

April 5, 2010

Excellence Initiative for New Group IV Semiconductor Materials & Processing

EI4GroupIV

Research Institute for Electrical Communication
Tohoku University

The Excellence Initiative for New Group IV Semiconductor Material & Processing, EI4GroupIV is announced by Prof. Junichi Murota of the Research Institute for Electrical Communication of the Tohoku University in Sendai, Japan. EI4GroupIV brings together a consortium of leading research groups from academic and non-governmental R&D organizations from all over the world to boost research on materials that allow further extension of the ITRS roadmap beyond the limitations of the classical Si materials system. The consortium shall work on extending the parameter domain of existing materials combinations and alloys as well as on the engineering of new materials systems build up by means of the elements of Group IV (of which silicon is the most used example). This will result in boosting the performance of more classical devices such as inversion MOSFETs and HBTs. Moreover, new and exciting applications in novel device structures such as deeply scaled self-aligned quantum well FETs and in nano-optical devices will emerge. Finally, the monolithic integration of III/V compound semiconductors on large size silicon substrates will lead to integrated functionalities that were never seen before. A key aspect of the consortium's plans involves also fundamental research and engineering of unit process steps next to exhaustive characterization of the new materials. Integration of these materials systems in novel device architectures will allow bench marking and a critical assessment that should point out new directions.

EI4GroupIV will be lead by Prof. Murota. The consortium consists of world leading groups in the areas of semiconductor materials, processing and device integration:

- Prof. Bernd Tillack : Innovations for High Performance(IHP)/Berlin Institute of Technology, Germany
- Profs. Erich Kasper and Joerg Schulze : University of Stuttgart, Germany
- Dr. Matty Caymax : imec, Belgium
- Prof. Vinh Le Thanh : Interdisciplinary Center on Nanoscience of Marseille (CINaM)-CNRS/University of Mediterranean, France
- Prof. Stefano Chiussi : University of Vigo, Spain
- Profs. Eugene A. Fitzgerald and Judy L. Hoyt : Massachusetts Institute of Technology (MIT), USA
- Prof. James C. Sturm : Princeton University, USA.

Synergistic collaboration that amplifies the individual member's work in Group IV Semiconductors is the main objective of EI4GroupIV. The members will perform individually

the following research programs and will promote the international scientific information exchange regarding New Group IV Semiconductor Materials & Processing by organizing related conferences and by publishing results in international scientific Journals.

Fundamental Research:

- Manufacturing and characterization of Si-based heterostructures such as quantum wells and superlattice structure
- Defect free strained layer engineering
- Atomically controlled processing for end-of-scaling-roadmap doping requirements
- Process technologies for Si, SiGe, SiGe:C, Ge, GeSn
- Laser processing
- Synergistic applications of SiGe:C, Ge and III-V materials on silicon substrates

Device Applications:

CMOS, BiCMOS, DRAM, HBT, Photonic Devices, Photovoltaics, Spintronic Devices

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