Fiber Fabrication, Optical Fiber Communication, Vol 1.

Edited by Tingye Li

(1985, Academic Press)

This book is the first volume in a series named "Optical Fiber Communication," which treats the science, technology, and applications of information transmission via optical fibers. The contents concentrate on the latest advances in this field. The topics in this first volume, *Fiber Fabrication*, cover materials and processes for the fabrication of optical fibers. Modified chemical vapor deposition (MCVD), outside vapor deposition (OVD), and vapor phase axial deposition (VAD) processes are described.

The authors of Chapter 1, on MCVD, are specialists with AT&T Bell Laboratories. The MCVD process is outlined first, then the chemistry and the deposition mechanism are described. The technique for reduction of OH absorption, is a key for obtaining low-loss fibers, and the techniques for high-rate deposition are also mentioned. The performance of fibers fabricated by MCVD are also discussed. Loss spectra and bandwidth data for multimode fibers and dispersion of single mode fibers are given. Dispersion-shifted single mode fibers, which will be used in future wide-band telecommunications systems with 1.5m wavelength, are also discussed.

The OVD process is described in Chapter 2 by the authors from Corning Glass Works. Its evolution and details of the processing steps are described first; then the performance of fibers fabricated with this technique, such as loss, refractive index profile, bandwidth, are presented. Compared to MCVD, OVC is more complicated, but the authors report that OVD is more flexible and economical.

The VAD method is described in Chapter 3 by specialists from NTT Ibaraki ECL, where the process was developed. VAD features continuous fabrication of fiber preforms. Since long, large-diameter preforms can be prepared by VAD, a significant reduction in fiber production is potentially expected. Following an outline, the preform fabrication process, glass particle formation process, and the technique for consolidation into a transparent preform are described. The dehydration process, essential for producing a low loss fiber, is discussed in detail. The properties of multimode fibers with graded index core, and the fabrication and characterization of single-mode fibers are also mentioned. High-speed deposition and fabrication of polarization maintaining fibers, a new field in VAD, is briefly discussed.

In the methods described in Chapters 1-3, preforms typically 10-25 mm in diameter and 60-100 cm long are first fabricated. A drawing technique is thus required to obtain the fiber. The drawing mechanism is described in Chapter 4, as well as coating process that is closely related to the mechanical strength of the fiber.

Chapter 5 describes the present fiber manufacturing at AT&T Technologies, at Corning Glass Works, and in Japan.

This book details three major processes for fiber fabrication. All are for silica fibers, which are most useful in present and near future applications. Other optical fibers, such as multicomponent glass fibers, infrared fibers and plastic fibers, are scarcely described in this volume. Descriptions on polarization maintaining fibers are sketchy. However, this book is quite useful as a reference of technology. Many references are included. This book is recommended to those who want to learn the fabrication principles and the performance parameters of silica fibers.

Reviewer: Kazuo Hotate is a lecturer at the Institute of Interdisciplinary Research, Faculty of Engineering, University of Tokyo. He is working on optical fiber characterization and its application to sensors.

Internal Friction and Ultrasonic Attenuation in Solids

Edited by G. Fantozzi and A. Vincent *(1983, Les Editions de Physique)*

This volume contains the proceedings of the Fourth European Conference on Internal Friction and Ultrasonic Attenuation in Solids held in July 1983 in Villeurbanne, France. Of the 121 articles, two thirds are in English and the remainder in French.

The volume is organized topically. The first section contains 20 papers on internal friction in amorphous materials, about evenly split between metallic glasses and all other glassy materials. The focus in metallic glass studies is structural relaxation and magnetic effects. The second section is devoted to the effects of phase transformations on internal friction. This category contains papers on martensitic transformations, diffusion assisted phase transformations, and paraelectric transformations.

Th third section deals with applications of internal friction, for example in noise control gearing and microporosity evaluation, and for measuring hydrogen penetration and hydride precipitation. The third section also contains papers on novel methods for determining internal friction, including acoustic microscopy, fast-Fourier-transform analysis, and microprocessor-based automation of data collection.

Section four is an amalgam of miscellaneous topics: eight papers on point defects, three papers on magnetic materials, and eight papers on composite structures.

Sections five and six, the largest in the

volume, are devoted to dislocations and their manifestations in internal friction. Dislocation pinning and breakaway, dislocation drag, Snoek-Koester relaxation, kink creation and diffusion, and dislocation line harmonics are all covered by several contributors. Also included are papers on high-temperature phenomena and microplasticity.

This proceedings is prefaced by six review articles that immediately bring the reader up to date. Any reader will be impressed with the vitality of this classical method for studying materials, and the extent the technique is currently being applied.

Reviewer: H. J. Leamy is an employee of AT&T Bell Laboratories in Murray Hill, NJ, where he has been engaged in materials research with particular emphasis on electronic materials.

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