



SUPRAMOLECULAR NANO CHEMISTRY AND MATERIALS (EMERGING GROUP)

Led by Dr. Daniel MasPOCH, the Supramolecular NanoChemistry & Materials Group (NANO^{UP}) aims to control the supramolecular assembly of molecules, biomolecules, metal ions and nanoscale building blocks at the nanometer scale for the design and synthesis of novel functional architectures. The Group uses the supramolecular chemistry as the underlying approach for exploring new materials and applications in diverse areas, including micro- and nanoencapsulation, drug-delivery systems, contrast agents and the development of novel sensors and magnetic platforms.

BACKGROUND

Miniaturisation to the nanometer scale regime is a very prolific strategy for the development of new materials with novel and often enhanced properties compared to traditional materials, opening up avenues for technological applications in many areas, including drug-delivery, catalysis, diagnostics, solar cells, etc. The use of supramolecular chemistry to control the fabrication of these nanoscale materials is a key aspect for the future of Nanoscience & Nanotechnology. The Group's main interest is the development of new synthetic methodologies and using these methods to fabricate complex supramolecular assemblies and bioinspired architectures with unprecedented structures and interesting physical and biological properties.

RESEARCH ACTIVITIES INCLUDE:

Nanoscale Supramolecular Materials

Developing novel synthetic methodologies to fabricate nanoscale supramolecular (mostly hybrid metal-organic) materials with controlled/ designed forms (particles, tubes, rods, fibers, crystals and thin-films), size, composition, and physical and biological properties (including luminescence, porosity, biocompatibility, recognition, magnetism, etc.) for applications in nanomedicine & biotechnology, catalysis, storage, encapsulation and sensing.

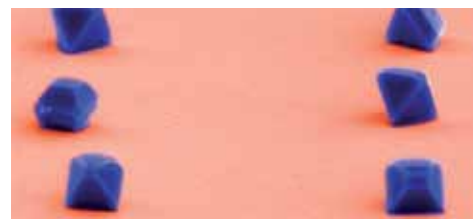
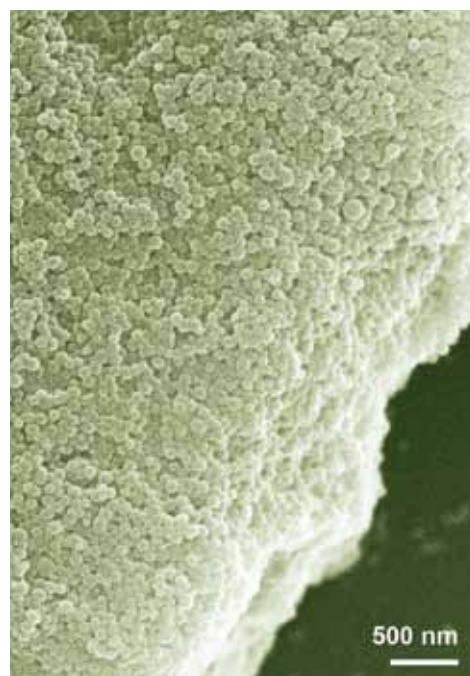
Supramolecular Nanostructures on Surfaces – Nanopatterning

Exploring Dip-Pen Nanolithography and other scanning probe techniques for controlling the integration, position and orientation of supramolecular nanomaterials on surfaces, opening up novel avenues for the fabrication

of complex surface sensors, drug-delivery platforms and catalysts.

Micro- and Nanoencapsulation Technologies for Industry

Offering our expertise in micro- and nanoencapsulation technologies as well as our continuous improvements in those technologies, installations and equipment in order to help private companies and other research institutions to develop novel encapsulation-related products. Our compromise involves helping design new products, developing precise technological processes for their fabrication (including their characterisation, coatings, final formulations, etc.) in our labs, and implementing (scale up) all developed encapsulation technologies for their large-scale fabrication.



DR. DANIEL MASPOCH
GROUP LEADER

Dr. Daniel MasPOCH received his B.Sc. Degree in Chemistry from the University of Girona in 1999 and obtained his Ph.D. at the Institut de Ciència dels Materials de Barcelona (ICMAB-CSIC) in 2004. After his postdoctoral studies in Prof. Chad A. Mirkin's Group at the International Institute for Nanotechnology (IIN) of Northwestern University, USA, he moved to the Catalan Institute of Nanotechnology (ICN) in Barcelona, Spain. He is currently a RyC researcher and head of the Supramolecular NanoChemistry & Materials Group at the ICN. His current fields of interest include nanoscale supramolecular materials, micro- and nanoencapsulation technologies, nanostructuring of soft materials on surfaces and Dip-Pen Nanolithography. Dr. MasPOCH is author of 52 scientific publications and 3 book chapters, holds 4 patents and 5 current contracts with private companies, including the successful knowledge transfer of a recently home-developed technology for immediate application in consumer products.

