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Department of Materials and Semiconductor Structures Research

SOurce Drain Architecture for Advanced MOS technology SODAMOS IST-2000-26475

COORDINATOR

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- Instytut Technologii Elektronowej, Warszawa, POLAND

OUR ROLE IN THE PROJECT

Cross-sectional transmission electron microscopy (XTEM) characterisation of ALSB MOSFET structures.

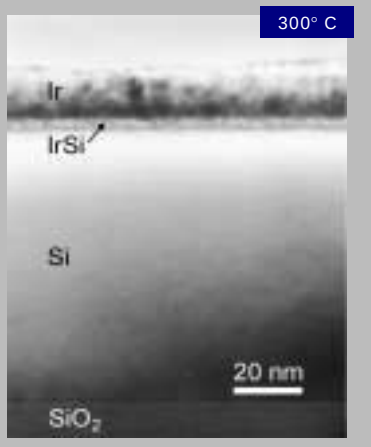
PROJECT DESCRIPTION

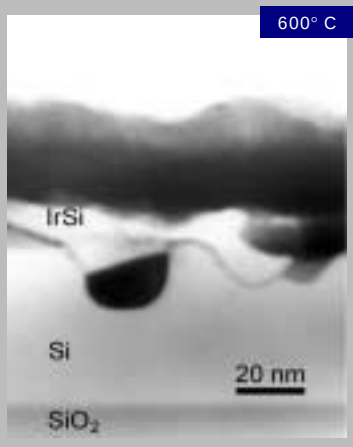
The design, optimisation and fabrication of Accumulated Low Schottky Barrier MOSFETs on SOI is proposed in order to solve critical problems associated to the source/drain architecture and more specifically due to the specific contact resistance at the silicide/silicon interface. A complete validation of the ALSB SOI technology will be performed in order to move from a laboratory concept to an industrially attractive solution that meets requirements of the ITRS roadmap up to the 35 nm technology node.

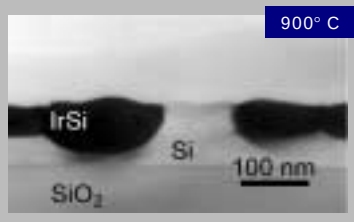
Some of the most relevant points in the project, ITE is involved are:

- reproducibility of contacts with very low Schottky barrier to holes (PtGeSi showed promising Schottky barrier below 50 meV); obtention of very low Schottky barriers for electrons based on erbium alloys,
-material engineering: to study and elaborate low (ideally 0 eV) Schottky barrier contact on thin SOI films;
-device fabrication and characterisation: to successively demonstrate three generations of ALSB-SOI MOSFETs corresponding to get length of 120 nm, 70 nm and ultimately in the 10-30 nm range;

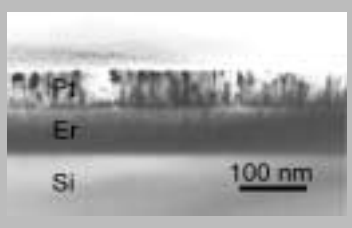
RESULTS

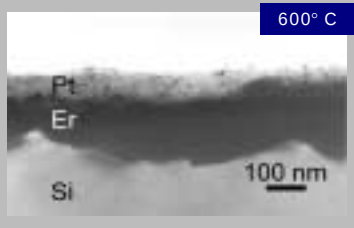




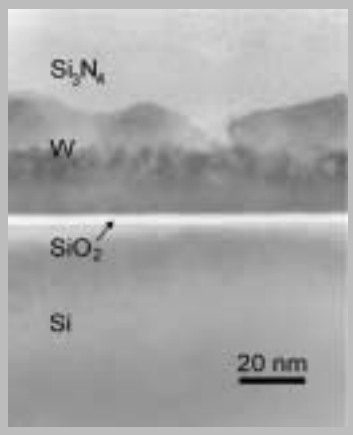


$Ir/Si/SiO_2$ structure annealed at various temperatures





Pt/Er/Si structure non-annealed and annealed at 600° C



$Si_3N_4/W/SiO_2/Si$ structure

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