

Master in

Molecular Nanoscience and Nanotechnology

Dr. Carlos Martí-Gastaldo
Mayo, 2015

VNIVERSITAT
DE VALÈNCIA

UAM
UNIVERSIDAD AUTONOMA
DE MADRID


Universidad de Alicante


Universidad de Valladolid

ULL
Universidad
de La Laguna


UCLM
UNIVERSIDAD DE CASTILLA-LA MANCHA


UNIVERSIDAD
Miguel Hernández

<http://www.icmol.es/master/nano>

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Master in

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de Murcia

The objective of this Master is to prepare students in the Nanoscience and Nanotechnology fields in order to be able to carry out a professional career in this area or a research activity leading to a doctoral thesis. This Master encompasses several disciplines: chemistry, physics, engineering, materials science, biochemistry, pharmacy and medicine.

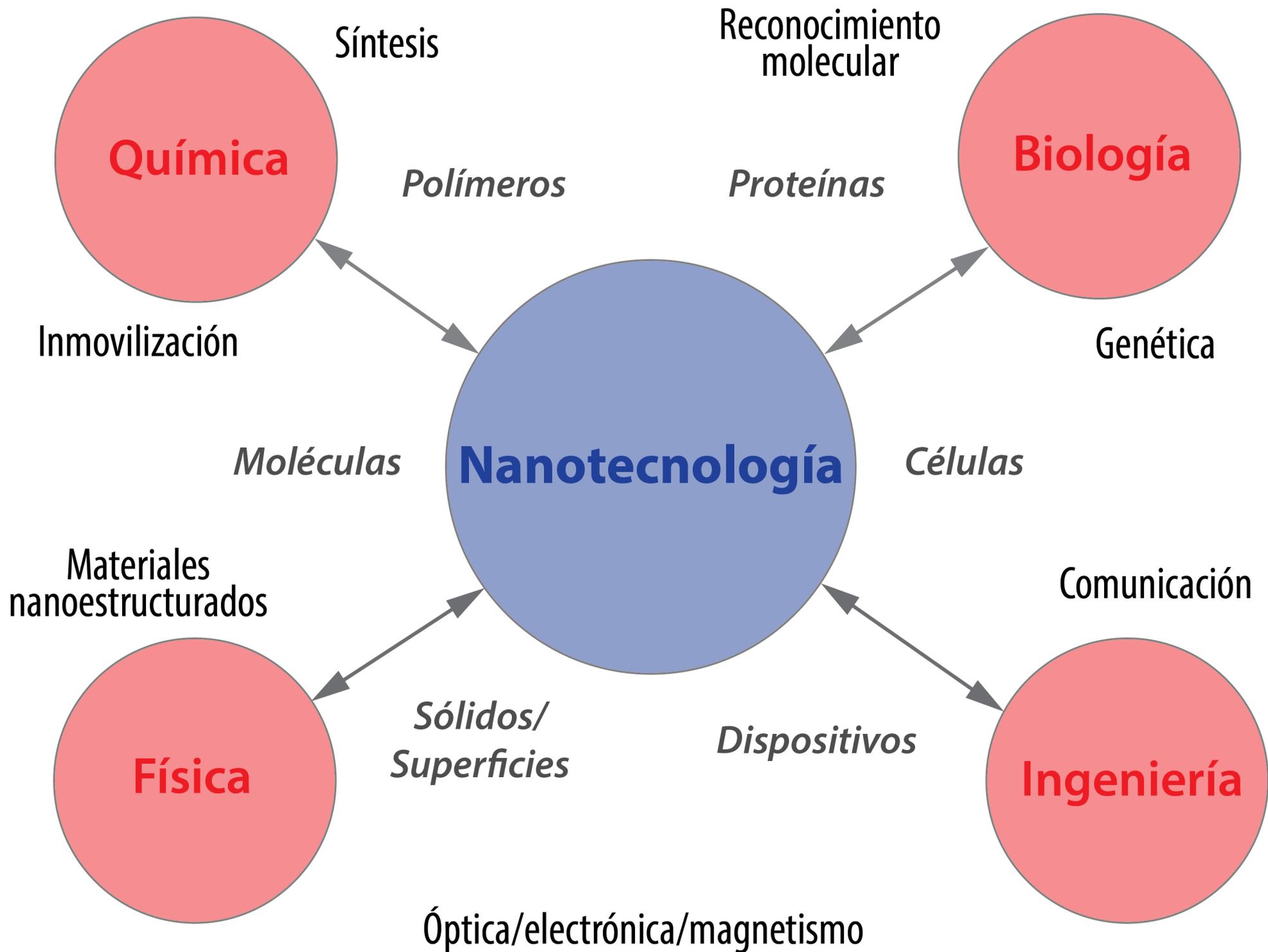
The syllabus of the Master is somewhere in between the Nanoscience/Nanotechnology fields and the molecular systems. Therefore, it explores scientific areas of increasing interest such as Molecular Electronics, Molecular Magnetism, Supramolecular Chemistry, Surfaces Chemistry or Molecular Materials Science.

The interuniversity master has two basic goals:

- a) To lay down a national excellence standard in Molecular Science to empower students to research in this area or for them to gain useful knowledge and skills to be able to develop a career in high technology companies.
- b) To create a multidisciplinary and competitive scientific community in Spain to research in these subjects. In this respect, the master is a suitable framework for the promotion of mobility and interaction between students from different scientific areas and contacts with other universities, research centres and companies operating in this area.

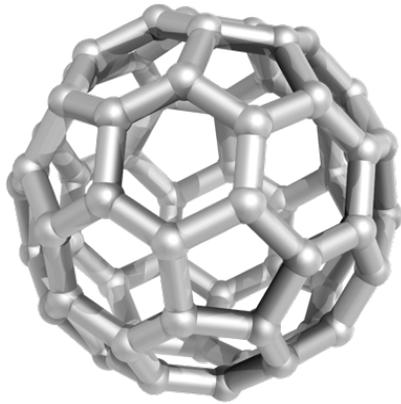
On completion of the course, students will be trained, on a multidisciplinary basis, in chemical aspects related with nanoscience (nanoscience bottom-up approach for the design of functional molecules and supramolecular structures; intermolecular interactions; molecular self-assembly and self-organisation) and in physical ones (nanomanufacturing top-down approach, physical manipulation techniques, organisation and characterisation of nanomaterials).

They will also learn to address scientific problems from the perspective of Materials Science. Lastly, they will have an overview of the impact of nanoscience on other scientific and technological areas such as electronics, chemistry, biomedicine, or materials science.



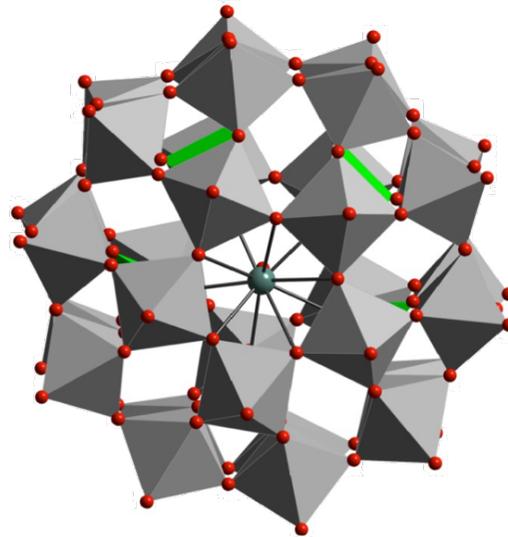
QUÍMICA: Diseño de moléculas

1 nm



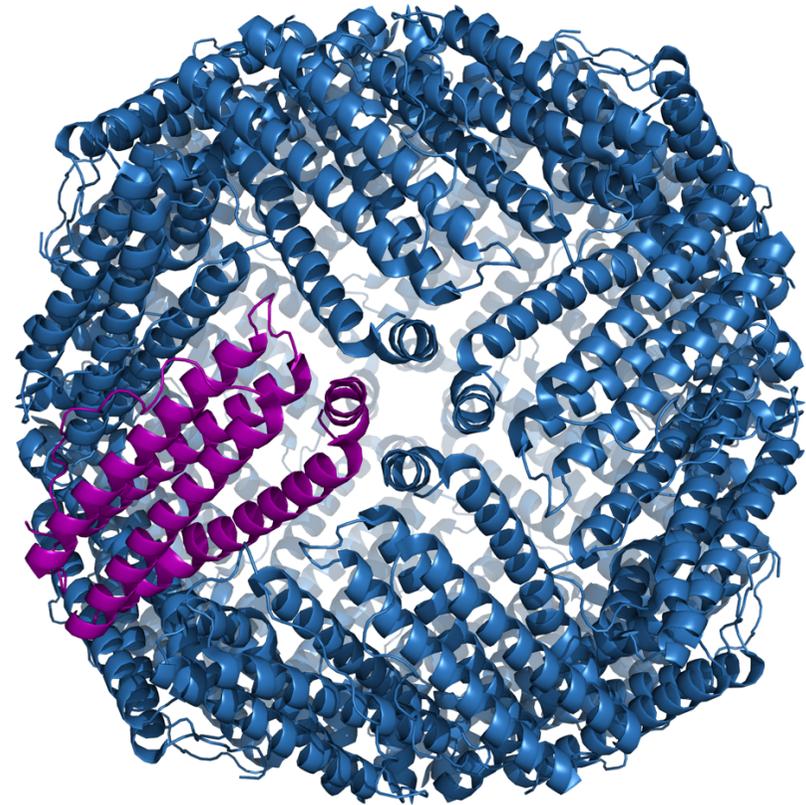
C_{60} Fullerenos
(carbono molecular)

5 nm



Óxidos metálicos
moleculares

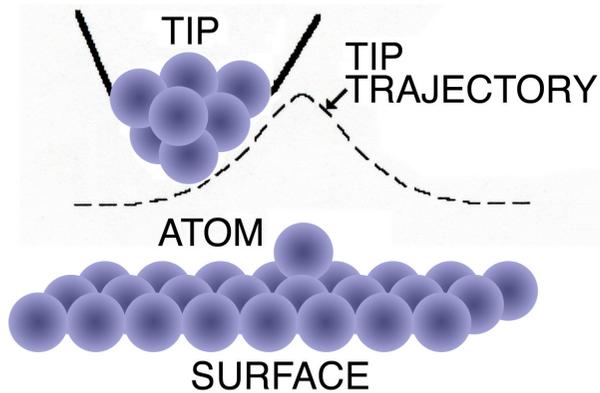
12 nm



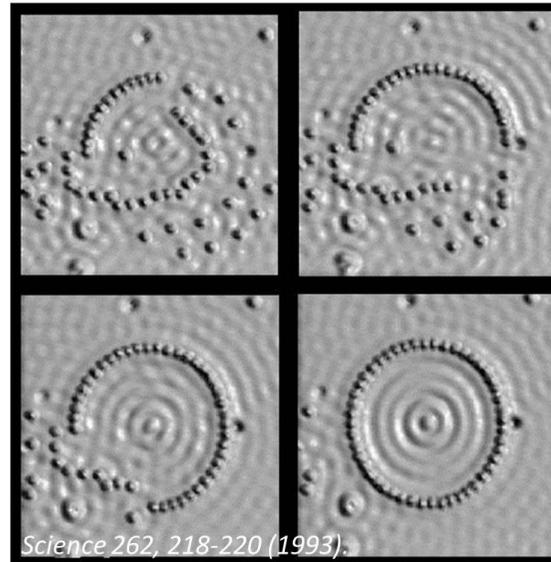
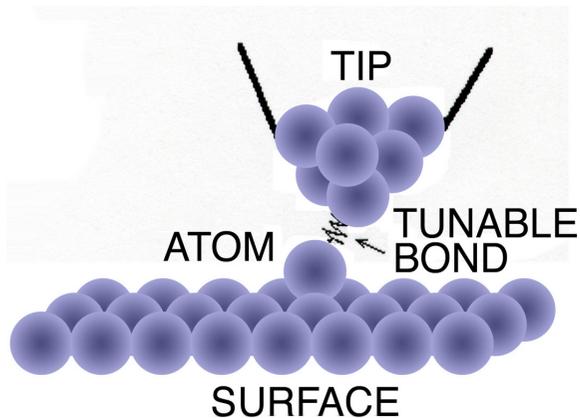
Biomoléculas: Ferritina

FÍSICA: Ver y mover átomos y moléculas

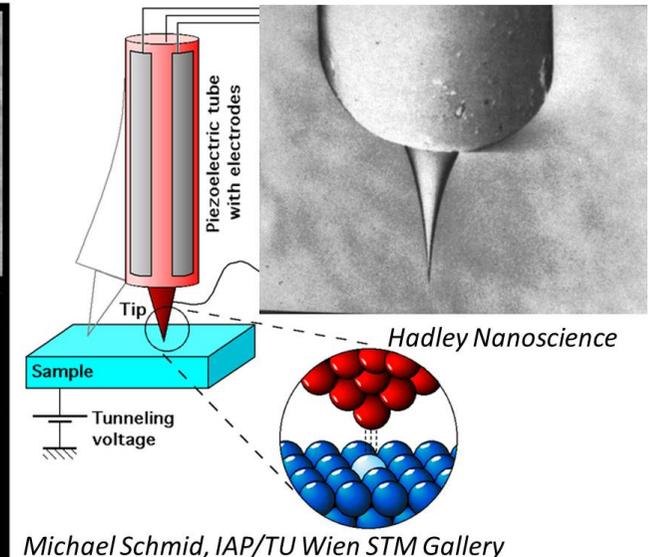
VER



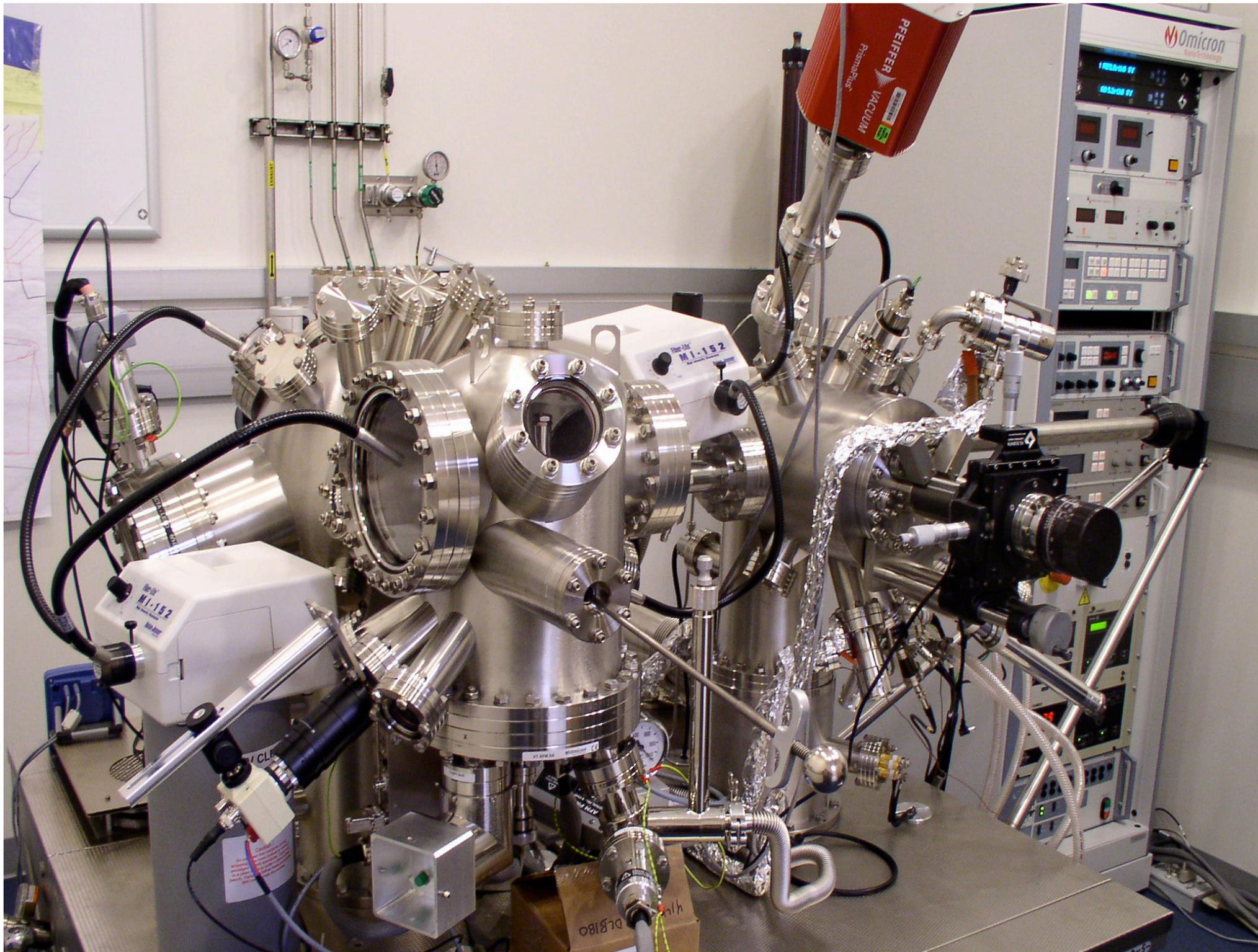
MANIPULAR



Science 262, 218-220 (1993).



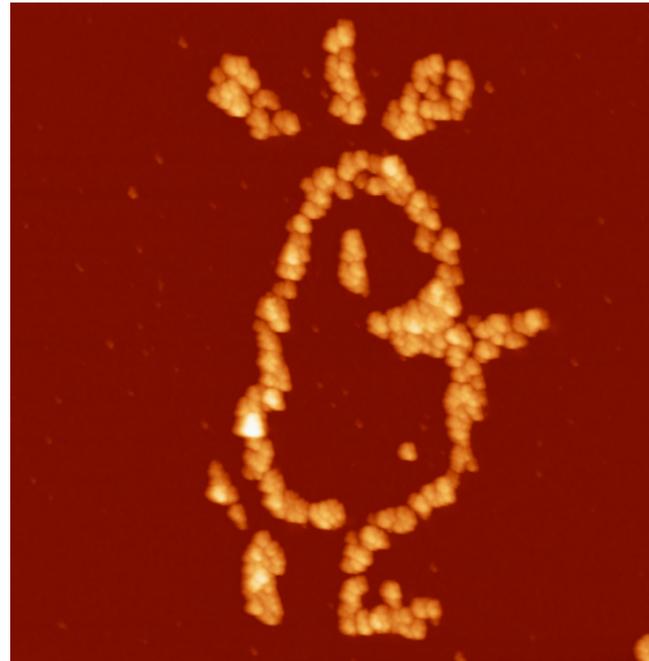
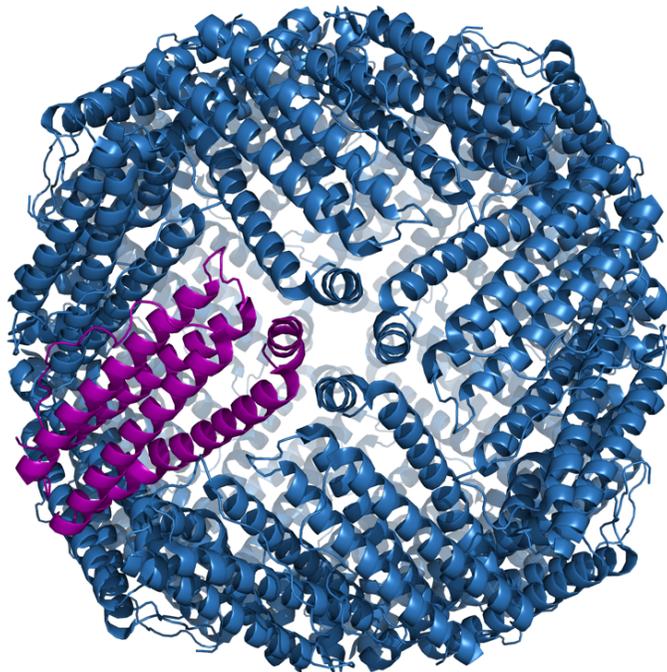
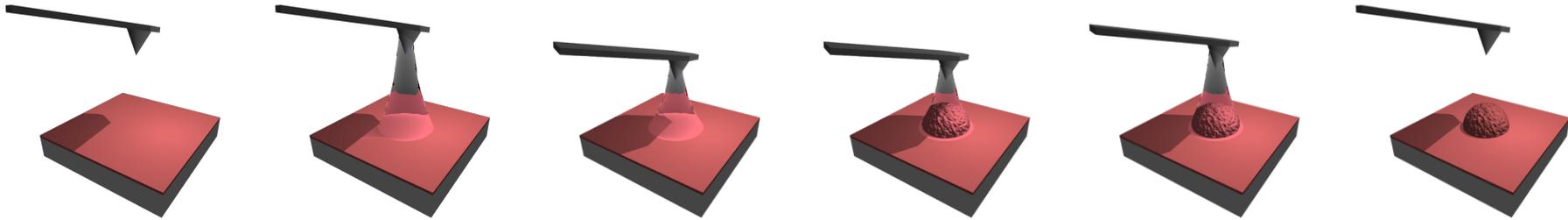
MICROSCOPIO DE EFECTO TUNEL (1990)



FÍSICA: Nanoestructurar moléculas

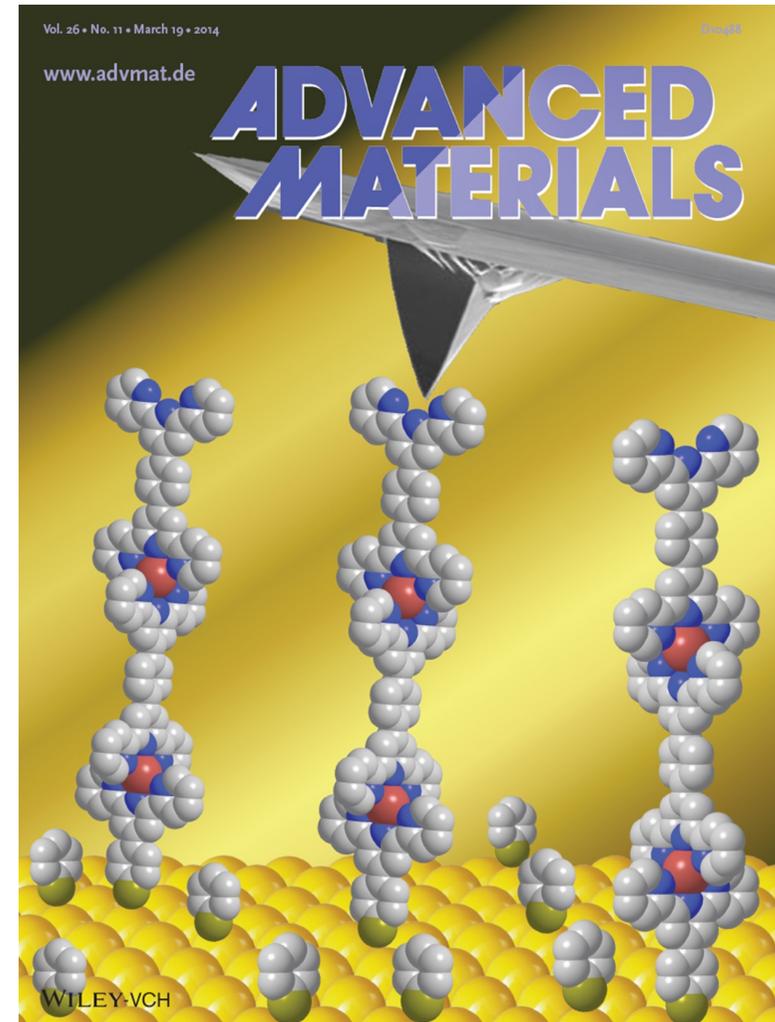
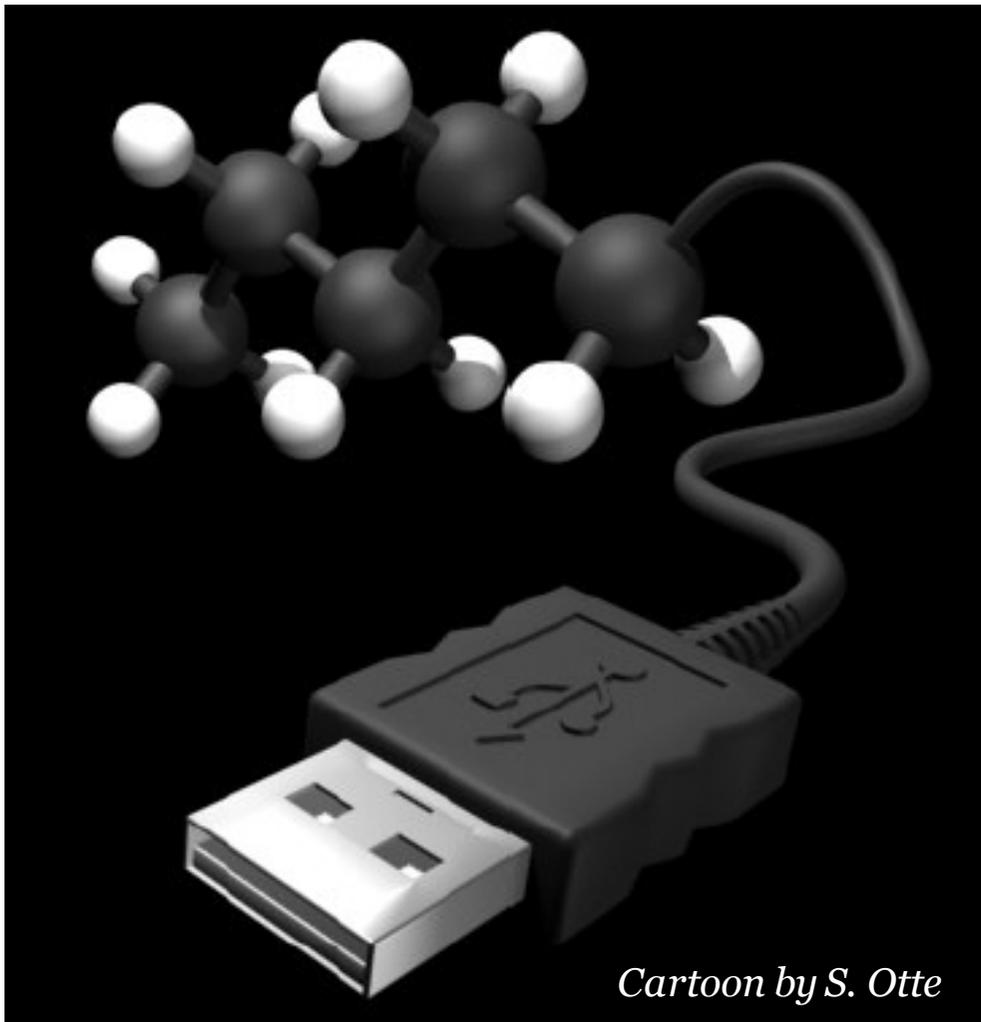
Nanolitografía de oxidación local.

MICROSCOPIA DE FUERZA ATÓMICA

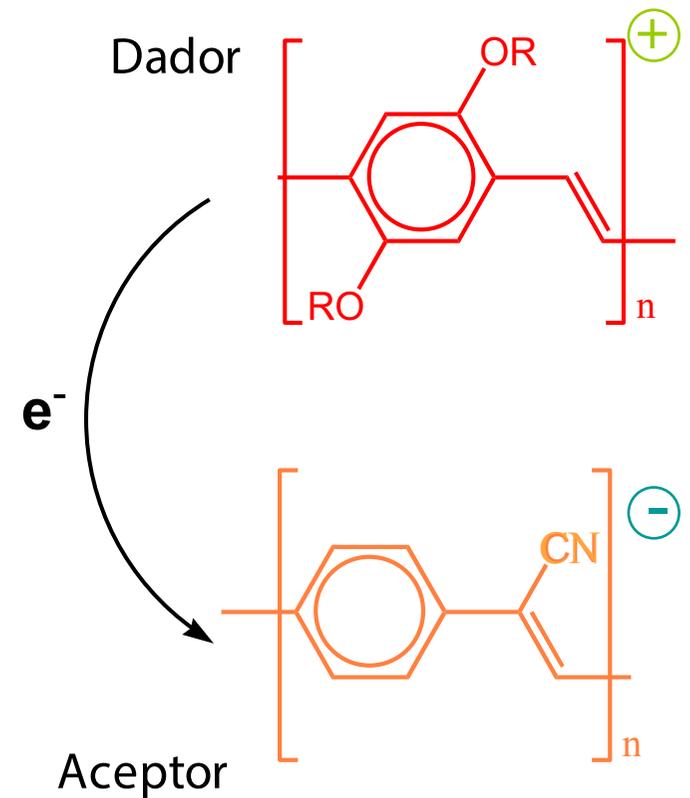
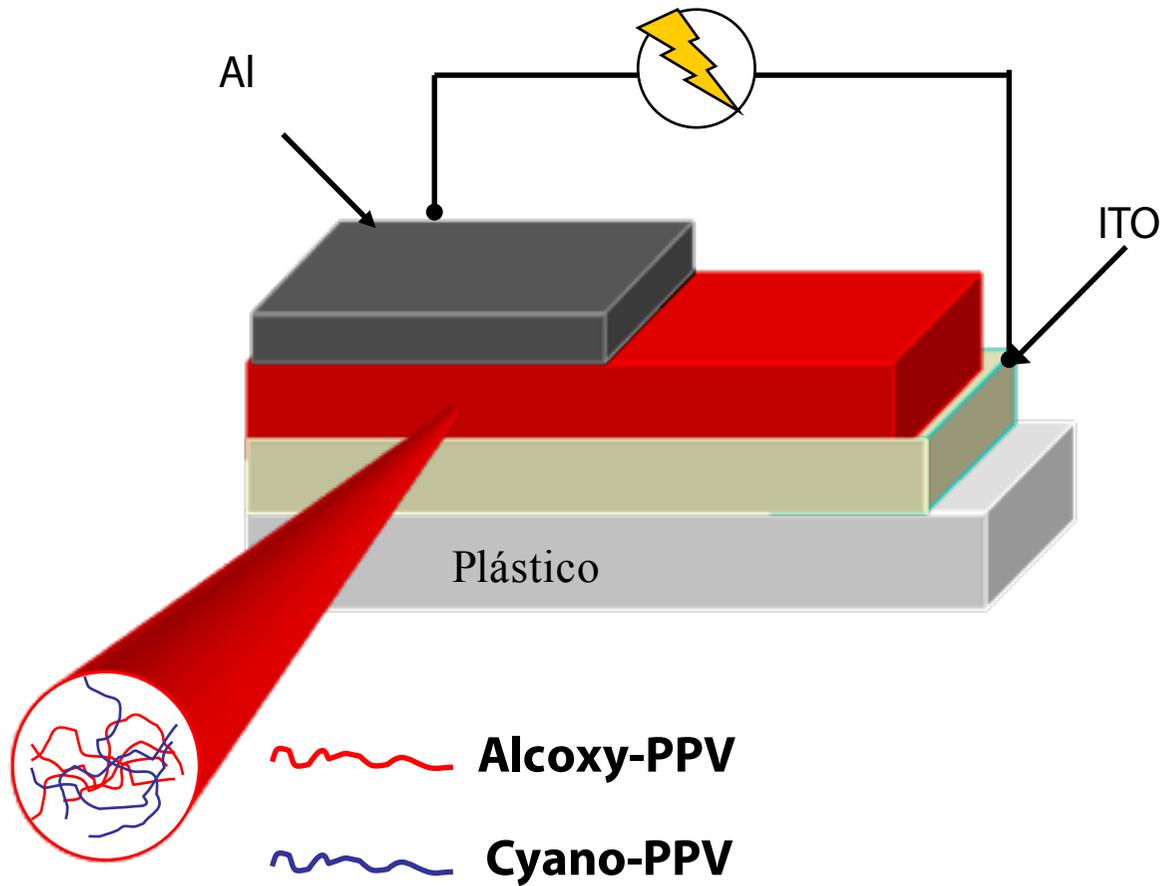
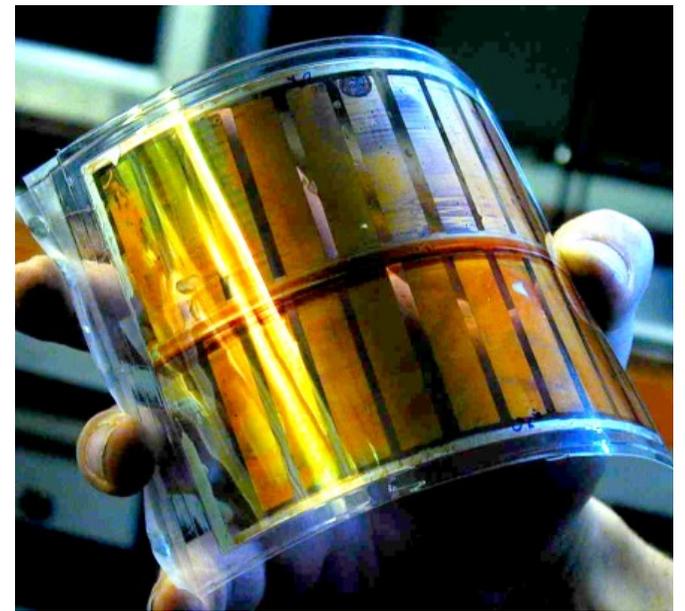


Aplicaciones: Electrónica Molecular

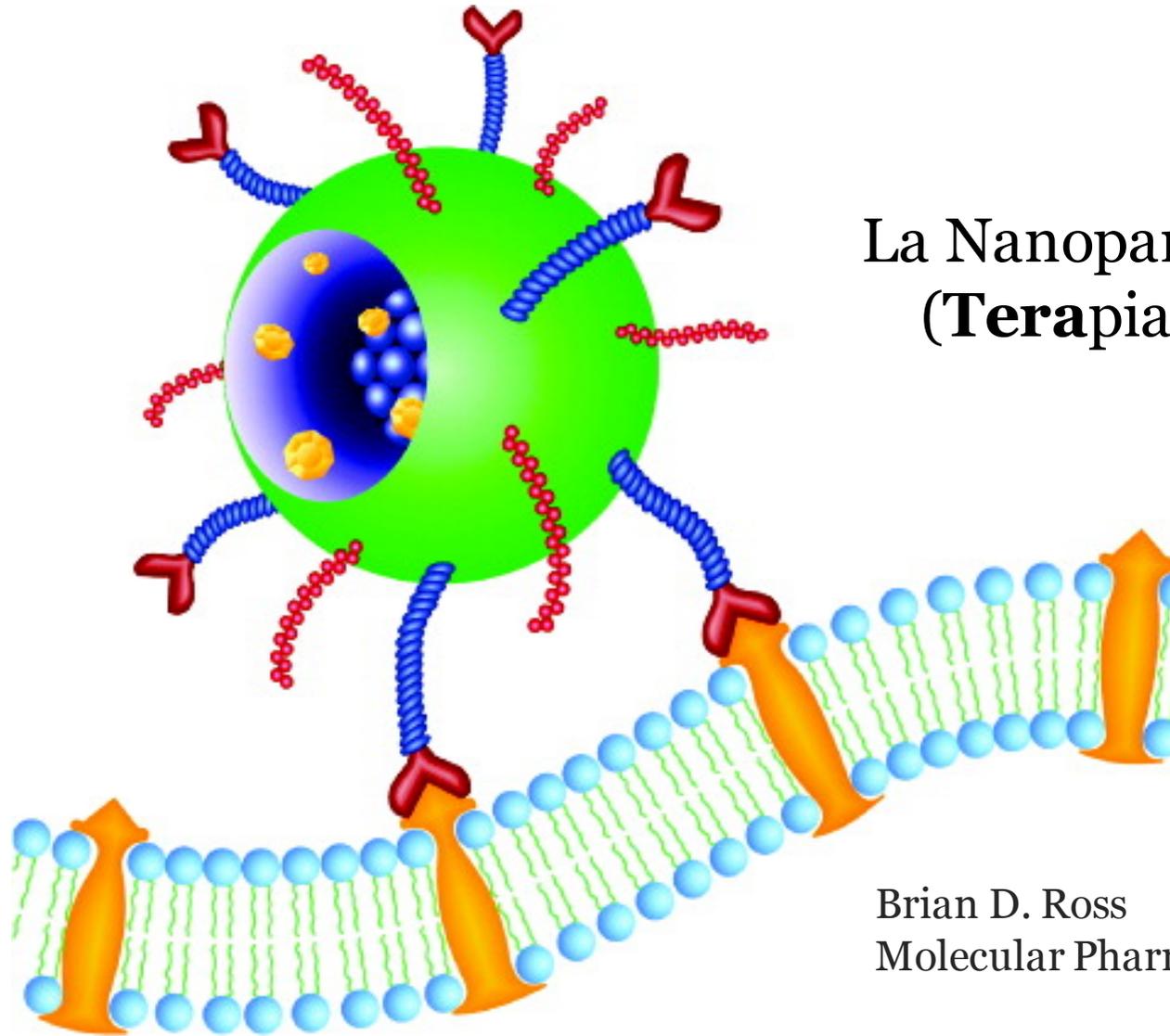
small scale , unique functions



Células solares orgánicas



Aplicaciones: Nanomedicina

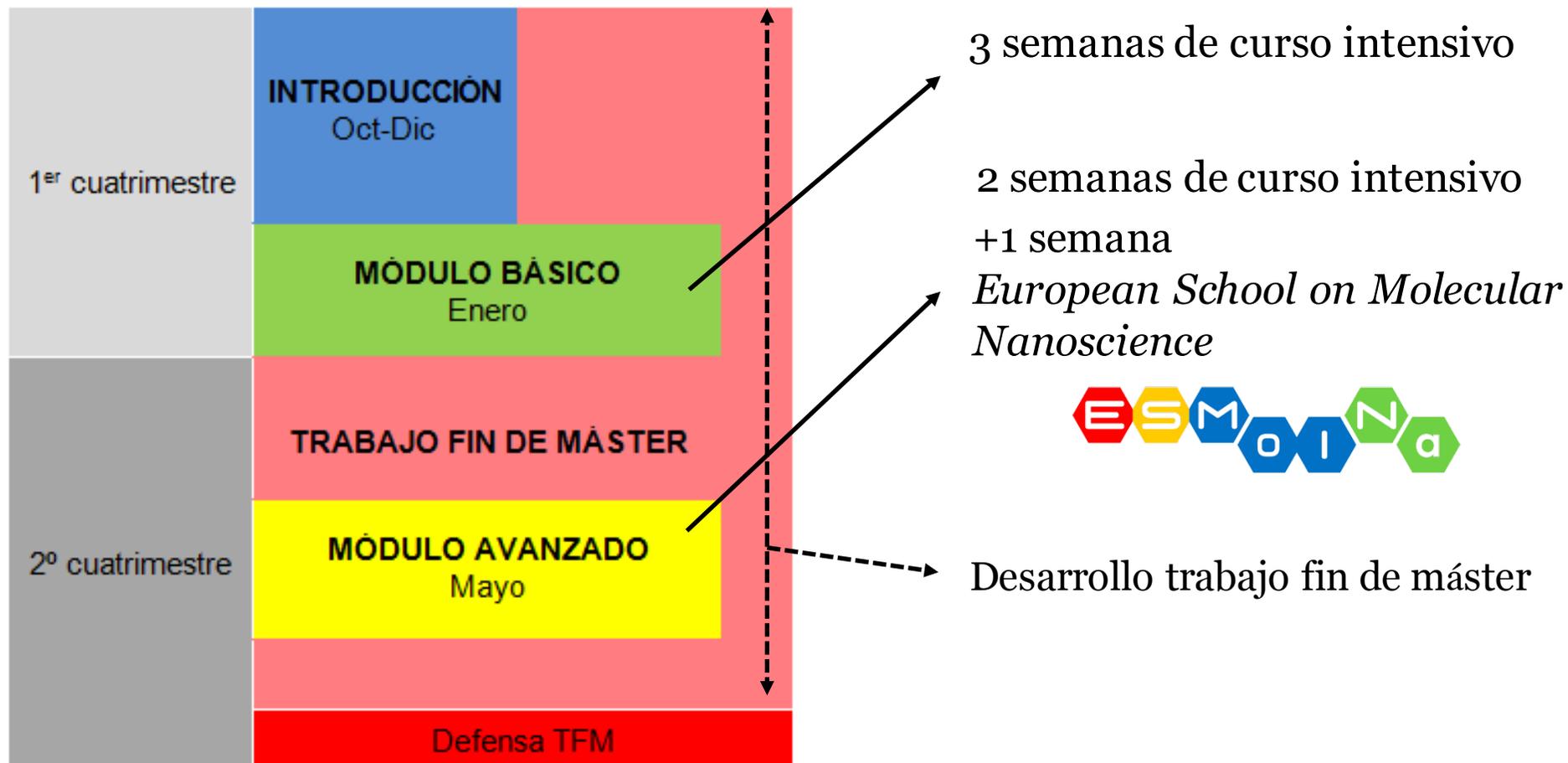


La Nanopartícula Teranóstica
(**Terapia + diagnóstico**)

Brian D. Ross
Molecular Pharmaceutics 2010

Nanopartícula multifuncional anclada a la membrana de una célula cancerígena a través de un ligando que se une específicamente a un receptor específico de la célula tumoral.
La nanopartícula contiene un agente de imagen (esferas azules) y uno terapéutico (estructuras amarillas).

ESTRUCTURA DEL MÁSTER



- En inglés
- Limitado a 60 estudiantes (en total)

ESTRUCTURA DEL MÁSTER

	ASIGNATURAS OBLIGATORIAS	ECTS
	MÓDULO INTRODUCCIÓN	
M1	Introducción al Máster en Nanociencia y Nanotecnología Molecular: Conceptos básicos.	6
	MÓDULO BÁSICO	
M2	Fundamentos de nanociencia	4,5
M3	Técnicas físicas de caracterización	4,5
M4	Técnicas físicas de nanofabricación	3
M5	Conceptos básicos de la química supramolecular	3
M6	Nanomateriales moleculares: métodos de preparación, propiedades y aplicaciones	6
	MÓDULO AVANZADO	
M7	Uso de la química supramolecular para la preparación de nanoestructuras y nanomateriales.	3
M8	Electrónica molecular	4,5
M9	Nanomagnetismo y espintrónica molecular	4,5
M10	Temas actuales de nanociencia y nanotecnología molecular (ESMoINa)	6
	MÓDULO TRABAJO FIN DE MÁSTER	
M11	Trabajo de Fin de Máster	15
		60

•Programa de Postgrado: Máster Interuniversitario en *NANOCIENCIA Y NANOTECNOLOGÍA MOLECULAR*

•Programa de Doctorado en
NANOCIENCIA Y NANOTECNOLOGÍA

CONTACTO:

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