

Materials Science Department – CENIMAT|I3N

Multifunctional 1D ZnO Nanostructures

CENIMAT – I3N / Microelectronic and Optoelectronic Group



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Objectives

Exploit and develop a new class of electronic devices, based on zinc oxide (ZnO) nanowires and related materials, either using rigid or flexible substrates. The emphasis will be put on developing nanoparticles samples to be used in sensors (like UV, gas sensors and biosensors) and other applications, like nanotransistors (n- and p-type), transducers or piezoelectrics devices, exploiting the properties of nanowires and boosting to its maximum their electronic performances for the next generation of nanodevices and nanosystems away from traditional covalent semiconductors.

Methodology

ZnO nanoparticles synthesized by hydrothermal process in the oven and in the microwave, at low temperatures.

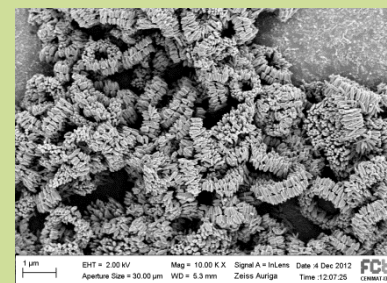
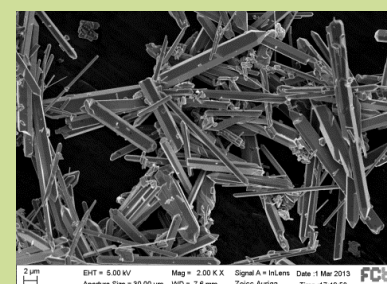
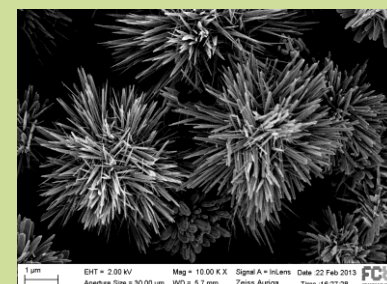
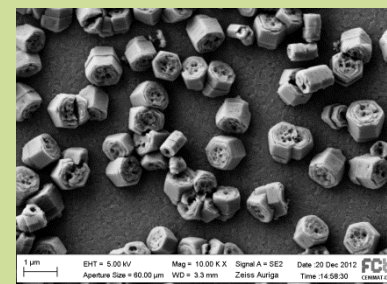
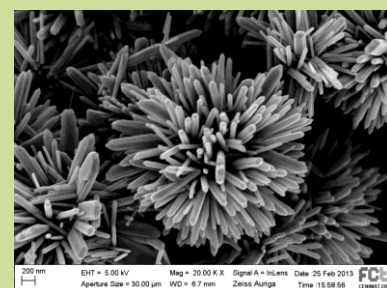
Study different precursors solution:

- Zinc nitrate and Hexamethylenetetramina
- Zinc acetate, sodium hydroxide and PEG
- Zinc acetate, potassium hydroxide and Triton X-100

Use different substrates for nano-fabrication: Si, glass, paper and polymeric substrates.

Expected Results

- Development of semiconductors ZnO nanowires with more than 10 μm long to be used in nano TFTs.
- Development of different ZnO nanostructures to be used in different areas of microelectronics and nanotechnologies, such as UV sensors, electrochromic devices and in paper electronics.



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