Preface

This volume contains all the manuscripts submitted for the Proceedings of the 15th International Conference on Gettering and Defect Engineering in Semiconductor Technology ('GADEST'). The conference will be held at St John's College, Oxford, UK, from 22nd to 27th September 2013.

The GADEST conference series was established in 1985 by Hans Richter as a meeting of experts in the field of semiconductor technology, semiconductor devices and semiconductor defect physics. Remarkably, from the beginning the conference was international with participants from both eastern and western Europe and from industry and academia. The conference has been held biennially ever since. Previous editions of the conference were held at Garzau in East Germany (1985, 1987, 1989), Klingemühle in Germany (1991, 1993), Wulkow in Germany (1995), Spa in Belgium (1997), Höör in Sweden (1999), Catania in Italy (2001), Zeuthen in Germany (2003), Giens in France (2005), Erice in Italy (2007), Döllnsee in Germany (2009), and Loipersdorf in Austria (2011).

The topics for discussion include both fundamental and technological aspects of defects in semiconductor materials and devices, including photovoltaics. At the time of going to press, the 2013 Conference will comprise 25 invited oral presentations, 51 contributed oral presentations and 45 poster presentations. 74 manuscripts were submitted by the final deadline of 29th June 2013. This volume contains these manuscripts organised into the following chapters:

I. Defect engineering in silicon solar cells
II. Structural and production issues in cast silicon materials for solar cells
III. Characterisation of silicon for solar cells
IV. Intrinsic point defects in silicon
V. Light impurities in silicon-based materials
VI. Metals in silicon: fundamental properties and gettering
VII. Extended and implantation-related defects in silicon
VIII. Surfaces, passivation and processing
IX. Germanium-based devices and materials
X. Semiconductors other than silicon and germanium
XI. Nanostructures and new materials systems

I am very grateful to the members of the Executive Committee, the International Program Committee and the Local Organising Committee for their suggestions for invited speakers and for their help with reviewing abstracts and manuscripts. In particular, I would like to thank Hans Richter and Martin Kittler for their assistance in the early stages of the conference organisation. The administrative support of Rebecca Bradford and Barry Fellows in the Department of Materials at the University of Oxford has been invaluable.

John D. Murphy
Editor, Proceedings of GADEST 2013
30th June 2013

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List of invited speakers and the titles of their presentations

(correct as of 30th June 2013)

Koji Araki (GlobalWafers Japan Co., Ltd., Japan)
Effect of hydrogen for the preservation of reconstructed surfaces

Tzanimir Arguirov (BTU Cottbus, Germany)
Light emission from bulk germanium and germanium on silicon structures

Hartmut Bracht (Universität Münster, Germany)
Properties of point defects in silicon: new results after a long-time debate

Nick Cowern (Newcastle University, UK)
Extended point defects in crystalline materials: Ge and Si

Alexander Ezhevskii (Lobachevsky State University of Nizhni Novgorod, Russia)
Monoisotopic ^{28}Si and ^{29}Si in spin resonance spectroscopy of electrons localized on donors and conduction electrons

Peter Fath (Centrotherm, Germany)
Si-based photovoltaics materials (mc-, mono-like- and mono-Si) and technology

Erwin Kessels (Eindhoven University of Technology, Netherlands)
Physical mechanisms of surface passivation of silicon wafers by ultrathin films of Al_2O_3

Vasilii Gusakov (NAS of Belarus, Belarus)
First principle study of the diffusion of oxygen and oxygen complexes in Si, Si<Ge> solid solutions and Si nanocrystals

Jasmin Hofstetter (Massachusetts Institute of Technology, USA)
Iron management in multicrystalline silicon through predictive simulation: point defects, precipitates, and structural defect interactions

Daniel Macdonald (Australian National University, Australia)
External and internal gettering of interstitial iron in silicon for solar cells

Vladimir Markevich (University of Manchester, UK)
The trivacancy and trivacancy-oxygen family of defects in silicon

Jurgen Michel (Massachusetts Institute of Technology, USA)
High n-type doping in Ge for optical gain and lasing

Salvatore Mirabella (CNR IMM, Catania, Italy)
Synthesis and light absorption in Si or Ge nanoclusters for photovoltaics application

Bernhard Mitchell (University of New South Wales, Australia)
Photoluminescence imaging of silicon bricks

Hans Joachim Möller (Technische Universität Bergakademie Freiberg, Germany)
Mechanical properties of silicon wafers for photovoltaic applications

Rachel Oliver (University of Cambridge, UK)
Defects and their relation to unintentional doping in GaN

Jan Schmidt (Institut für Solarenergieforschung in Hameln/Emmerthal, Germany)
P-type vs n-type silicon: which will be the PV material of the future?

Martin Schubert (Fraunhofer ISE, Germany)
Efficiency-limiting recombination in multicrystalline silicon solar cells

Ron Sinton (Sinton Instruments, USA)
Overview and latest developments in photoconductance lifetime measurements in silicon

Bhushan Sopori (NREL, USA)
Defect generation and propagation in mc-Si ingots

Michael Stavola (Lehigh University, USA)
Light impurities and their reactions in Si photovoltaic materials from IR spectroscopy

Mike Thewalt (Simon Fraser University, Canada)
Transition metal-related photoluminescence in silicon

Vladimir Voronkov (MEMC Electronic Materials, Italy)
Light-induced boron-oxygen recombination centres in silicon: understanding their formation and elimination

Jörg Weber (Technische Universität Dresden, Germany)
New results on the electrical activity of transition metal impurities in silicon

Angus Wilkinson (University of Oxford, UK)
Lattice strain, rotation and defect assessment in GaN and other semiconductors using electron backscatter diffraction

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