



COST

Action Title

Action number

Start date: 15/04/2014

End date: 14/04/2018

Year: *Starting*

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Chair

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Scientific context and objectives

(1/2)

- **Background / Problem statement:**

Transition metal oxides are envisaged as next-generation materials for many applications in the field of nanoelectronics, microactuation/microsensing and energy conversion. Unsolved fundamental and materials science issues hamper so far the development of commercial technologies.

- **Brief reminder of MoU objectives:**

ORGANIZATION: To network scientists working on transition metal oxides (a) among themselves; (b) to the mainstream of solid-state technologies; (c) to private companies and d) to Public Society

SCIENCE : To foster and coordinate a research aimed at advancing our present understanding about the way the multiple lattice and electronic degrees of freedom and of their mutual interactions determine the physical properties of transition metal oxides

TECHNOLOGY

To foster the development of a technology for the growth of in-situ-quality-controlled, large-area epitaxial oxide films and heterostructures on different substrates including Si.

To single out the most promising applications of TMOs to nanoelectronics, microactuation/microsensing and energy conversion and to coordinate fabrication and testing of devices performed at a prototype level.

Scientific context and objectives

(2/2)

- **Research directions:**
- to integrate in a collaborative network expertise and research activities from complementary fields of experimental and theoretical science;
- to foster the development of high-throughput, large-area systems for the deposition of oxide thin films, heterostructures and coatings on low-cost substrates, with extensive atomic-scale, real-time control of the growth process
- to identify the TMO-based device concept with the highest potential for: a) nanoelectronics (i.e. memories, switchable logic devices; memristors; etc; b) epitaxial piezo-MEMS for micro-actuators (inkjet-printing, microfluidics), microsensors (pressure, chemical, accelerometers); bioMEMS, RF devices; c) energy conversion, as all-oxide, bandgap-engineered PV cells; thermoelectric devices; magnetocaloric devices; energy harvesting, solid oxide fuel cells.
- **Innovative approach:**
- pushing the European community active on transition metal oxides to shift from a purely bottom-up, curiosity-driven phase and open a novel, scientifically/technologically/industrially mature phase of its activity



Working groups

WG0 Management (MA). *Leader: F. Miletto Granozio, Action Chair, CNR-SPIN, IT.*

Four Tasks: 1) internal networking (Events); 2) external communication (Dissemination); 3) management of ESR (STSMs, Schools); 4) Oxide Technology Roadmap

- **WG1 Fundamental Understanding (FU),** *Leader: Jeroen Van Den Brink, IFW Dresden, DE.*
- **WG2 Growth Control (GC),** *Leader: Gertjan Koster, Mesa+/Univ. Twente, NL.*
- **WG3 Towards Applications (TA),** *Leader: Nini Pryds, Danish Technical University, DK.*



Future Plans and Challenges

- TO-BE 2014 Fall meeting
- Full operation of the Action Web Site (examples)
- Starting of the STSMs
- Organization of Spring Meetings
- Organization of first summer school
- Startup of Dissemination Activity
- Joining more private partners to the team
- TO-BE participation to relevant EU events in the field (as WOE and dedicated EMRS symposia)
- **Startup of the Oxide Technology Roadmap activity**