

Materials Science Department – CENIMAT/I3N

PV materials and devices

CENIMAT/I3N, MEO Group



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12.2007 - Research Fellow,
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12.2002 – 11.2007 Post-Doc
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Objectives

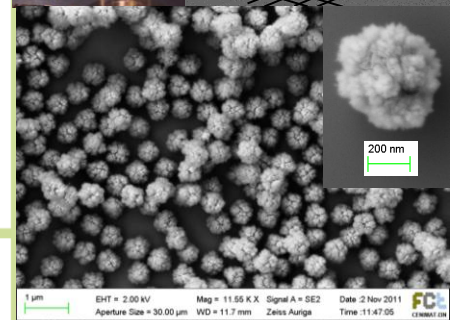
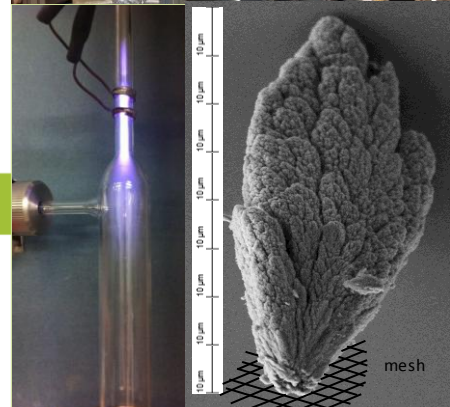
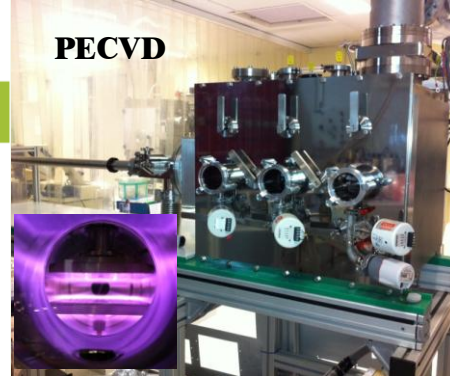
- Optimization of process parameters for fabrication of cost-efficient photovoltaic devices with improved efficiency and stability;
- Development of new photosensitive materials based on silicon nanostructures, such as nanocrystalline thin films, nanocrystals, quantum dot superlattices, etc.;
- Study hybrid materials, such as blends of silicon nanocrystals with conductive polymers (e.g. P3HT), and evaluate its application for printing technology;
- Fabrication of solar cells exploiting new concepts, materials and technologies. Investigate influence of interfaces in the solar cell structure on its performance.

Methodology

- Deposition of device-grade silicon thin films by standard techniques, such as RF-PECVD, using non-conventional deposition conditions, such as high pressure, high power, low substrate temperature.
- Use non-conventional substrates for fabrication of solar cells, such as wall ceramic tiles, plastics, paper, textiles, etc.
- Comprehensive characterization of produced thin films and devices.
- Synergy of conventional deposition techniques for fabrication of new types of photosensitive materials, such as quantum dot superlattices, organic/inorganic blends.

Expected Results

- Fine tuning of optical and electronic properties of new photosensitive materials as a result of optimized fabrication processes.
- Development of future generation photovoltaic devices with enhanced light harvesting and conversion.
- Establishment of new collaborations between FCT/UNL departments, e.g. DCM, DF, DQ, etc. and submission of common projects.



Funding:



1 µm EHT = 2.00 kV Mag = 11.55 K.X Signal A = SE2 Date : 2 Nov 2011 FCT
Aperture Size = 30.00 µm WD = 11.7 mm Zeiss Auriga Time : 11:47:05