

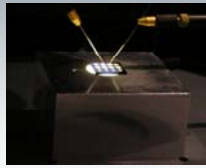
EMMA

Emerging Materials for Mass-storage Architectures

SPECIFIC TARGETED RESEARCH OR INNOVATION PROJECT
SIXTH FRAMEWORK PROGRAMME
PRIORITY 2
INFORMATION SOCIETY TECHNOLOGIES



Contract no. : 033751



EMMA Partners



EMMA objectives

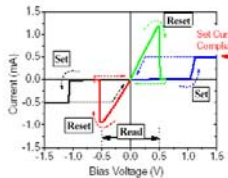
- The objective of the EMMA project is the investigation of **new solutions** for massive non-volatile data storage solid-state memories.
- This project investigates the feasibility of emerging new non-volatile memory concepts based on **resistive-switching materials** for enabling new mass-storage memory systems.
- Focus is on concept **scalability**, based on gained understanding of the physical operation concepts. Investigation will further include **cell integration** aspects, **reliability** assessment, and memory **architectures**.

- Start date:** 01-09-2006
- Duration:** 36 months

Technology

The program focuses both on:

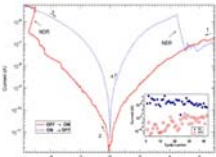
- binary resistive switching oxides (NiO_x, WO_x...)**



NiO Resistive switching device
Baek et al., 2004 IEDM Tech. Dig., 587-590 (2004)

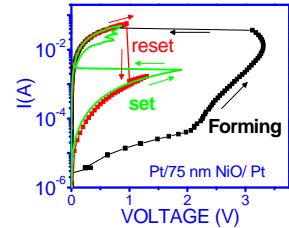
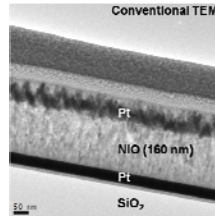
Initial development of CuTCNQ was performed by IMEC within the framework of the MOSCE MEMORIAS IST project FP6-507934.

- organic CuTCNQ**

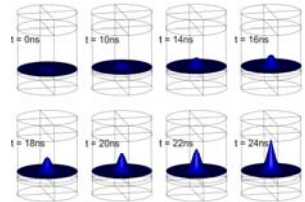
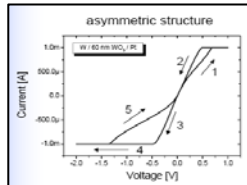


CuTCNQ switching device
R. Muller et al., APPLIED PHYSICS LETTERS 89, 223501 (2006)

II. Growth of NiO_x by e-beam and ALD



III. WO_x: switching and filament growth modeling



Exploitation potential

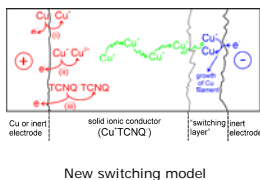
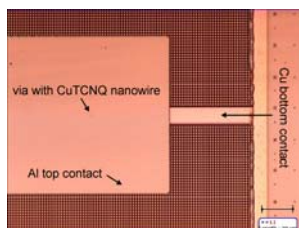
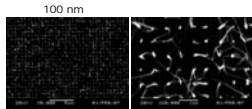
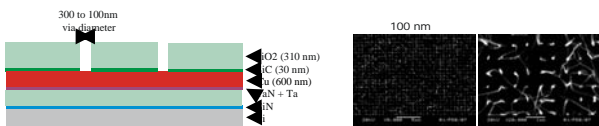
- Numonyx** is one of the major semiconductor companies that play in the arena of NV memories, with a strong interest in emerging concepts and novel memories, and it has recently entered the field of memories for mass-storage. The results of this Project could be directly applied to the development of large size memories, probably starting from the 65nm node, as well as for small and medium-sized arrays for embedded applications.
- Others:** IP (patents), technology transfer, publications & conferences

Interactions

- WIND project**
 - WIND (Wide Integrated technologies Dissemination; EMMA partners involved IMEC and RWTH) aims at improving the competitiveness of the European data storage/memory industry through
 - creating a European information network,
 - by developing an effective dissemination strategy
 - Organization of IMST (Innovative Mass Storage Technologies) conf. + update "Whitebook"
- VERSATILE**
 - VERSATILE (EMMA partners involved: STM and MDM) deals with material for diodes integrated in a cross-point metallization array, to be used in conjunction with resistive type memories. Both components (diode and resistive switch element) are essential for a cross-point memory.

Results

I. Growth of CuTCNQ nanowires in 100nm via-size contact holes by gas/solid reaction



Information and website

- Website: <http://www.imec.be/EMMA/>
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