"This is a truly comprehensive text in its coverage of the many diverse ways in which lasers are now used in manufacture, in the depth with which each of these is explored and in the vision for the future with which it coincides. It is a volume of lasting value." M.F. Ashby, University of Cambridge, UK

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* The first systematic, single volume laser processing reference for students and engineers

* Covers the principles, practice and application of lasers in all contemporary industrial processes

* Packed with examples, material data and analysis, modelling techniques, plus end of chapter questions and exercises

Essential for anyone studying or working with lasers, *Laser Processing of Engineering Materials* provides a clear explanation of the underlying principles, including physics, chemistry and materials science, along with a framework of available laser processes and their distinguishing features and variables. This book delivers the knowledge needed to understand and apply lasers to the processing of engineering materials, and is

highly recommended as a valuable guide to this revolutionary manufacturing technology.

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