

Preface : Advanced gate stack, source/drain and channel engineering for Si-based CMOS 4 : new materials, processes and equipment

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PREFACE

From May 18-22, 2008, the international symposium on *Advanced Gate Stack, Source/Drain and Channel Engineering for Si-based CMOS: New Materials, Processes and Equipment*, 4 will be held in Phoenix, the capital and the industrial and commercial center of Arizona (USA), as a part of the 213th Meeting of the Electrochemical Society. The main objective of this annual symposium is to provide a forum for scientists and technologists to discuss recent advances in channel, gate stack and source/drain engineering for state-of-the-art CMOS integrated circuit manufacturing. The symposium includes more than 60 papers covering a broad variety of topics focusing on new materials, processes and manufacturing equipment.

This book contains the majority of the papers presented at the symposium. The papers are arranged in several sections.

After the keynote address on the Semiconductor Industry's Nanoelectronics Research Initiative, the first section contains papers on dopant activation and diffusion. The clear trend here is towards advanced millisecond annealing technologies, and the papers include studies of novel flash-lamp and laser annealing approaches. The next section covers gate-stack engineering, most papers focusing here on ALD-grown high-k/metal gate stacks. Several papers address the recent implementation of high-k/metal gate CMOS in volume manufacturing. The next section includes papers on advanced channel engineering and novel device concepts. The evolution in channel engineering is reflected in papers on the use of strain and the incorporation of new materials such as SiGe, Ge and III-V compounds. New device configurations are also addressed, especially those based on FINFETs and nanowires. The following section explores contacts, focusing on new approaches and materials that can help overcome the challenge of parasitic resistance in highly scaled CMOS. Another clear trend is the emergence of advanced memory as a driver of process and device innovation. The last section contains papers that describe novel processes in this field.

The organizers would like to express special thanks to the speakers for their interest in the symposium, and for submitting high-quality abstracts and preparing their manuscripts at short notice. Finally, the success of the symposium would not have been possible without the financial support given by the sponsoring ECS Divisions, Electronics and Photonics (main sponsor), Dielectric Science and Technology and High Temperature Materials (co-sponsors) as well as the following industrial sponsors (at the time of printing of this book): Air Liquide, Aixtron, Annealsys, Applied Materials, ASM International, Aviza Technologies, Sigma-Aldrich, Jusung Engineering, Mattson Technology, NXP Semiconductors, Oxford Instruments and QUALCOMM, Their continued support and loyal sponsorship are highly valued, especially in these economically dynamic times.

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