

GLASSES FOR PHOTONICS

This book is an introduction to recent progress in the development and application of glass with special photonics properties. Glass has a number of structural and practical advantages over crystalline materials, including excellent homogeneity, variety of form and size, and the potential for doping with a variety of dopant materials. Glasses with photonic properties have great potential and are expected to play a significant role in the next generation of multimedia systems.

Fundamentals of glass materials are explained in the first chapter and the book then proceeds to a discussion of gradient index glass, laser glasses, non-linear optical glasses and magneto-optical glasses. Beginning with the basic theory, the book discusses actual problems, the performance and applications of glasses. The authors include much useful background material describing developments over the past 20 years in this rapidly moving field.

The book will be of value to graduate students, researchers and professional engineers working in materials science, chemistry and physics with an interest in photonics and glass with special properties.

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Preface

Glass can be doped with rare earth ions, high refractive index ions and micro-crystallites which give it great potential as a photonic medium. The practical advances of these types of glass are expected to have significant roles in multimedia systems in the next generation.

This book is thus an introduction to the theory and recent progress in the technology of glass with special photonic properties, for graduate students, practising engineers and scientists, who wish to supplement their theoretical and practical knowledge of this field with the material science aspects. Hence, this book is intended to be comprehensive enough for an introductory course and be easily readable by practising engineers who are interested in and desire an overview of this field.

Although this book is designed with the purpose of providing a fundamental review of materials with special optical properties, another goal is to provide practical and useful information about developments over the last 10 years in this rapidly changing field. It is impossible, however, to describe all the innovations which have been developed over the last 10 years and omissions are inevitable in a compilation of the size of this book. References to work with respect to the range of glasses examined in this book are given as references to the tables in each chapter. Readers interested in specific data will be able to refer to the original literature. Even so, there remains the possibility of serious omission, for which we beg, in advance, the reader's pardon.

M. Yamane and Y. Asahara