



# Optical Diagnostics for Thin Film Processing

*Irving P. Herman Ph.D. Massachusetts Institute of Technology*

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This volume describes the increasing role of *in situ* optical diagnostics in thin film processing for applications ranging from fundamental science studies to process development to control during manufacturing. The key advantage of optical diagnostics in these applications is that they are usually noninvasive and nonintrusive. Optical probes of the surface, film, wafer, and gas above the wafer are described for many processes, including plasma etching, MBE, MOCVD, and rapid thermal processing. For each optical technique, the underlying principles are presented, modes of experimental implementation are described, and applications of the diagnostic in thin film processing are analyzed, with examples drawn from microelectronics and optoelectronics. Special attention is paid to real-time probing of the surface, to the noninvasive measurement of temperature, and to the use of optical probes for process control.

**Optical Diagnostics for Thin Film Processing** is unique. No other volume explores the real-time application of optical techniques in all modes of thin film processing. The text can be used by students and those new to the topic as an introduction and review of the subject. It also serves as a comprehensive resource for engineers, technicians, researchers, and scientists already working in the field.

## Key Features

- \* The only volume that comprehensively explores *in situ*, real-time, optical probes for all types of thin film processing
- \* Useful as an introduction to the subject or as a resource handbook
- \* Covers a wide range of thin film processes including plasma etching, MBE, MOCVD, and rapid thermal processing
- \* Examples emphasize applications in microelectronics and optoelectronics
- \* Introductory chapter serves as a guide to all optical diagnostics and their applications
- \* Each chapter presents the underlying principles, experimental implementation, and applications for a specific optical diagnostic

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