



# **GEMaC**

## **Groupe d'Étude de la Matière Condensée**

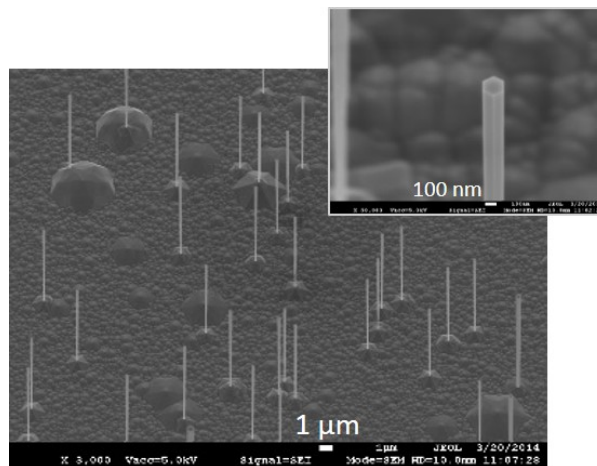
## **NANOSTRUCTURES BASED ON II-VI SEMICONDUCTORS**

The team is interested in the epitaxy of thin films, alloys, quantum wells, nanostructures and heterostructures based on II-VI semiconductors in the {Zn, Mg, Cd, O, S, Se, Te} system. In particular, we master the elaboration of ZnO nanowire arrays by spontaneous growth as well as catalyzed growth using gold droplets. More recently we have been working on ZnTe and ZnS nanowires. We realize so-called core-shell structures for which the nanowires are coated by another material, in order to obtain, for example, type II ZnO/ZnSe junction.

We characterize the structures by transmission electron microscopy (LEM-ONERA, C2N, CLYM-Lyon collaborations), X-ray diffraction, atomic force microscopy, and optical spectroscopy.

We have studied the p-type doping of ZnO nanowires, and have also developed tools and methodologies for fine characterization of the electrical properties of semiconductor

nanowires. We are interested in the effects of in situ doping on the growth mechanisms and crystal facets of nanowires.



Nanofils ZnO dopés  $\text{NH}_3$

## Research projects in progress

ANR "SPINOXIDE" (2020-2023): "Spin injection and detection in all-oxide nanostructures"

Flagship Labex NanoSaclay "nanovibes" (2020-2025): "Nanomaterials and nano-structured architectures for micro-devices harvesting mechanical energies".

## Past research projects

ANR "GAZON" (2016-2018, nanomaterials and nanotechnologies for the products of the future) "Ga-doped ZnO nanostructures for tunable IR plasmonics" (coordination INL-Lyon)

ANR P2N "MADFIZ" (2012-2015): "Controlling the doping of semiconductor nanowires: the case of zinc oxide" (GEMAC coordination)