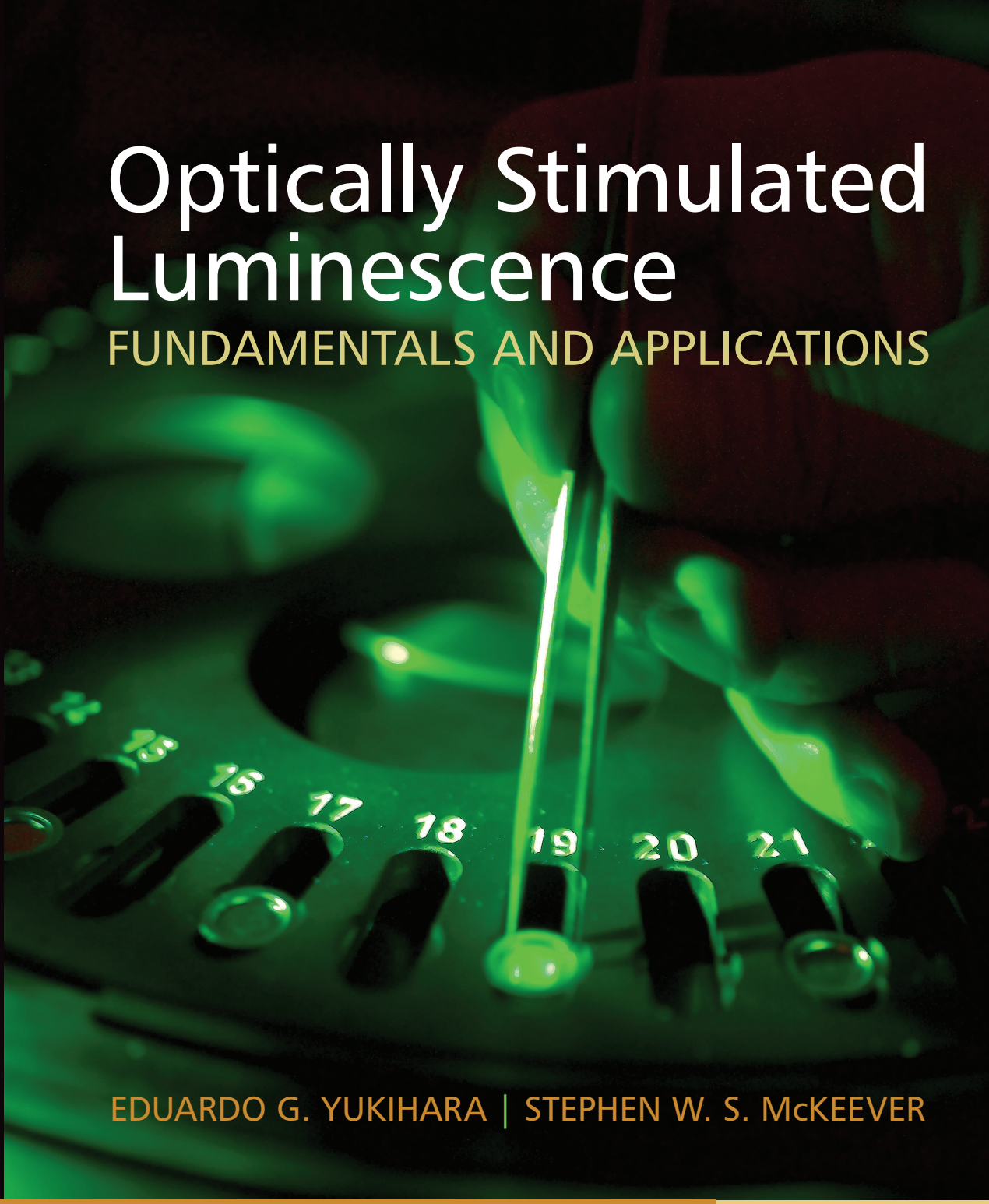
Optically Stimulated Luminescence

FUNDAMENTALS AND APPLICATIONS



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WILEY

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Fundamentals and Applications

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To Stefanie, my music, my silence

To Joan and our wonderful daughters, Katie and Alison.

Contents

Preface

This book was born from our combined years exploring the use of optically stimulated luminescence (OSL) in different areas of radiation dosimetry with a seemingly unending curiosity about the physics of the process and our aspirations and dreams concerning potential applications. We wished to learn about and understand the challenges presented by the many different areas of dosimetry and how OSL could play a useful role and, of course, we hoped that we would make meaningful contributions to the field. The book is an attempt to share our collective experience and organize the available information concerning the different areas of application of the OSL technique. We made a conscious effort to place the material in context and make it useful for a wide audience. In each chapter we have tried to set the stage for more meaningful discussions of the OSL technique by providing background information (though by no means exhaustive) and relevant key references. On some occasions new illustrations or graphs were created to better illustrate the ideas and explanations.

We recognize that to some readers the background information in each chapter may appear over-simplified, especially for specialists in the respective fields. This brings us to the discussion of the intended audience of this book. We tried to make the book both relevant and accessible: relevant for the specialist by providing topical information, and accessible to those without expertise in these particular areas by including important fundamental aspects. We often thought of our audience as students or postdoctoral fellows that have just joined a research laboratory, not necessarily having worked in these areas beforehand. What would we like them to know before they engage in their research activities? It is obvious that one text cannot provide all answers and details, but we hope our book gives readers a general overview of the current problems and an initial reference point before they submerge themselves in the more specialized literature.

Acknowledgments

Our gratitude first goes to Safa Kasap, who first mentioned the notion of the book to one of us while we were attending an international conference together. The task of writing a book is not to be taken lightly, involving as it does many unsociable and apparently endless hours of hard work. Safa's kind persistence paid off, however, and there is no doubt that without it the book would never have been started.

We are extremely grateful for the time and attention dedicated by several people in reading the manuscript and for their critical and insightful comments. Gabriel Sawakuchi's expertise in medical and space dosimetry, as well as his unselfish dedication, was extremely helpful and resulted in several revisions to the manuscript, improving it immeasurably. We also received very useful comments and suggestions from Gregoire Denis, Oliver Hanson, Emico Okuno and Matthew Rodriguez.

We also thank colleagues and collaborators who contributed with discussion, data, figures and pre-prints, including: Claus Andersen, Eric Benton, Enver Bulur, Ramona Gaza, Razvan Gaza, Carla da Costa Guimarães, Regina DeWitt, H. Y. Göksu, Elizabeth Inrig, David Klein, Gladys Klemic, Matthew Rodriguez, Gabriel Sawakuchi, Kristina Thomsen and Clemens Woda.

Finally, we thank our collaborators who, throughout our careers, have provided wisdom, direction, support and encouragement. They opened opportunities for collaboration in so many different areas, on so many different problems. It has been a pleasure and a delight to work with such clever and capable people. They are too many to mention without risk of leaving someone out by mistake. They know who they are and so we hope they accept this general acknowledgment as an expression of our gratitude.

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