

		<a href="mailto:sylvie.schammchardon@cemes.fr">sylvie.schammchardon@cemes.fr</a> tel : +33 (0) 562257877 fax : +33 (0) 562257999	Toulouse
---	---	--	----------

## POST-DOCTORAL POSITION FOR THE STUDY OF NANODEVICES USING TEM-EELS

- within the nMat group at CEMES-CNRS, Toulouse, France
- for a period of 12 months (possibility of renewal for a second year)
- starting now and at latest september, 2010
- position financed by the NanoSci-ERA project "NANOBLOCK"  
(NANOdevice fabrication using BLOCK-copolymer based technology)
- salary: 2100 € per month

The objective of the NANOBLOCK project is the growth and manipulation of semiconducting (silicon and metallic gold) nano-objects (nanodots, nanowires) in/on an oxide matrix in order to fabricate devices in which the different fabric elements will be interfaced to create a new generation of nano-transistors, nano-memories and nano-emitters. The placement of these nano-objects will be controlled by templated-self-assembly, i.e. the combination of conventional lithography and self assembled block copolymers (BC). By combining "bottom up" self assembled BC thin films with "top-down" patterned templates it is possible to precisely control the positioning of nanodot and nanowire arrays and even of single nanodot or nanowire in a well defined location. This will provide a unique opportunity to study the interfacing of these nano-objects and to achieve their electrical and optical coupling both at nanoscale level (individual behavior) and on large assembly of nano-components (macroscopic behavior).

The equipments and skills in transmission electron microscopy of the nanoMaterials (nMat) group at CEMES will be exploited within this project. This group is actively developing "quantitative" TEM so that size-distributions, densities and volume fraction of the precipitate material can routinely be measured with high accuracy using transmission electron microscopy coupled to electron energy-loss spectroscopy. Particularly, imaging using energy filtered TEM (EFTEM) and local analysis using STEM-EELS acquisition modes will be implemented in this work. The "TECNAI" FEI microscope is the highest-level microscope installed at CEMES. It is a TEM-FEG fitted with a Cs corrector allowing to obtained images free of delocalization effects with a point resolution of 0.12 nm. Moreover, the microscope is also fitted with an energy-filter "TRIDIEM". Specimen preparation for the TEM from real devices can be performed by Focused Ion Beam (FIB) CrossBeam system, a ZEISS XB1455 machine, which can deliver a minimum focused ion spot of 10 nm in diameter.

Within this framework, the candidate will support the French contribution to the project that involves Italian and Spanish collaborators. He or she will be in charge of the physico-chemical investigation of the nano-devices using TEM-EELS techniques. For the follow-up of the French participation to the project, he or she will also participate to the coordination of ion implantation experiments with an engineer already on place, ion implantation being one of the nano-objects fabrication routes chosen in the Nanoblock project. Proficiency in the use of TEM-EELS and TEM sample preparation is required together with a background in semiconductor physics and materials science. This project would suit a candidate with strong experimental and communication skills (reports, papers and oral presentation of the results).

The post-doctoral position is located at CEMES which is a laboratory of the "National Center for Scientific Research" (CNRS) set in Toulouse and will be developed within the nMat group (<http://www.cemes.fr/nMat>). The applications should include curriculum vitae and give complete information about the applicant's education, experience and publications (copies of the best papers) together with recommendation letters. Applications are being considered now upon mutual agreement (preferably before july 2010).