Single molecule on surfaces: manipulation and study of chemical, electronic and vibrational properties with a low temperature ultra high vacuum scanning tunnelling microscopy

Fact Sheet

Project Information

SMS-STM

Grant agreement ID: 514412

Project closed

Start date
15 April 2005

End date
14 October 2007

Funded under
Human resources and Mobility in the specific programme for research, technological development and demonstration "Structuring the European Research Area" under the Sixth Framework Programme 2002-2006

Total cost
No data

EU contribution
€ 207 562,00

Coordinated by
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
Spain

Objective

This project consists on the study of the interaction of single molecules on surfaces and their manipulation with a Low Temperature Ultra High Vacuum Scanning Tunnelling Microscopy (LT UHV STM). In order to study the interaction between single molecules, t he electronic and vibrational properties of individually selected and targeted molecules will be measured.

The project can be divided into two parts: The first part, carried out during the outgoing phase of the project, will be dedicated to study the interaction of water with different systems. First, the interaction of water with hydrophobic and hydrophylic molecules will be studied in order to understand the wetting of water at the molecular level. After that, the interaction of water molecules with biological molecules such as aminoacids and nucleotides will be studied. The exact atomic positions at the water-adsorbate and water-surface interfaces will be determined by means of electronic and vibrational spectroscopy and arranging a controlled environment by manipulating the molecules with the STM tip.

The second part, carried out in the re-integration phase, will consist on the study of the electronic properties of nano-objects, focusing on single organic molecules that can be used in molecular electronics. The main part of the project will consist on how these are integrated into the electronic devices, i.e. the interface between the molecules and the leads. In order to understand the effect of the leads on the electronic properties of the molecules, a precise analysis is needed at the atomic scale, and LT UHV STM has proved so far to be the only technique capable of relating in-situ atomic structure to electronic properties. The interest of the project covers a large number of fields, such as nanoelectronics , nanocatalysis, biophysics or environmental science.

Fields of science (EuroSciVoc)

natural sciences > biological sciences > biochemistry > **biomolecules**

natural sciences > earth and related environmental sciences > **environmental sciences**

natural sciences > physical sciences > optics > **microscopy**

natural sciences > biological sciences > **biophysics**

natural sciences > physical sciences > optics > **spectroscopy**

Keywords

Instrumental techniques | Single molecule chemistry | molecular biophysics | nanobiotechnology

Programme(s)

FP6-MOBILITY - Human resources and Mobility in the specific programme for research, technological development and demonstration "Structuring the European Research Area" under the Sixth Framework Programme 2002-2006

Topic(s)

MOBILITY-2.2 - Marie Curie Outgoing International Fellowships (OIF)

Call for proposal

FP6-2002-MOBILITY-6
See other projects for this call

Funding Scheme

OIF - Marie Curie actions-Outgoing International Fellowships

Coordinator

CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS

EU contribution

No data

Total cost

No data

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Links

Contact the organisation Website

HORIZON collaboration network

Participants (1)

LAWRENCE BERKELEY NATIONAL LABORATORY

United States

EU contribution

No data

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Links

Contact the organisation Website

HORIZON collaboration network

Total cost

No data

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