

Paulo LIMA-O-VIEIRA  
Department of Physics, New University of Lisbon  
Quinta da Torre, 2829-516 Caparica, Portugal  
plimaovieira@fct.unl.pt

---

REFERENCE: Short Term Scientific Mission, COST P9  
Beneficiary: Paulo LIMA-O-VIEIRA, New University of Lisbon  
Host: Prof. Dr. Eugen Illenberger, Free University Berlin, Berlin, Germany  
Period: from 31/01/2005 to 05/02/2005 Place: Berlin - Germany  
Reference code: COST-STSM-P9-00206

## SCIENTIFIC REPORT

### *PURPOSE OF VISIT*

Since most of the biomolecules are presented in solution or on a surface cell environment, it is important to characterize their behavior as a function of the medium. This visit to Berlin aims to study molecular species adsorbed on a Au(111) surface and on sub-monolayers of water and rare gases. The study the electronic state spectroscopy of several biomolecules in order to understand the structural and chemical modification of these systems during electron irradiation is extremely important. This may, in turn, provide information about the molecular pathways that lead from initial deposition of radiative energy to the formation of irreversible biomaterial damage.

The purpose of the visit was to carry on with the previous measurements on the condensed phase and to establish a new joint collaboration research work on a charge transfer experiment that I am setting up in my home laboratory in Lisbon, Portugal.

### *DESCRIPTION OF THE WORK CARRIED OUT DURING THE VISIT*

During my visit to Prof. Eugen Illenberger's laboratory, and following previous joint collaborations with his group, the experiments performed at the Free University in Berlin, using the condensed phase machine with a mass spectrometer to monitor anionic fragments formed by low energy electron impact were obtained. Those joint experiments on electron stimulated desorption (together with the PhD student Tibor Sedlacko) were focus mainly on trifluoro acetic acid.

### DESCRIPTION OF THE MAIN RESULTS OBTAINED

- Negative ion desorption signal of F<sup>-</sup>, OH<sup>-</sup> and O<sup>-</sup>, as a function of irradiation time;
- Evolution of the anionic desorption signal (F<sup>-</sup>) as a function of the thickness of the adsorbed film in an electron energy range from 0 – 20 eV;
- Negative ion desorption yields.

## ***FUTURE COLLABORATION WITH HOST INSTITUTIONS***

Is being planed for the near future the study of other relevent biomolecular targets (both in gas and condensed phases). Moreover, and due to the expertise and consultant nature of Prof. Illenberger to a research grant I have been awarded recently in Portugal to investigate atom-molecule collisional processes, joint collaboration is ongoing with the host institution.

## ***PROJECTED PUBLICATIONS/ARTICLES RESULTING OR TO RESULT FROM THE STSM***

The obtained results are now being worked up at this moment in order to prepare a joint publication to be submitted to a international journal shortly.

Dr. Paulo Limao-Vieira

Lisbon, 15<sup>th</sup> February 2004.

## ***CONFIRMATION BY THE HOST INSTITUTE OF THE SUCCESSFUL EXECUTION OF THE MISSION***

The visit of Dr. Paulo Limao-Vieira was underdone with success and according to the planed activities.

Prof. Dr. Eugen Illenberger

Berlin, 15<sup>th</sup> February 2005.