2017-2018

Internship proposal (Master or final project Engineering School) at LMGP Lab.

Optimization of the resistive switching in $LaMnO_3$-based devices

Abstract

Recently, resistive random access memories (ReRAM) have generated significant interest both in industry and in the scientific community for their use as non-volatile memory beyond Flash memory scaling. ReRAMs are considered one of the most promising emerging non-volatile memories due to high speed, high density, great scalability and low power consumption. Recent work carried out in the group has pointed out towards lanthanum manganite as an attractive switching material. The goal of this project is to optimize the **chemical deposition parameters of $LaMnO_3$ by innovative research strategies with the aim of improving and tuning their resistive switching properties**.

Project description

This project will focus on the synthesis and tailoring of $LaMnO_{3-\delta}$ oxides with perovskite-type structure, which will be studied as memristive materials and will be carried out within the framework of an ANR project (*Alps Memories* project).

The Masters student will focus on the preparation of the manganite thin films by **Metal Organic Chemical Vapour Deposition (MOCVD) and on their structural and microstructural characterization.** MOCVD will be used as the deposition technique for its precise control and reproducibility. The obtained films will be fully analyzed (see Figure 1): X-ray diffraction (Theta-2theta, GIXRD, and Reflectometry), atomic force microscopy, electron microscopy (FEG-SEM, TEM) and in-situ Raman spectroscopy will be routinely used for the physical characterization. The LMGP houses state of the art experimental equipment for investigating such properties.

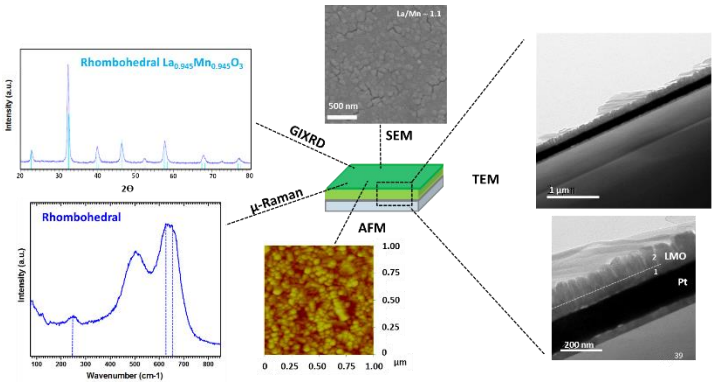

Figure 1 Main techniques used for the characterization of the $LaMnO_{3-\delta}$ films

The materials functional properties will be optimized by exploring the effects of a number of parameters allowing morphology control and epitaxial strain engineering. The tuning and optimization of the chemical deposition parameters by these research strategies will be used as the main tools to modify the physico-chemical, structural and microstructural properties to enhance the resistive switching performance.

Scientific environment:

The candidate will work in the FM2N group within the LMGP, Materials and Physical Engineering Laboratory. Located in the heart of an exceptional scientific environment, the LMGP offers the applicant a rewarding place to work.
LMGP Web Site: http://www.lmgp.grenoble-inp.fr/

Profile & requested skills:

We are looking for a highly-motivated Engineering School or M2 Masters student with a strong interest in experimental physics and materials science. Interpersonal skills, dynamism, rigor and teamwork abilities will be appreciated. Candidates should be fluent in English and/or in French and have good English writing skills.

Subject could be continued with a PhD thesis: YES

Allowance: Internship allowance will be provided

CONTACT

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