

EXPLORATION SYSTEM FOR OPTIMIZATION OF SHAPE MEMORY ACTUATION IN COMPOSITIONAL SPREADS

Goal of the project

The project had as main fundamental objectives the development of an exploration system that would allow:

- a combinatorial optimization of actuation using the sputtering technique to generate compositional spreads;
- the development of models for combinatorial systems adapted for investigation of actuation;
- the implementation of the combinatorial exploration system for the case of intelligent materials, with focus on shape memory alloy families;
- the development of microactuators with controlled and optimized functionality;
- the investigation or modelling of systems for the exploration, and
- the microfabrication of materials with "on demand" properties, adapted for applications in microsystem engineering.

Short description of the project

The project aims to design, fabricate and develop a combinatorial exploration system for optimization of microactuation using the sputtering technique of thin film compositional spreads.

Project implemented by

Politehnica University Timisoara, Romania

Implementation period

03.10.2011 - 02.10.2017

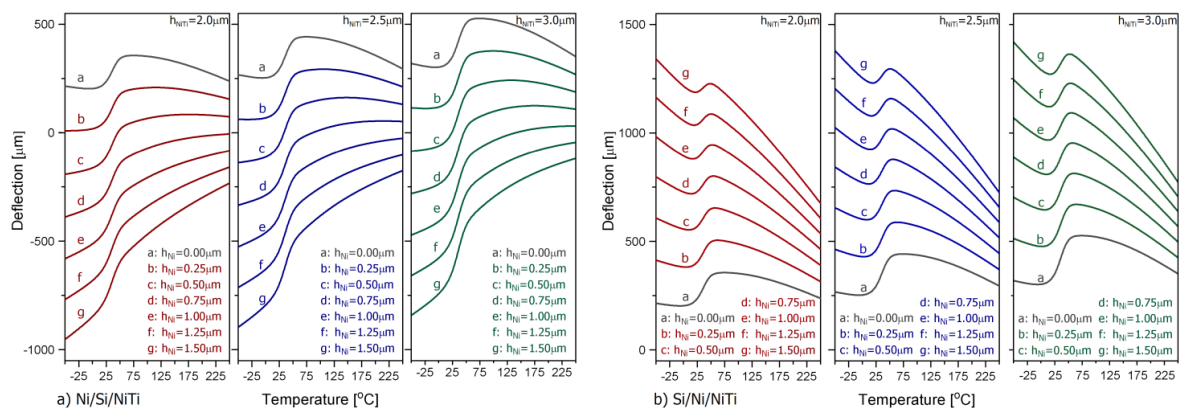
Main activities

The experimental objectives of the project were:

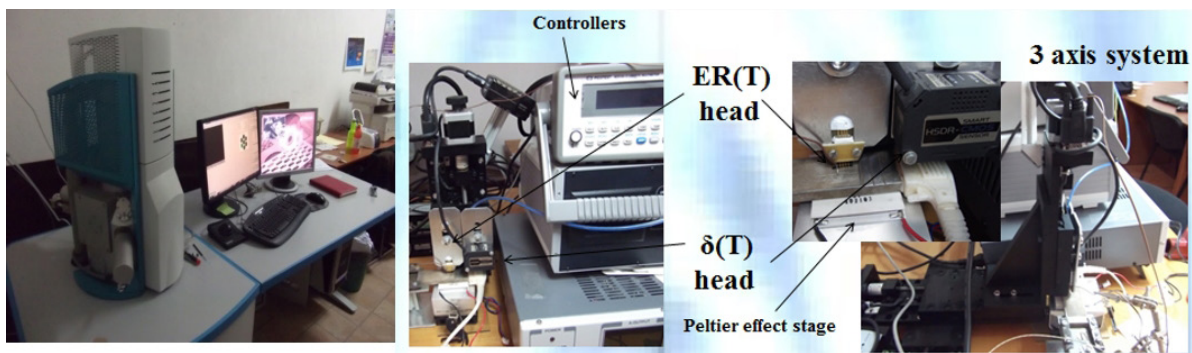
- identification of specific design requirements for a system dedicated to generating combinatorial libraries of metallic materials;
- design of an exploration path for specific functionalities;
- design and fabrication of an exploratory system that allows sputtering of compositional spreads;
- design and microfabrication of substrates for the investigations of functional libraries;
- microfabrication of sputtered compositional spreads based on shape memory alloy compositions;
- microstructural-compositional characterization of libraries;
- design of an actuator based on thin film microfabrication.

Results

Actuation prediction in bimorphs based on shape memory alloy films

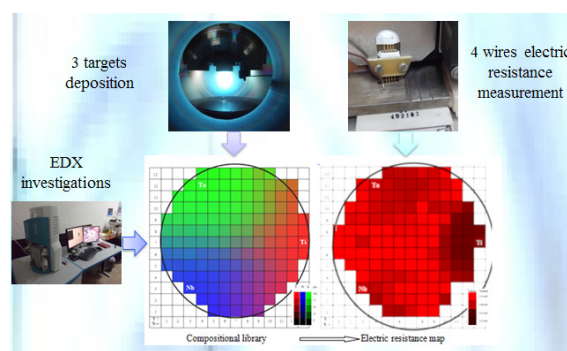


Acquisition of an electron microscope and development of a 3 axis measurement system for electric resistance and deflection as a function of temperature



Design and fabrication of an equipment for combinatorial exploration

Fabrication and characterization of shape memory alloy libraries



Dissemination:

- 15 ISI Papers with impact factor
- 6 ISI Proceedings papers
- 3 published books

Applicability and transferability of the results

In the field of micro and nanoengineering and in the research of new materials

Financed through/by

Romanian National Authority for Scientific Research CNCS – UEFISCDI

Research centre

Center for Smart Materials Micro and nanoengineering

Research team

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