Eur. Phys. J. Appl. Phys. **27**, 7 (2004)
DOI: 10.1051/epjap:2004187

THE EUROPEAN PHYSICAL JOURNAL APPLIED PHYSICS

Preface for DRIP X proceedings

This issue of the "European Physical Journal – Applied Physics" contains the papers presented at the Tenth International Conference on Defects: Recognition, Imaging and Physics in Semiconductors (DRIP X), held in Batz-sur-Mer, France, from 29th September to 2nd October, 2003.

The conference gathered 150 scientists from academic institutions and industry of 20 countries from around the world, showing the pertinence of the biennial series of DRIP conferences. A much appreciated aspect of DRIP X was the variety of the different backgrounds of the participants, leading to much fruitful exchange and stimulating discussion.

Following the spirit of previous DRIP conferences, the main concern of DRIP X was the methodology and the physics of measurement procedures, together with specific developments in instrumentation, and their relationship with the structural, optical and electrical properties of semiconductor defects. The topics covered related to the different methods and techniques used for the recognition and imaging of defects in semiconductor materials (Si, III-V's including nitrides, SiC, IV-IV's, II-VI's, organic compounds, ...) and in semiconductor devices ranging from defects in the raw materials at the wafer level, through process-induced defects and defects that appear during operation (burn-in, aging tests, ...).

One of the highlights of the social events of DRIP X was the awards ceremony as part of the celebrations for the Tenth meeting of DRIP. The founders of the DRIP series, Professor Jean-Pierre Fillard and Professor Tomoya Ogawa were both invited to be permanent members of the International Steering Committee and awarded with appropriately engraved trophies to mark the occasion. With help form Tomoya Ogawa, Jean-Pierre Fillard organized the first DRIP conference in 1985 in La Grande Motte, France. The amusing and thought provoking slide presentation by Jean-Pierre Fillard went a great way to remind us of the history of this conference series and to fill with enthusiasm the young and the not-so-young researchers alike to face up to the ever present challenges of defect analysis in semiconductors. We were reminded that with the large variety of imaging techniques available and the vast improvements in technology, there lies ahead tremendous potential for gaining a better understanding of defects in semiconductors by applying image processing techniques.

DRIP X was arranged into 13 oral sessions, consisting of 12 invited talks and 59 contributed papers, and two poster sessions made up from 76 contributed papers. The Proceeding chapters reflect the oral sessions with the poster papers being added to the relevant sessions. The sessions covered the following topics:

- Sessions 1 and 2 were on nanostructures and near field probe techniques, with invited papers from F. Priolo on the luminescence properties of Si nanocrystals and L.K. Orlov on quantum wires in GaAs/GaInAs materials systems prepared by electrochemical etching.
- Session 3 was on defects in silicon, with an invited paper by Y. Mochizuki on the characterization of process induced defects in deep sub-micron transistors by electrically detected magnetic resonance and transmission electron microscopy.
- Session 4 was on electrical properties, with an invited paper by D. Roy on the electrical characteristics of advanced MOS structures with ultra-thin oxides.
- Sessions 5 and 6 were on defects in wide bandgap materials, with invited papers by S. Müller on the current status of the quality of SiC substrates and epitaxial layers, and by J.L Weyher on the characterization of defects in wide band gap semiconductors (mainly GaN) by defect-selective etching in combination with other standard methods (transmission electron microscopy, photo-luminescence, micro-Raman).
- Session 7 was on spectroscopic techniques, with an invited paper by V. Higgs on the use of photo-luminescence wafer mapping in the context of the production of Si or SiGe materials.
- Session 8 was on electron beam methods, with an invited paper by R. Balboni on strain mapping in deep sub-micron Si devices using convergent beam electron diffraction in STEM.
- Session 9 was a specific session on the issue of defect mapping over large area wafers, a new idea to the DRIP series, for investigating the possibilities of implementing different kinds of techniques having a potential for high lateral resolution over the very large areas required nowadays for semiconductor substrates and materials. This session was introduced by an invited talk by S. Ostapenko on defect mapping in multi-crystalline Si as well as SiC wafers.
- Session 10 on multi-techniques investigation, also new to the DRIP series, showed the importance of having access to a wide variety of techniques and managing such a "strategy" in an optimal way for solving certain defect problems

present in today's semiconductor materials. The session was introduced by an invited talk by I. De Wolf, showing the importance of this approach to failure analysis in microelectronics.

- Session 11 was on X-ray based techniques, with an invited paper by U. Zeimer on the use of grazing incidence X-ray diffraction and X-ray spectroscopy (in the scanning or transmission electron microscope) for the study of epitaxial layers grown after lateral patterning at the nanometer scale of underlying layers.
- Session 12 was on defects in semiconductor lasers and other devices, with an invited paper by J. Jiménez on the use of spectroscopic techniques (cathodo-luminescence, micro-Raman...) for the assessment of defects in relation to aging behavior in high-power AlGaAs/GaAs laser diodes.
- Session 13, the final session, was on electronic properties through contactless characterization.

We would like to thank all those involved in the local Organizing Committee, the International Steering Committee and the Scientific Committee for their hard work in helping with the organization of DRIP X, as well as all those who participated in the conference as delegates, speakers, invited speakers and chairpersons for contributing to such a successful conference. Thanks are also due to colleagues who served as referees for the papers.

For its eleventh edition in 2005, DRIP XI will normally be organized by Professor Zhanguo Wang in Peking, China. Details of DRIP XI will be posted on the DRIP X website `www.cnrs-imn.fr/dripx`.

Jean-Pierre Landesman (Chairman),
Paul C. Montgomery (co-Chairman)