

**SEMINAR SERIES****HIGHLIGHTS IN ENERGY RESEARCH****05.12.2019, 16:00 - 17:00, EPFL Valais, 4<sup>th</sup> floor, TSEUZIER room****From porous metal-organic frameworks to metal-organic polyhedra: a journey in miniaturization*****Prof. Daniel MASPOCH****Catalan Institute of Nanoscience and Nanotechnology (ICN2) & ICREA, Barcelona, Spain*Host : Prof. Wendy Queen

Metal-organic frameworks (MOFs) are among the most attractive porous materials today. Their miniaturization to the nanoscale, to yield *nanoMOFs*, is expected to expand their scope to myriad applications, from drug-delivery to membranes, open up novel avenues to more traditional storage and catalysis applications, and enable creation of sophisticated ordered superstructures. In this talk, I will explain our last advances in miniaturizing MOFs at the nanoscale for the synthesis of colloidal MOF particles with controlled sizes, shapes and compositions and their combination with other materials (e.g. inorganic nanoparticles and polymers) to make composites. Moreover, I will show how this miniaturization has allowed the creation of MOF-based three-dimensional photonic crystals, programmable self-assembling 3D architectures and CO<sub>2</sub> sensors, among other applications. Finally, I will show the ultimate miniaturization of MOFs at the nanoscale: the formation of metal-organic polyhedra (MOPs); a new class of porous “molecular nanoparticles”.



**Bio :** Dr. Daniel Maspoch is an ICREA Research Professor and Leader of the Supramolecular NanoChemistry & Materials Group at ICN2. He is a chemist who has always maintained a rewarding balance between fundamental and applied research, with pioneering developments in the field of porous metal/covalent-organic frameworks and delivery systems. He is author of over 140 manuscripts and 6 book chapters. In addition, in 2014 he got a prestigious ERC Consolidator Grant and, in 2019, a ERC-POC. In 2015, he was awarded the Premio Marcial Moreno Mañas Lectureship. From the technology transfer side, several technologies and materials developed by his group have been transferred –through licensing patents or signing technology transfer contracts– to various companies. More specifically, Daniel has signed more than 17 research contracts with private companies and has filed 10 patents, from which 4 have been licensed. Moreover, he has been able to signed 4 technology transfer contracts. Interestingly, these technologies have given rise to families of products that are now on the market, as for example LuctaCaps® and Fungipol@CP. He is also co-founder of the spin-off company Ahead Therapeutics. Dr. Maspoch graduated in Chemistry at the Universitat de Girona and obtained his PhD in Materials Science at the Universitat Autònoma de Barcelona & Institut de Ciència de Materials de Barcelona. He then moved to Northwestern University, where he worked as a postdoctoral fellow in the group of Prof. Chad A. Mirkin. Since September 2011 he is ICREA Research Professor and Group Leader at the Institut Català de Nanociència i Nanotecnologia (ICN2).