

MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 591

Nondestructive Methods for Materials Characterization

Symposium held November 29-30, 1999, Boston, Massachusetts, U.S.A.

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Materials Research Society

Warrendale, Pennsylvania

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Single article reprints from this publication are available through University Microfilms Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48106

CODEN: RSPDH

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Published by:

Materials Research Society
506 Keystone Drive
Warrendale, PA 15086
Telephone (724) 779-3003
Fax (724) 779-8313
Web site: <http://www.mrs.org/>

Library of Congress Cataloging-in-Publication Data

Nondestructive methods for materials characterization : symposium held November 29-30, 1999, Boston Massachusetts / editors, George Y. Baaklini, Norbert Meyendorf, Theodore E. Matikas, Robert S. Gilmore
p.cm.—(Materials Research Society symposium proceedings ; ISSN 0272-9172 ; v. 591)

Includes bibliographical references and indexes.

ISBN 1-55899-499-8

I. Nondestructive testing—Congresses. 2. Materials—Testing—Congresses.
I. Baaklini, George Y. II. Meyendorf, Norbert III. Matikas, Theodore E.

IV. Gilmore, Robert S. V. Materials Research Society symposium proceedings ; v. 591

TA417.2 .N67247 2000
620.1'127—dc21

00-023037

Manufactured in the United States of America

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PREFACE

This book contains forty-six papers from Symposium S, "Nondestructive Methods for Materials Characterization," from the 1999 MRS Fall Meeting in Boston, Massachusetts, and represents the latest developments in nondestructive methods for the characterization of many classes of materials focusing on advanced nondestructive evaluation (NDE) methodologies and instrumentation. In this book, six major parts highlight the scientific, technical, and industry emphasis of the papers. Several x-ray techniques were developed or tailored for process control and deformation behavior in high- and low-density materials. Fracture, fatigue, and corrosion behavior of aging aircraft materials were characterized via linear and nonlinear acoustics. Structure-sensitive properties in magnetic materials and building materials were gauged with NDE parameters. Electric and dielectric properties in ceramics and composite materials were established. Thickness and interface properties in silicon wafers and thin films were studied. Advanced optical and infrared technologies were investigated for the characterization of capacitance, circuit boards, laser diodes, and material growth.

The authors are leading researchers in the field of NDE from Brazil, Canada, Italy, Israel, France, Germany, Greece, Japan, Poland, Russia, Singapore, Ukraine, United Kingdom, and United States.

The invited papers covered varying areas in NDE science, from electronically-based nondestructive microstructural characterization to the role of structure-property relationships in materials characterization, to the optimization of x-ray techniques of single crystal turbine blades, and to the quantitative contact spectroscopy and imaging by atomic-force acoustic microscopy.

The editors believe that this book is a testimonial to the success of this symposium, having achieved its goal by bringing in scientists, engineers, and academicians to focus and report on multidisciplinary approaches in solving materials characterization problems, thereby advancing the state-of-the-art in the NDE of material properties that affect micro- and macro-structural behavior.

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