Available online at www.sciencedirect.com
SCIENCE DIRECT®
Thin Solid Films 450 (2004) 1–2
thin solid films
www.elsevier.com/locate/tsf

Editorial[☆]

This special volume of *Thin Solid Films* is devoted to papers presented at Symposium M of the Spring Meeting of the European Materials Research Society (E-MRS) entitled *Optical and X-ray Metrology for Advanced Device Materials Characterization* held in Strasbourg (France) on June 10–13, 2003. The in-line metrology paradigm is increasingly adopted in other sectors of the microelectronics and micro-systems industry, most notably in compound semiconductor electronics, the wider photonics industry as well as within MEMS and sensors. The need for improvement of optical and X-ray metrology for microelectronics and micro-systems is driven by the increasing diversity of materials used in the industry. Current driving forces for new metrology tools and software are the increasing volume and complexity of compound semiconductor epitaxial wafers, more challenging tolerances on band-gap engineering, the challenge of measuring compound semiconductor device parameters at wafer levels (to maximize fabrication yields). Special requirements come from the introduction of high-*k* dielectrics and ferroelectrics in CMOS microelectronics and in a variety of micro-systems. One of the aims of the symposium was to promote and encourage the interaction between academic and industrial research (instrument manufacture, IC industry and material suppliers) to address scientific and technological challenges to improve analytical methods and novel characterization techniques. The 4-day symposium provided an overview of the current status of the wide field of optical and X-ray metrology for material qualification of thin film and layer-structured materials, with a particular emphasis on the state-of-the-art metrology. The symposium attracted high interest from both the academic and industrial communities, with a program based upon over 69 abstracts submitted by scientists worldwide. Presentations at the conference, whose proceedings are reported in the present volume (including eight invited talks by distinguished guest speakers), stimulated lively discussion and revealed important, rapidly evolving research fields.

The symposium M was organized on behalf of partners of the two European projects MARS GRD-1999-10535-MARS (http://www.nmrc.ie/projects/mars/) and ESQUI G6RD-CT99-00169 (http://www.ing.unitn.it/~maud/esqui/), respectively, dedicated to up-to-date optical and X-ray investigating techniques.

During the symposium the EU project MARS consortia organized a special workshop on the topic 'Modulation and Anisotropic Reflectance Spectroscopies'. Among the reported data was the particular attention for the increasing potential of modulated optical techniques for in-line characterization of wafer devices with complex structures such as VCSELs and HBTs. Also mentioned was the significant effort made on metrology development for ultrathin and multilayer structures.

A particularly stimulating and interesting moment of the symposium was the Round Table on *Advances in Optical and X-ray Metrology*. The open discussion during this round table has pointed out the necessity of a more close collaboration between optical and X-ray related scientific communities. It was concluded that, for example, novel applications like ultrathin oxide and high-*k* dielectrics for the next-generation CMOS devices required a combined optical and X-ray reflectivity metrology. Another important conclusion of this round table was the necessity of further theoretical development of the fundamentals of optical and X-ray metrology rather than the development of new instruments.

The symposium was made possible due to the generous contribution of several sponsors, namely, Optical Metrology Innovations Ltd, ItalStructures, Thales R&T, Point Electronic GmbH, PANalytical and Specs.

The organizers acknowledge the valuable help of the Scientific Committee in planning and preparation of the symposium, as well as the role of the E-MRS staff that helped to make the symposium a success. They would like to thank all the participants including invited speak-

[☆] Proceedings of the E-MRS 2003 Spring Meeting, Symposium M on Optical and X-ray Metrology for Advanced Device Materials Characterization, Strasbourg, France, June 10–13, 2003.

0040-6090/04/$ - see front matter © 2003 Elsevier B.V. All rights reserved.
doi:10.1016/j.tsf.2003.10.039

ers for their excellent presentations. Our gratitude to all authors, who made this volume possible, both for their contribution as well as for adhering to the strict deadline for manuscript revision. We thank the reviewers for their careful job, which strongly helped in maintaining a very high scientific standard, and finally we wish to acknowledge the Elsevier staff, particularly Michelle Penman and Lucy Dickinson, for their experienced editorial support.

The Guest Editors:
Mircea Modreanu
NMRC, Cork, Ireland

Martin Murtagh
Optical Metrology Innovations Ltd, Cork, Ireland

Jesús Ricote
Instituto de Ciencia de Materiales de Madrid, CSIC, Madrid, Spain

Daniel Chateigner
CRISMAT-ENSICAEN, Caen, France

Jürgen Schreiber
Martin-Luther-University Halle-Wittenberg, Halle, Germany