

## **Mexican and Dutch researchers help reduce air pollution**

During Spring of 2008, Dr. Inga Tuzovskaya, PhD in physical chemistry and catalysis of the Center of Nanoscience and Nanotechnology, Ensenada, Mexico visited the Department of Catalytic Processes and Materials, University of Twente, MESA+ in the Netherlands supported by the EU NanoforumEULA project.

What have you worked on during your visit?

The topic of the work in general is catalysis by supported gold nanoparticles for oxidation of Carbon monoxide (CO). In particular, the research was devoted to revealing the mechanism of activation and deactivation of active gold sites in the gold catalyst. Therefore, systematic study was made of the change of the electronic gold state during reduction and oxidation treatments by in-situ infrared (IR) spectroscopy of adsorbed CO.

Why is that important for your research and for progress in nanotechnology?

The knowledge about what makes gold nanoparticles active and what deactivates them can be applied for developing active catalysts and for reactivation of wastes. The uniqueness of gold nanoparticles supported on transition metal oxides is the ability to catalyze CO oxidation (the main automotive pollutant) at room temperature and even below zero. It has potential for application as a component in automotive catalysts at the cold start of the vehicle.

Why did you come to this European research centre to do this project?

I wanted to establish collaboration between our centre in Mexico and any European centre of nanotechnology to share the experience because it is the best way to progress in research. And the reason why I've chosen the department of Catalytic Processes and Materials at MESA+ was that this centre has the equipment necessary to do the work I wanted to do.

What are the results? How will you disseminate them?

Besides the experience of living in a nice European city and working with really enthusiastic people I've got interesting scientific results. This work will help to understand more about the main secret of gold catalysis: what the active site is and how to reactivate it in case of deactivation. At the moment I'm preparing a paper for future publication in a scientific journal. Also I am planning a presentation at scientific conferences (VIII International Symposium "Investigacion Quimica en la Frontera", Tijuana, Mexico, November, 2008; "Simposio de Física de Materiales at CCMC-UNAM", Ensenada, Mexico, February 2009 etc).

This is the first contact between our institutes. For the future, we are writing a scientific paper together with Professor Leon Lefferts from CPM, MESA+. And we are planning to realize the exchange of research fellows, graduate students and samples for analysis. Professor Leon Lefferts have offered me to come again for longer time when it is possible.

Do you intend to apply for funding in the EU 7<sup>th</sup> Framework Programme for RTD?  
I've heard about this program for the first time. I will check the basis for a possible participation.

How may your project in the long term benefit the development of your country or Latin America in general?

Mexico-City is one of the most polluted cities of the world. Urgent actions are needed to lower down the levels of main air pollutants like CO, NO<sub>x</sub> and hydrocarbons, mainly coming from the internal combustion in automobiles. The amount of CO emitted into the atmosphere is the greatest among all of the air pollutants and actually exceeds the sum of all other air pollutants. Stable catalysts able to control those gasses are needed to minimize the contamination levels. Gold supported catalysts could be a potential partial solution to this problem, especially for the cold start emissions, since these catalysts are able to convert CO at low temperatures, where the traditional Platinum (Pt) or Palladium (Pd) catalysts are not active.

What are your plans for disseminating the results of your visit outside the research community in your country?

As a part of dissemination I've already presented a lecture for a scientific audience and students of a public university in our institution in Mexico. Also I am planning to translate this interview in Spanish and send it as press release to local media of Baja California region in Mexico.

**Identification:**

- Name and disciplinary background of researcher: [Dr. Inga Tuzovskaya, PhD in physical chemistry, catalysis](#);
- Employer organization in Latin America: [Center of Nanoscience and Nanotechnology, Ensenada, Mexico. http://www.cnyn.unam.mx/](#) ;
- Host organization in Europe: [Department of Catalytic Processes and Materials, University of Twente, MESA+, Holland. http://cpm.tnw.utwente.nl/](#)

**About NANOFORUMEULA**

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Check our website for updates: [www.nanoforumeula.eu](http://www.nanoforumeula.eu)  
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