Home > ... > FP6 >

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

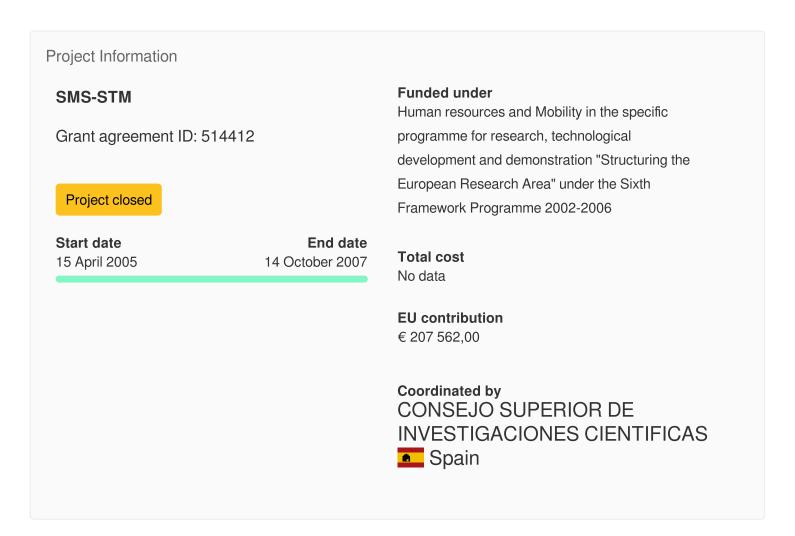


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Single molecule on surfaces: manipulation and study of chemical, electronic and vibrational properties with a low temperature ultra high vacuum scanning tunnelling microscopy

Fact Sheet



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, the 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) 1

<u>natural sciences</u> > <u>biological sciences</u> > <u>biochemistry</u> > <u>biomolecules</u>

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)

<u>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</u>

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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Contact the organisation Website HORIZON collaboration network

Participants (1)



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EU contribution

No data

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Links

Contact the organisation Website Mebsite Mebs

Total cost

No data

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