

Ink with nanotubes conducts electricity

Prof. Dr. Yadira Vega-Cantú works at the Advanced Materials Department in the Laboratory for Nanoscience and Nanotechnology Research (LINAN), IPICYT, San Luis Potosi, Mexico. She visited the MINATEC research centre of the Centre for Atomic Energy in Grenoble, France earlier this year.

What have you worked on during your visit?

Formulation and testing of nanocomposite based conductive inks for ink-jet printing deposition.

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

One of my main research interests is the preparation of nanocomposite materials by functionalizing carbon nanotubes. Recently our group was able to produce polyaniline-carbon nanotube materials by functionalizing multiwalled carbon nanotube (MWNTs) and by chemical reactions over the walls of nitrogen-doped MWNTs. The obtained materials are powdery; therefore it could be complicated to measure the electrical properties. If we can deposit films of these samples by ink-jet printing, taking advantage of their dispersibility in aqueous or alcoholic solutions, this would facilitate conductivity measurements. At the same time, evaluation of conductivity and other properties could indicate whether or not there is an efficient chemical interaction between carbon nanotubes and the polymer matrix. Testing the ink-jet printing of these composites could also be used to evaluate their applications in printable circuits.

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

I wanted to benefit from the large expertise of researchers at Minatec and CEA-Grenoble in the fabrication of electronic devices, and the opportunity to use the ink-jet printing equipment in this centre and to learn their insights on conductive inks.

What are the results? How will you disseminate them?

There was not enough time to do all the experiments originally planned. Nevertheless, we have made advances on formulation of nanocomposites. Our advances were based on results from the work at CEA that dispersion for printing was not very effective with the formulations tested. We also found some interesting changes in morphology of the nanocomposite due to processing for dispersion as inks. The full characterization is still in progress, and will be used in a scientific paper and in presentation in scientific meetings.

Is this the first contact between both organizations or is your visit part of existing collaboration?

I think there was a previous individual contact between researchers, but my visit was actually the first formal collaboration between both organizations.

What are the plans for future collaboration?

We started working on a proposal that unfortunately we were not able to complete with my hosts at CEA, due to lack of a third partner required in the call for proposals. There are no other formal plans for collaboration at this time, but we are looking for other opportunities within other calls for proposals. I am not sure yet if we will apply for funding in the EU 7th Framework Programme for RTD.

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

It is important that people in emerging economies not only acquire the expertise to manufacture nanotechnology products but that they are also able to develop their own intellectual property in nanotechnology. In that context, this research project will enable our group to achieve greater expertise in nanoelectronics, and will help advance the research in conducting-polymer nanotube composites, already in progress. This knowledge will become part of the classes I teach, and of the thesis projects of my students, giving them a broader picture of nanotechnology.

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

This interview will be posted on our group web page, and the results, once completed will be published in internationally recognized journals and will be presented in international scientific meetings.

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