

**ICB PhD public presentations****MICROFLUIDIC SYNTHESIS AND  
CHARACTERIZATION OF SINGLE-  
ATOM CATALYSTS****Thomas Moragues**

ICB / deMello group and Advanced Catalysis  
Engineering group

Supervisor: Prof. Dr. Andrew deMello

Co-examiners: Prof. Dr. Javier Pérez-Ramírez,  
Prof. Dr. Milad Abolhasani and Dr. Sharon Mitchell



**28/11/2024, 1:15 pm**

**ETH Hönggerberg, HCI D2 and on Zoom**

(<https://ethz.zoom.us/j/66599746225>)

**Project Summary:** Single-atom heterogeneous catalysts (SACs) have emerged as promising sustainable alternatives to organometallic complexes currently ubiquitous in organic transformations. Yet, limited understanding of the parameters that govern their synthesis, and a lack of liquid-phase characterization approaches that permit investigation of their behavior under operational conditions, impedes their design and broader utilization. Droplet-based microfluidic systems generate, manipulate and process sub-microliter droplets enclosed within an immiscible carrier fluid. Such a technology set provides an ideal environment for performing both assays and reactions and displays clear advantages over classical batch approaches, including enhanced heat and mass transport, facile payload control, high-throughput operation and ease of integration with in-line analytical tools. This presentation will demonstrate how these unique capabilities can be leveraged to enable both (i) systematic synthesis and (ii) in-situ characterization of SACs in liquid-phase catalytic reactions via X-ray absorption and electron paramagnetic resonance spectroscopy.

**CV.** Thomas earned a chemical technician degree from IUT Montpellier, France before joining the École Nationale Supérieure de Chimie de Paris (PSL University). There, he completed dual MSc degrees in Chemical Sciences and Engineering and Microfluidics in 2020. That same year, he started his doctoral studies in the group Prof. Andrew deMello, exploring microfluidic technologies for heterogeneous catalysis in collaboration with the Advanced Catalysis Engineering group led by Prof. Javier Pérez-Ramírez.