

## **Epitaxial BaTiO<sub>3</sub> microcapacitors by pulsed laser deposition using micro-stencils**

The student will join the Laboratory of Multifunctional Thin Films and Complex Structures (<http://www.icmab.es/mulfox/>) at Instituto de Ciencia de Materiales de Barcelona (ICMAB). The project aim to fabricate ferroelectric microstructures of BaTiO<sub>3</sub> using a bottom-up approach. BaTiO<sub>3</sub> will be deposited by pulsed laser deposition on SrTiO<sub>3</sub>(001) single crystals, using shadow masks to confine laterally the growth. The masks, compatible with the high growth temperature, will define objects of different geometry with lateral dimensions of tens of micrometer. A critical parameter to replicate the mask geometry is the oxygen pressure during deposition, as high pressure would cause lateral scattering of atoms and low pressure would degrade the ferroelectric properties. Different conditions of static pressure will be used to optimize the BaTiO<sub>3</sub> microstructures. We will explore also a new method based in dynamically tuned oxygen pressure.

The student will use a state-of-the-art pulsed laser deposition set-up at ICMAB (<http://www.icmab.es/icmab/scientific-technical-services/thin-films.html>), and he will use also advanced methods of characterization. BaTiO<sub>3</sub> microstructures will be investigated by field emission scanning electron microscopy (SEM), atomic force microscopy (AFM), X-ray diffractometry (XRD), and by measurement of the ferroelectric properties. Our group receives every year undergraduated students, either thanks the JAE program or others, and the experience has been always very successful. The project will permit the student to work in a Research Laboratory. In addition of the supervision from the scientific responsible (F. Sánchez), he/she will be directly supported by a PhD student.

Interested candidates should contact:

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