



Mission report after a visit and a presentation of two seminars at the Master ERASMUS  
MUNDUS Chemical NanoEngineering

The visit happened between December 1<sup>st</sup> and December 7<sup>th</sup> 2019, at the campus Marseille-Etoile St Jerome.

- The first meeting with the students was on December 3, when I gave my first seminar about solar cells. The presentation included an introduction to the definition, structure and functioning of silicon based solar cells. This was followed by a quick review of the research work being done on new generations of solar cells and the trends being surveyed in recent studies. The second part of this seminar was about a new structure of a solar cell being lately developed in my lab (EC2M) in conjunction with the University of Montpellier. Our structure is a DSSC (Dye Sensitized Solar Cell) that is based on the growth of zinc oxide nanowires on spheres of polystyrene, to form an urchin like structure. The techniques being used (Electrochemistry, atomic layer deposition ...) are essential for any chemical engineering process.

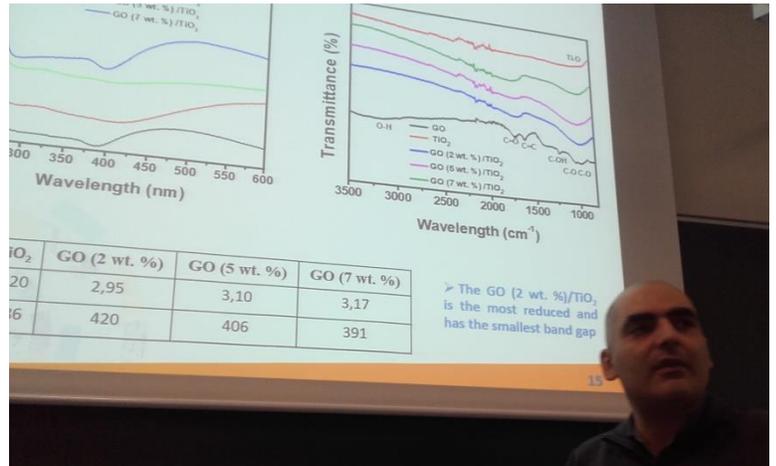
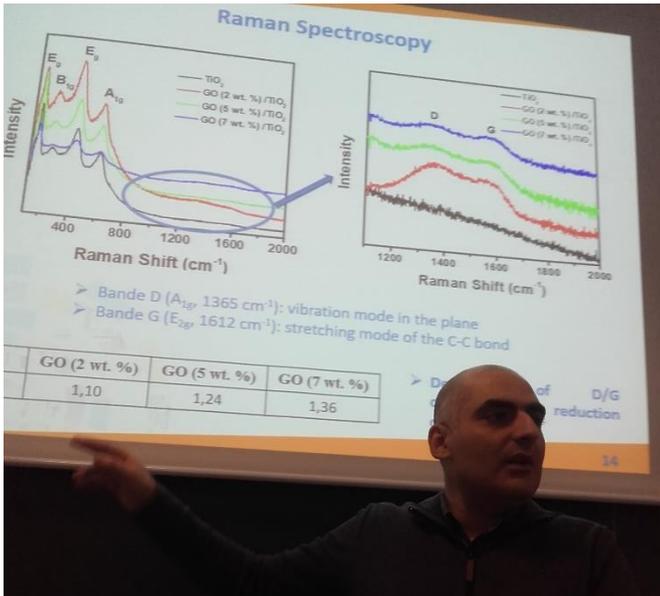
After the seminar, a discussion session was held with the students where they were able to ask questions about all the methods and techniques involved in the technology of solar cells.

- The second seminar was on December 4, when I did a presentation on nanomaterials for photocatalysis. It included an introduction to photocatalysis, followed by recent developments done in our labs on the enhancement of the photocatalytic effects under visible light through band gap engineering. The techniques included the fabrication of nanofibers (by Electrospinning) to obtain several combinations of materials such as: TiO<sub>2</sub> + Graphene oxide, ZnO + Boron nitride, ZnO + Al<sub>2</sub>O<sub>3</sub> along with the addition of silver nanoparticles. Several characterization techniques were also presented and explained, in particular the ones dealing with nanoparticles and nanotubes.

This session was followed by a very fruitful discussion with the students where they were able to discover and ask about a lot of techniques related to nanoengineering.

In summary it was a very interesting visit, the interaction with the students was very stimulating and fascinating. I also had the chance to make a lot of meetings and scientific discussions with the colleagues who are involved in this master program.

Following are some pictures of my visit:



December 8, 2019

Prof. Roland Habchi